



D5.3 Final evaluation report with case studies of EDU-ARCTIC

Project Acronym: EDU-ARCTIC

Project Title:

“Edu-Arctic – Innovative educational program attracting young people to natural sciences and polar research”

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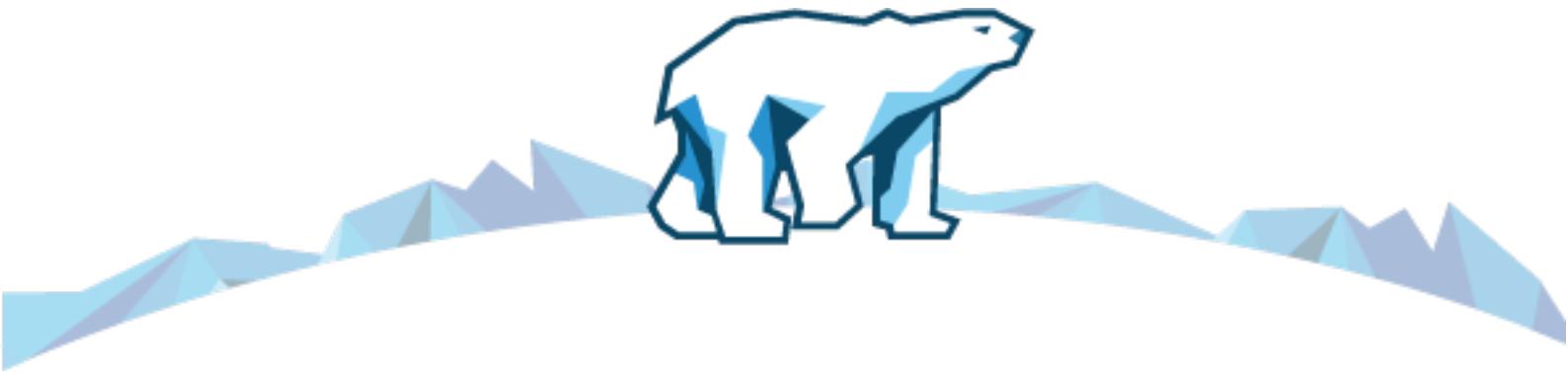
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Executive summary

This document concerns deliverable D.5.3 Final evaluation report with case studies of EDU-ARCTIC that is part of WP5 Evaluation and impact.

The document fulfills several basic goals:

- measurement of enhancement of knowledge about science and scientific research
- measurement of enhancement of knowledge about nature, geography, natural resources, history, social and political specificities, increase of sensitivity to environmental issues and climate change
- measurement of differences of impact on boys and girls of the EDU-ARTIC project
- measurement of pupils' interest in STEM after taking part in the EDU-ARCTIC project

The target audiences of this document are:

- Consortium members
- REA/European Commission (EC)
- Other interested parties

1. Introduction

This report contains the mid-term evaluation report – “During EDU-ARCTIC” survey and end-report “After EDU-ARCTIC survey” as mentioned in the Grant Agreement, WP 5, Task 5.3. The Main survey was created as step (3) of the project evaluation - in order to monitor the process and see the reaction of pupils while taking part in the educational program and on the end of the project - as mentioned in the deliverables D 5.1 Evaluation plan including KPIs, page 4 and 12.

The online lessons, Educators' Fora and Arctic Competitions have been or are evaluated by separate surveys that are presented in separate reports and are briefly summarized here as follows:

Evaluation of online lessons

The online lessons are foreseen till the end of the current school-year. Their evaluation is on-going: the surveys are sent to participants after each lesson. Therefore, the results of online



lessons' evaluation will be presented in the deliverable D4.3. Arctic transmissions, due in the month 39 (July 2019).

Evaluation of Educators' Fora

The 3 Educators Fora, which took place in 2017 in 3 regions, were evaluated by participants just after its closure. The results of evaluation were presented in the deliverable D4.6 in month 18.

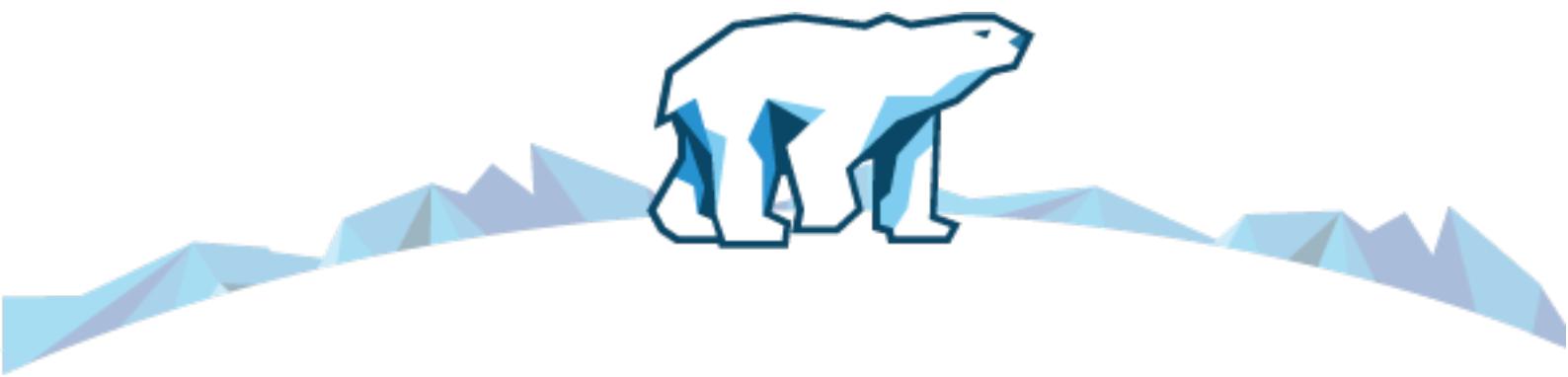
Evaluation of Arctic Competitions

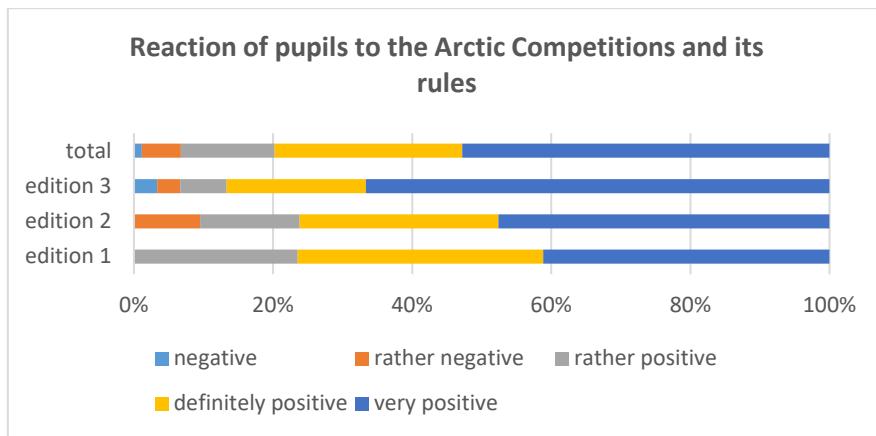
The 3 editions of the Arctic Competitions were evaluated by their participants after the first stage of each edition.

Within the project assessment of impact of participation in the EDU-ARCTIC Competition on students' interest in STEM and knowledge about the Arctic was implemented. After each first stage of three editions of the Arctic Competition all teachers, who participated in the contest, were invited to fill in the survey, however it was not obligatory. The survey consisted of 5 content question and one field for suggestions and recommendations.

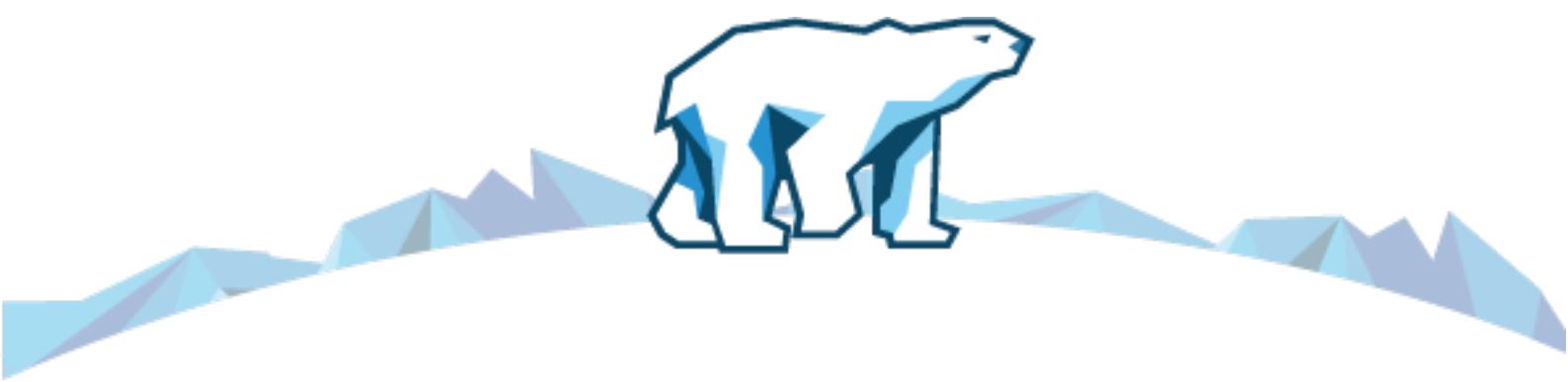
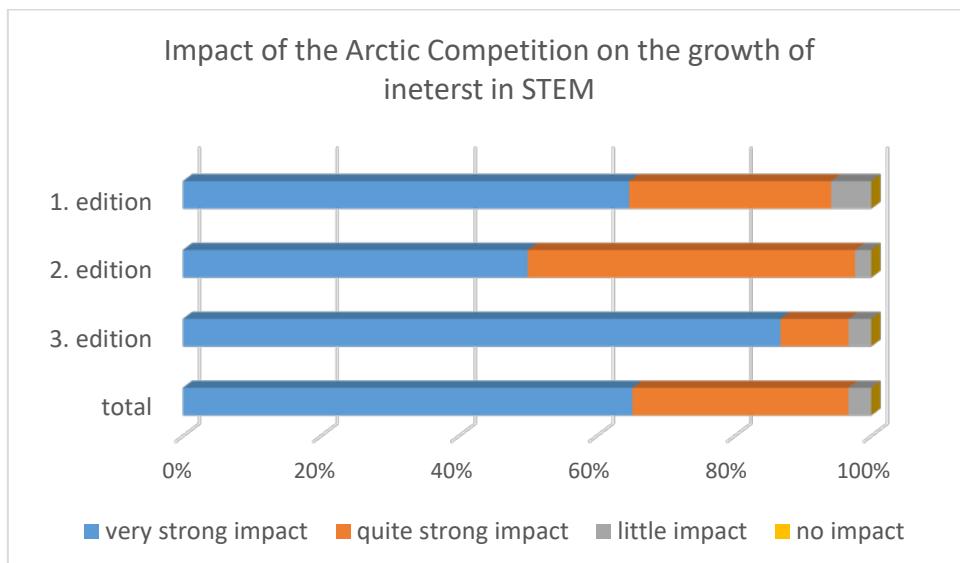
Questions concerned 1) understandability of the rules, 2) assessment of the substantive level and given requirements, 3) reaction of pupils, 4) impact of competitions on the growth of interest in STEM, and 5) impact on the level of knowledge about the Arctic.

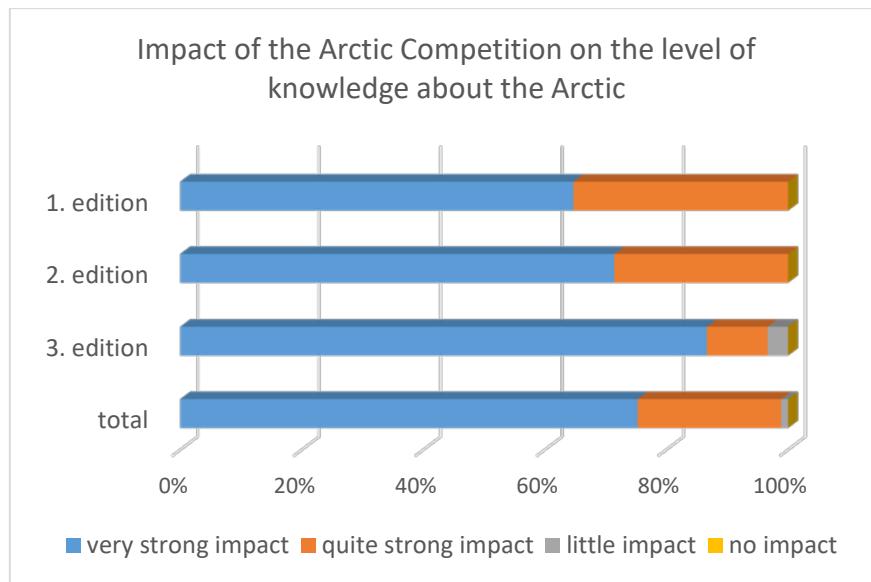
Teachers were requested to assess the reaction of their pupils to the Arctic competition and its rules. They were assessing in a 6-grade scale from very negative (1) to very positive (6) emotions. 17 answers were obtained in the first, 42 in the second, and 30 in the third edition. The results of these surveys are presented in the Fig. 1.





97% of teachers considered that the Arctic competition has a positive effect on the growth of interest in STEM among their pupils (16 out of 17 answers in the first edition, 41 out of 42 answers in the second edition and 29 out of 30 answers in the third edition), with respectively 11, 21 and 26 declarations of very strong effect. The results of this part of the survey are shown in Fig. 2, whereas the Fig. 3 presents the results concerning impact on pupils' knowledge about the Arctic. 99% of teachers thought that the Arctic Competition positively affected the level of knowledge about the Arctic among their pupils (75% considered it as a very strong impact).





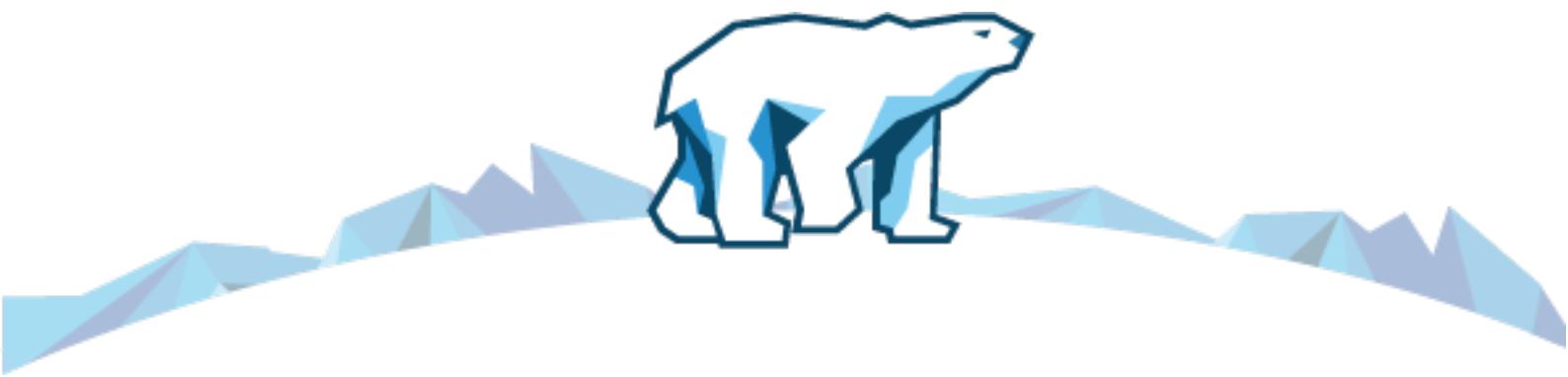
2. Methodology – premises the evaluation is based on (as elaborated in D 5.1 Evaluation plan including KPIs, page 5 and 6).

The evaluation process was conducted with the use of the following 2 research techniques:

2.1 CAWI (Computer Assisted Web Interviews)

For the evaluation of EDU-ARCTIC and the Main survey in particular, specific computer assisted web interviews were developed. Participants fill in an on-line questionnaire received via Internet. This technique relies on the following principles: 1. anonymity 2. the opportunity to participate in the study at any time convenient for the respondent.

The target groups of the Main arctic survey are: 1. a wider group of potential respondents, 2. specific target groups. The respondents were defined as “teachers”, according to deliverable D 5.1 based on decisions of the consortium (no dates). The reasons for focusing on teachers, rather than pupils are given in D 5.1. There were some other details required from the teachers like “teacher’s country” and “teacher’s sex”. The survey allows to collect information about “the average age of your pupils” and “the number of schoolgirls and schoolboys”. The



term “your pupils” means “only pupils who participated in the EDU-ARCTIC on a regular basis”. The main survey was uploaded on the portal. Each teacher registered on the portal had the opportunity to fill in the survey.

2.2 Key Performance Indicators (KPIs)

KPIs represent a set of values against which to measure responses to questions in the surveys. The set of values was defined for each question separately. The surveys are based on the so-called SMART criteria: specific, measurable, achievable, realistic, time-bound.

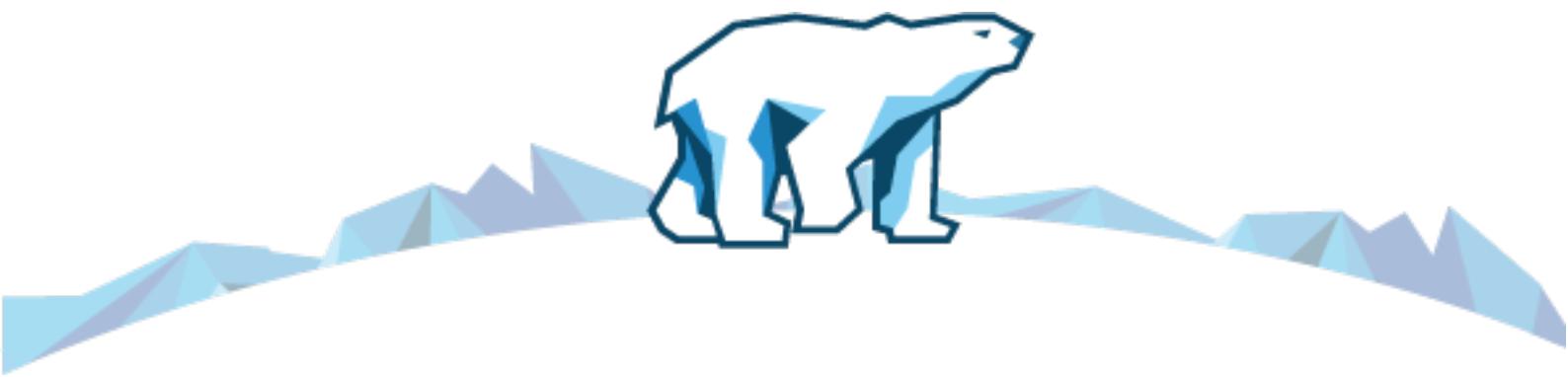
3 Objectives – categories to be measured

Thanks to the KPI values, an evaluation of the 3 main categories-targets discussed below is possible. In each category the relevant KPIs for the Main survey (D 5.1) have been applied.

3.1 The quality of educational program

- 3.1.1 Utility of educational tools proposed and implemented in the project during online lessons is measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 7).
- 3.1.2 The visual attractiveness of the educational tools proposed and implemented in the project is measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 7).
- 3.1.3 Frequency of using educational tools proposed and implemented in the project is measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 7).

3.2 The project’s direct results



3.2.1 Enhancement of knowledge about science and scientific research, as well as their place in the modern world measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 7).

3.2.2 Enhancement of knowledge about nature, geography, natural resources, history, social and political specificities concerning polar regions and increase of sensitivity to environmental issues and climate change – measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 7).

3.2.3 Establishing strong links between the worlds of research and young people/society to increase their ability to understand scientific messages and scientific language – to be measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 7).

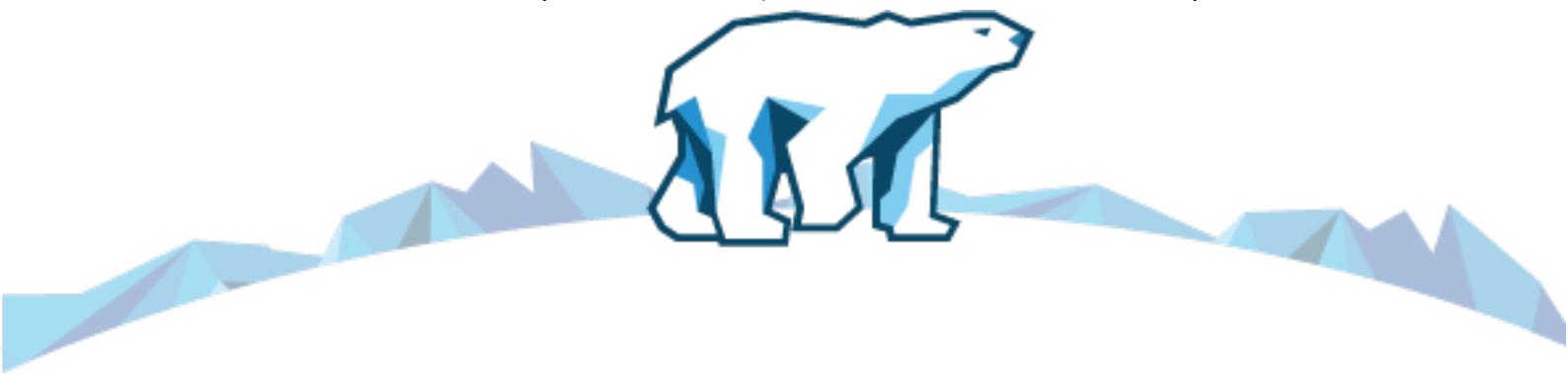
3.3 The project’s impact upon the engagement of young people in STEM activities

3.1. Increase of the number of young people interested in STEM and scientific career (target: + 25% compared to input level) – to be measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 8).

1.2. Increase of the number of girls interested in scientific careers (+ 20% compared to input level) – to be measured by “During-” and “After Edu-Arctic” surveys for teachers (see D 5.1, point 3: method of measurement, p. 8).

4. Evaluation of the CAWI Main survey – “During EDU-ARCTIC” survey

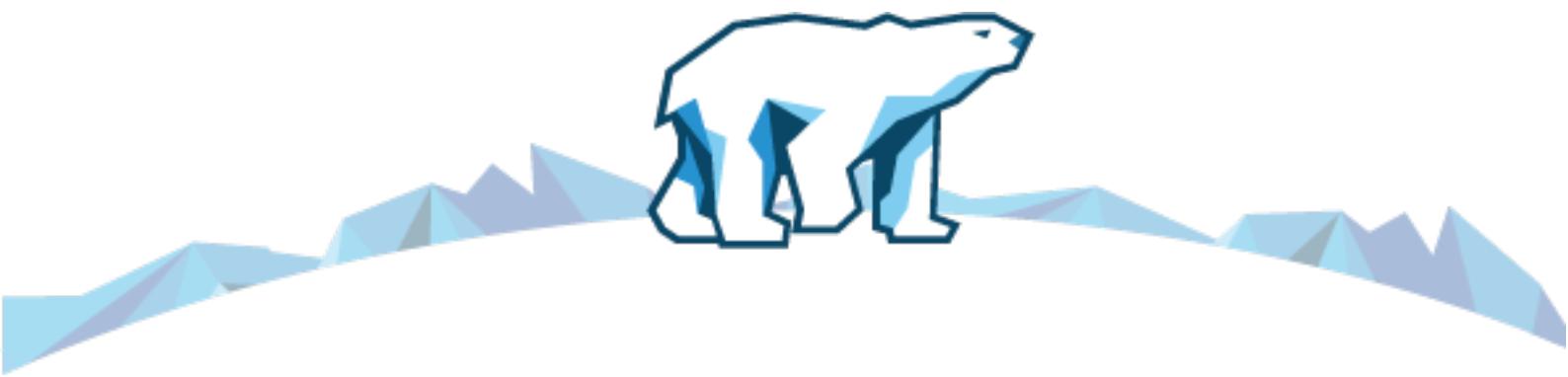
The evaluation report draws on the results of the “Kopia teacher_cawi_main_survey_during-final” (excel-file sent to UVSQ by Agata Goździk, 19.03.2018, 16:04, document created by AG 19.03.2018) and “cawi_main_survey_desk” (pdf-file, sent to UVSQ by Agata Goździk, 5.3.2018, 16:37, document created by AG, 25.01.2017). The first file contains 130 anonymous teacher

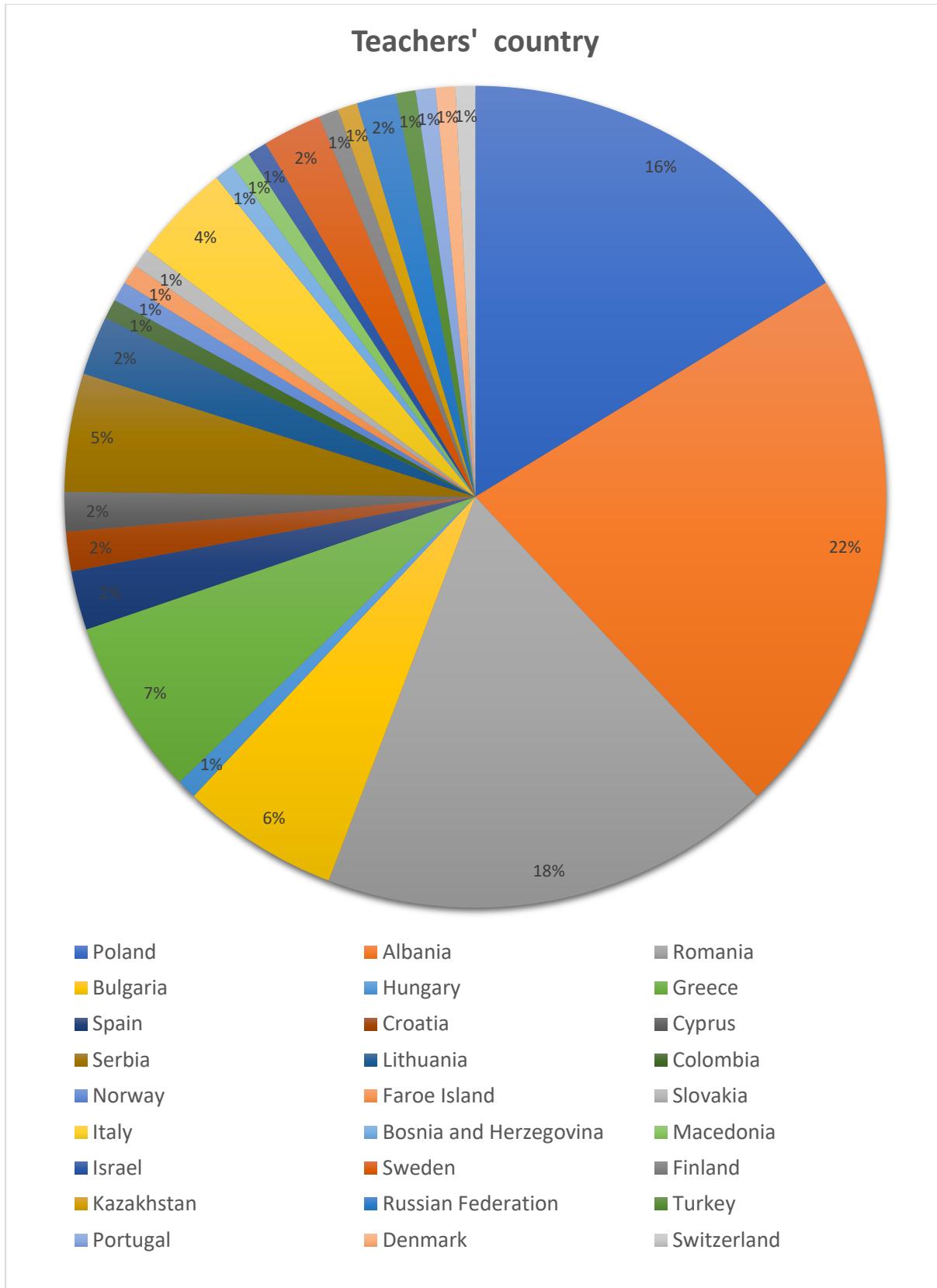


CAWI surveys, filled in by teachers from 27 countries from Western and Southern Europe - Greece, Spain, Cyprus, Italy, Israel, Switzerland, Portugal; Northern Europe – Norway, Faroe Island, Sweden, Finland, Denmark; Central and Eastern Europe – Poland, Albania, Romania, Bulgaria, Hungary, Croatia, Serbia, Lithuania, Slovenia, Bosnia and Herzegovina, Macedonia and also from Colombia, Kazakhstan, the Russian Federation and Turkey during the period 16.02.2018-16.03.2018. The second document contains a template/ description of the main survey.

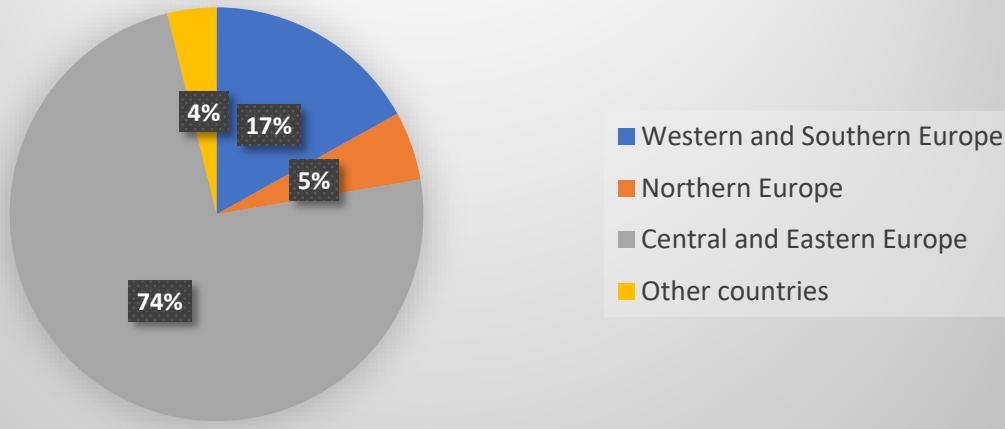
The three countries most largely represented in this survey are Albania (22%), Poland (18%) and Romania (16%). 4-7% of the survey were filled in by teachers from Bulgaria, Greece, Serbia and Italy. 2% of the surveys were filled in by teachers from Spain, Croatia, Cyprus, Lithuania, Sweden and Russian Federation; 1 % of the surveys was filled in by teachers from Hungary, Israel, Switzerland, Portugal, Norway, Faroe Island, Finland, Denmark, Hungary, Slovenia, Bosnia and Herzegovina, Macedonia, Colombia, Kazakhstan and Turkey.

Most of the surveys were filled in by teachers from Central and Eastern Europe (74%). 17% of the surveys were filled in by teachers from Western Europe and the smallest group are teachers from Northern Europe. 70% of the teachers who filled in the survey are women and 30% men.

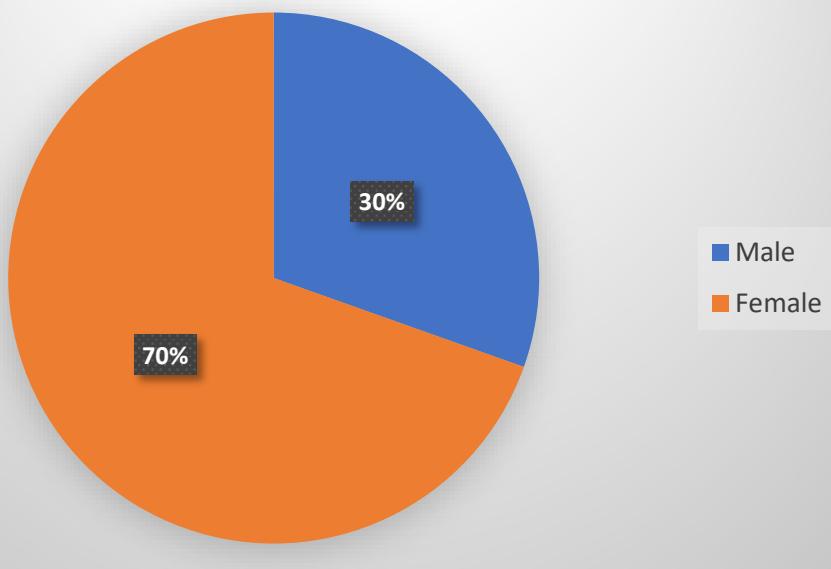




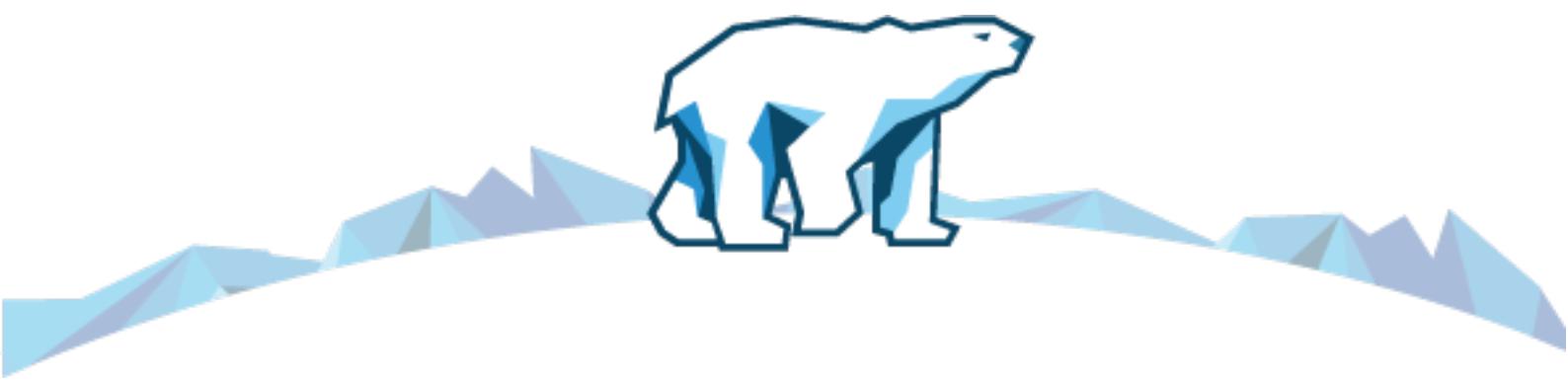
Participation in the main survey in Western and Southern, Northern, Central and Eastern Europe



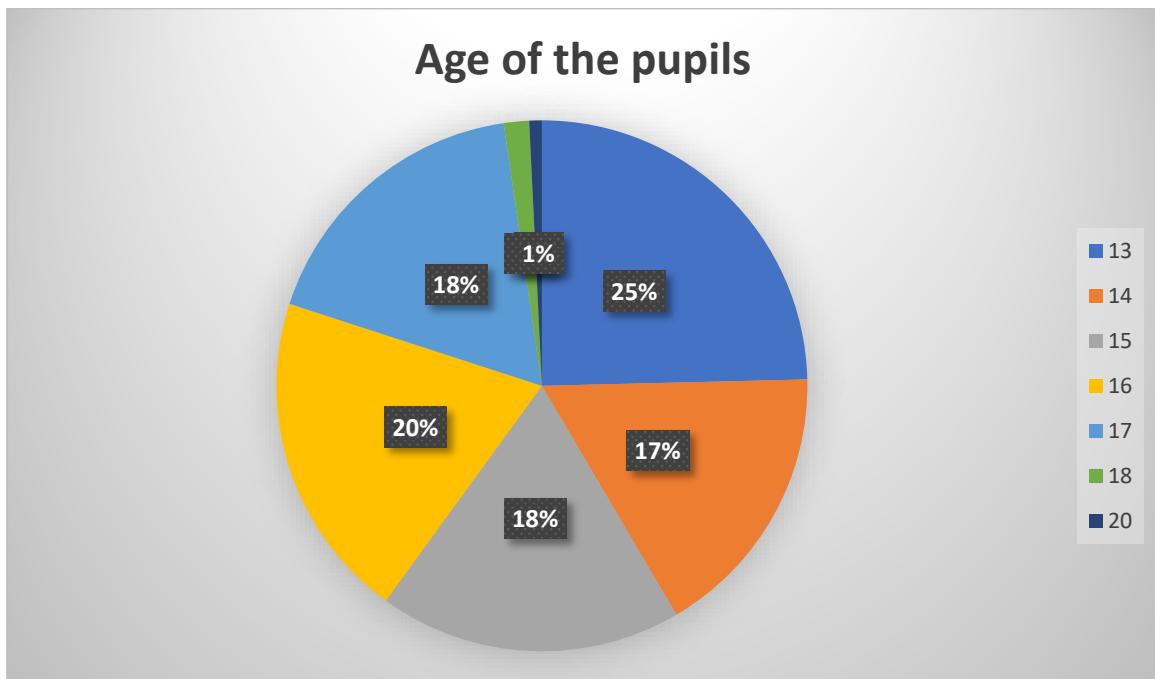
Teachers' sex



Concerning the “age of the pupils in their class”, indications vary between 13-20. The single largest group of interviewed teachers – 32 – indicated the age of 13 years. Nobody indicated



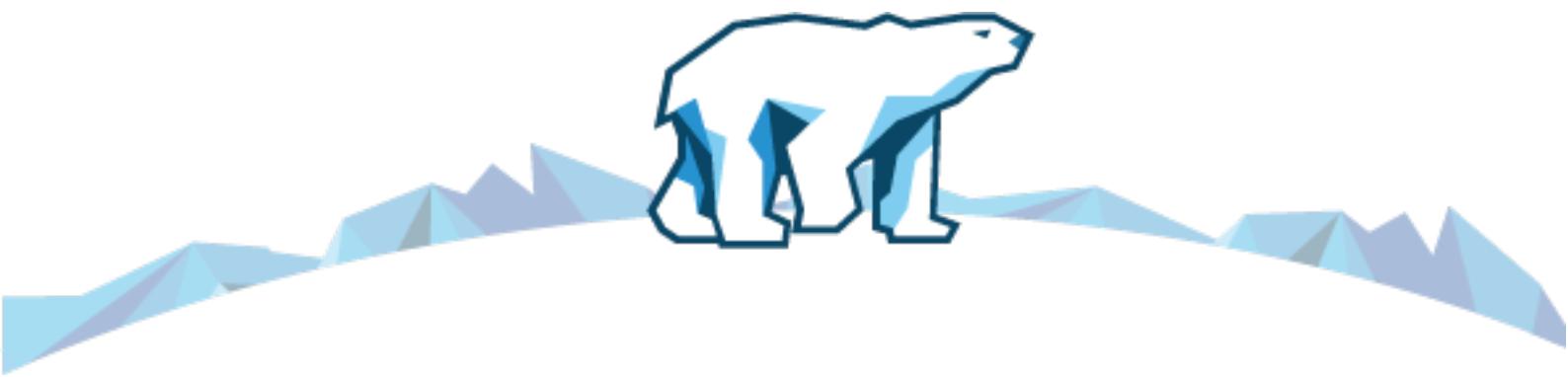
19, two indicated 18 years, one 20. Thus, the majority of teachers have pupils in the age of 13 to 17.



The total number of schoolgirls indicated by teachers is 8471 and 7889 schoolboys.

The survey was divided into 2 parts: (1) TECHNOLOGY including 3 questions about the various modules of the EDU-ARCTIC portal and (2) FACTUAL including 6 questions about the impact of the project on pupils (e.g. interest, understanding, knowledge). The 3 questions dedicated to the technology were multiple choice questions with a descriptive part. According to the given answer teachers had to explain their choice. The category – factual contains 6 multiple choice questions. The last 3 questions distinguish between schoolgirls and schoolboys.

All questions allow to collect the subjective opinion of anonymous teachers from 25 European countries, as well as Colombia and Kazakhstan, on technical aspects of the EDU-ARCTIC project like utility, visual attractiveness and the frequency of using online lessons, Polarpedia and the monitoring system and factual aspects like the impact of online lessons, Polarpedia and the monitoring system on the knowledge, skills and interest of pupils on STEM and increase of knowledge, understanding and interest in STEM as a result of EDU-ARCTIC among schoolgirls and schoolboys. Teachers were asked to estimate their pupils' knowledge, interest, understanding of STEM and the impact of EDU-ARCTIC on those aspects.



The following items were collected in particular:

(1) TECHNOLOGY:

Question 1: Utility of (1) online lessons, (2) Polarpedia and (3) monitoring system in conducting various activities within the EDU-ARCTIC project; reason for teachers' evaluation and recommended changes; Question 2: visual attractiveness of (1) online lessons, (2) Polarpedia and (3) monitoring system; reason for teachers' evaluation and recommended changes; Question 3: Frequency of using of (1) online lessons, (2) Polarpedia and (3) monitoring system; factors that determine your school's non-participation or lack of use and interest.

(2) FACTUAL

Question 1: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on pupils' knowledge about issues related to the Arctic; Question 2: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on the level of understanding of scientific issues and scientific language among pupils; Question 3: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on the level of interest in STEM and scientific careers among pupils; Question 4: Differences in extension of increasing of pupils' knowledge on issues related to the Arctic between schoolgirls and schoolboys after the participation in EDU-ARCTIC; Question 5: Differences in contribution of EDU-ARCTIC to improve the level of pupils' understanding of the world of science and scientific language between schoolgirls and schoolboys; Question 6: Differences in contribution of the EDU-ARCTIC project to the increase of interest in STEM and scientific careers among schoolgirls and schoolboys.

The values to be chosen from vary from question to question.

5. Evaluation question by question

(1) TECHNOLOGY

Question 1. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal and the whole EDU-ARCTIC project in terms of their utility in conducting various activities within the project:

1. ONLINE LESSONS

1 2 3 4 5 6

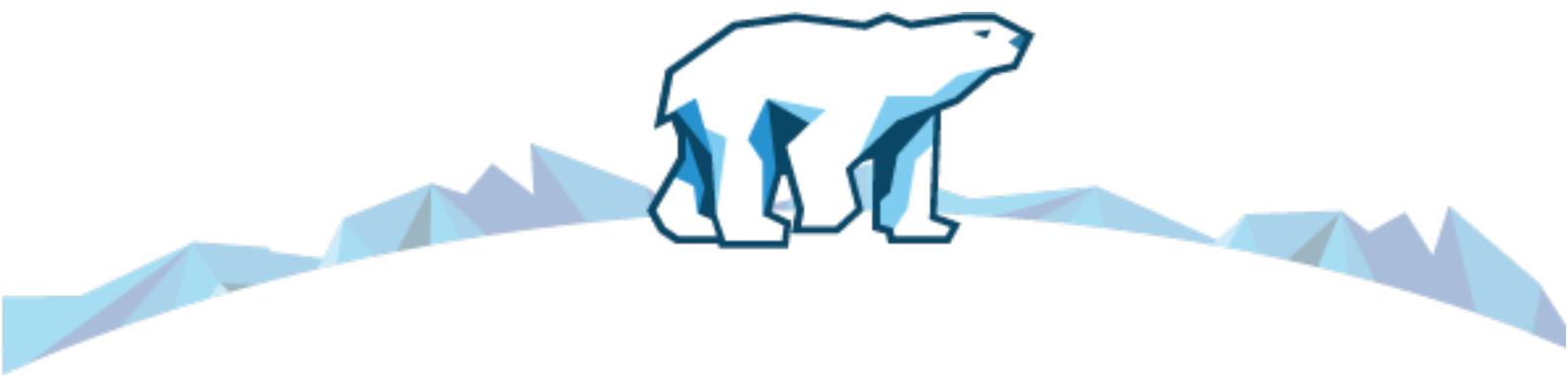
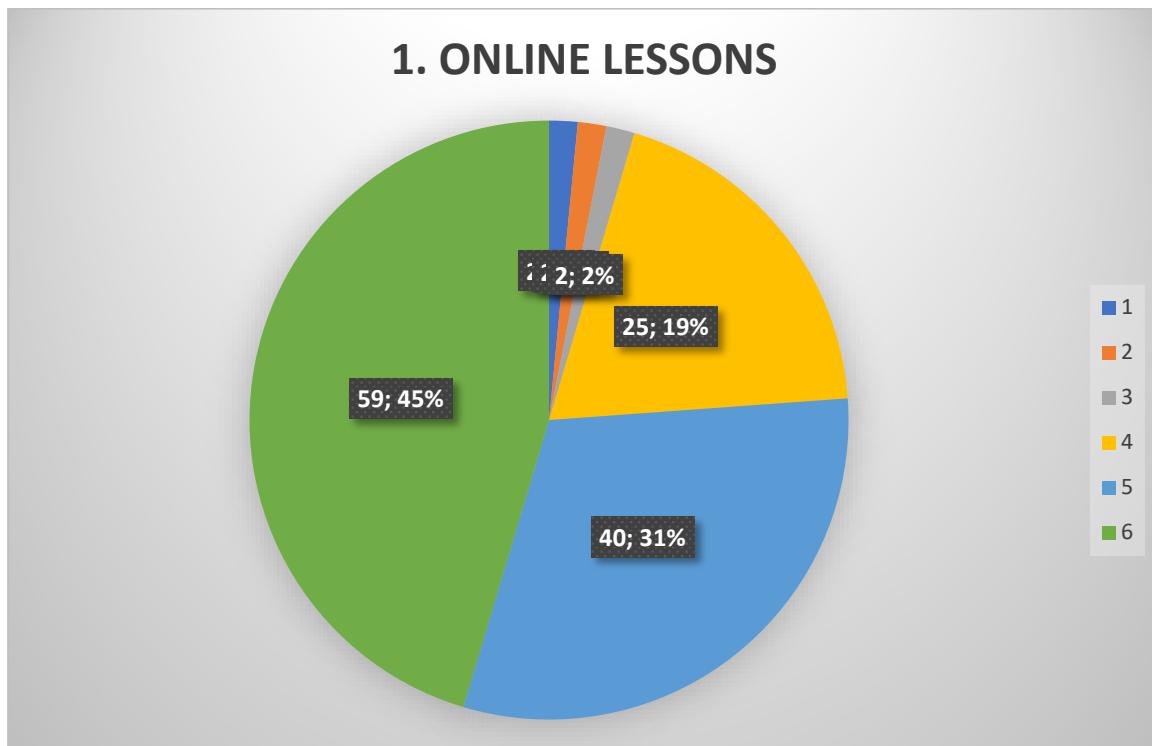


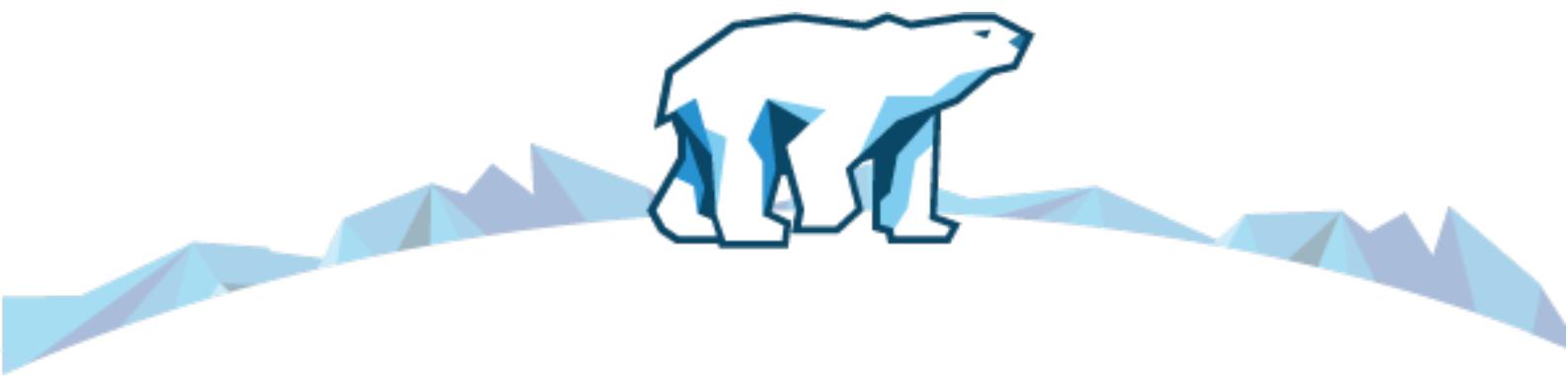
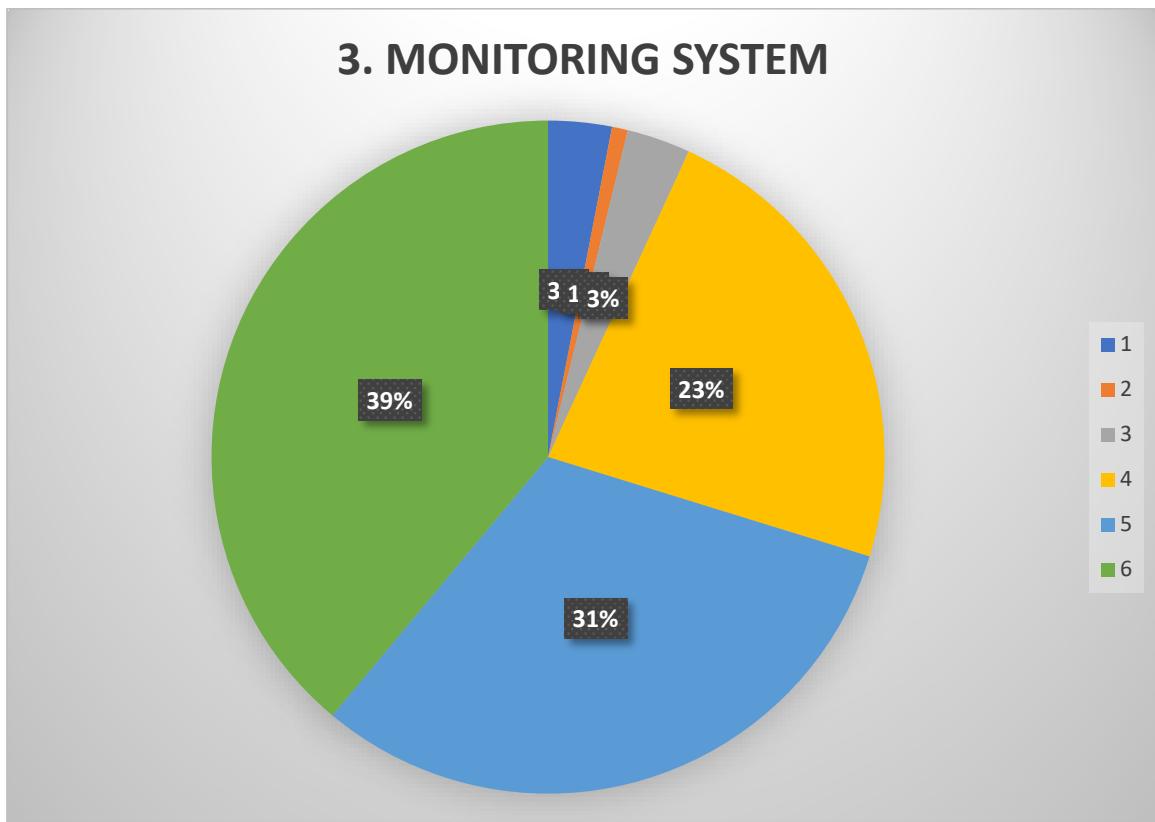
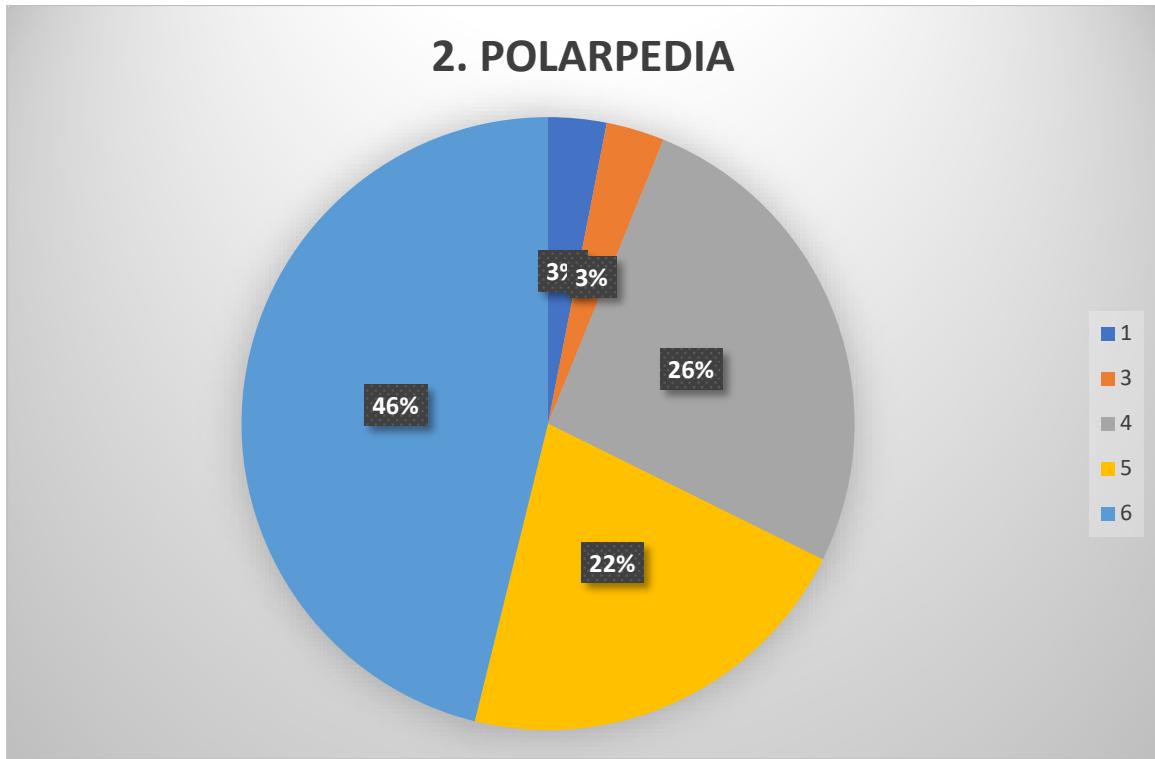
2. POLARPEDIA

1 2 3 4 5 6

3. MONITORING SYSTEM

1 2 3 4 5 6





In case your answer is 3 or less for any of the modules, please answer the following questions:

1. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal that received a mark of 3 or less. Thank you.

12 replies from teachers (all written in English)

Summary of the replies - problems with:

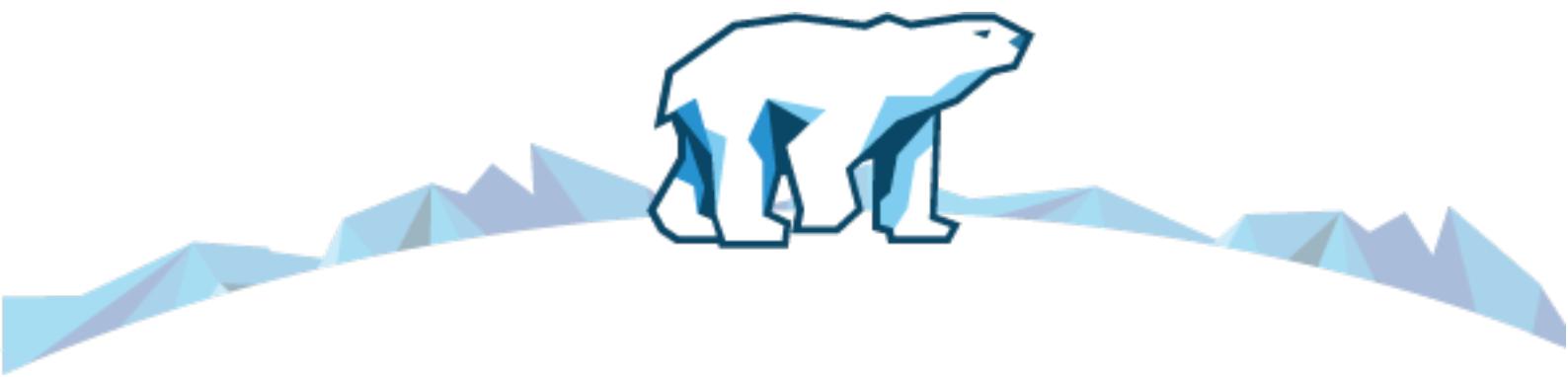
1. Organising activities outside the classroom
2. Fitting the online lesson into the plan; how to find recorded lessons online
3. English language problems
4. Habit of pupils to visit Polarpedia
5. No time to organise monitoring activities
6. Not enough staff or new staff at school
7. Technical problems
8. Monitoring system too difficult
9. Not enough interested pupils

These replies were not accompanied by any further comments from the teachers.

2. What changes would have to be implemented within a given module in terms of its utility in conducting various activities within the project? Please provide a separate idea for changes for each module of the portal, which received a mark of 3 or less.

10 replies:

1. Get in contact with local entities to study local glaciers
2. Online lessons available on the EDU-ARCTIC web-site
3. Polarpedia terms in national languages – Greek
4. Create the habit to use Polarpedia
5. Badges for regular activities
6. Shorter online lessons
7. Online lessons available via google chrome
8. Competition for each category of online lessons



Question 2. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal in terms of their visual attractiveness:

1. ONLINE LESSONS

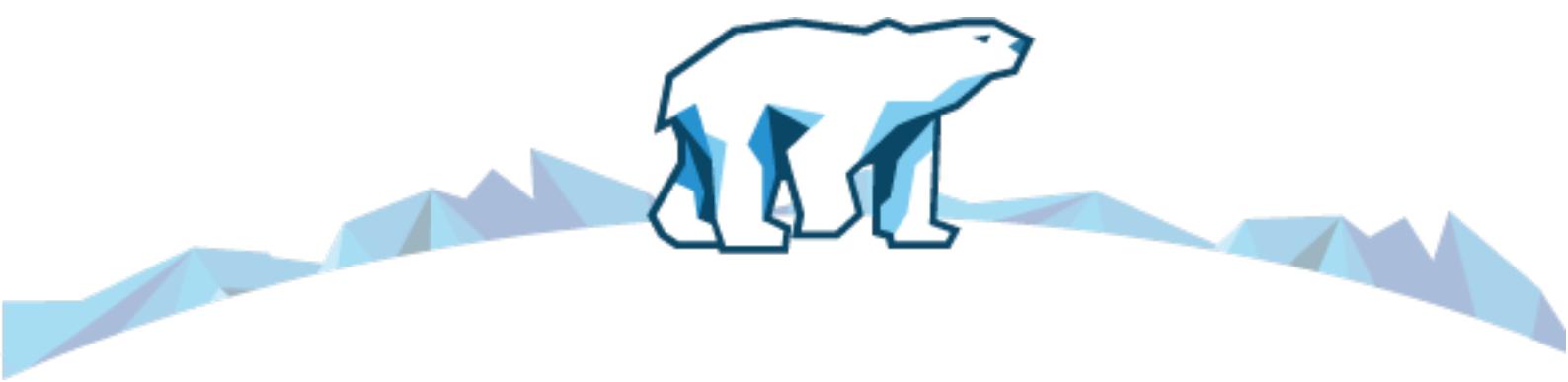
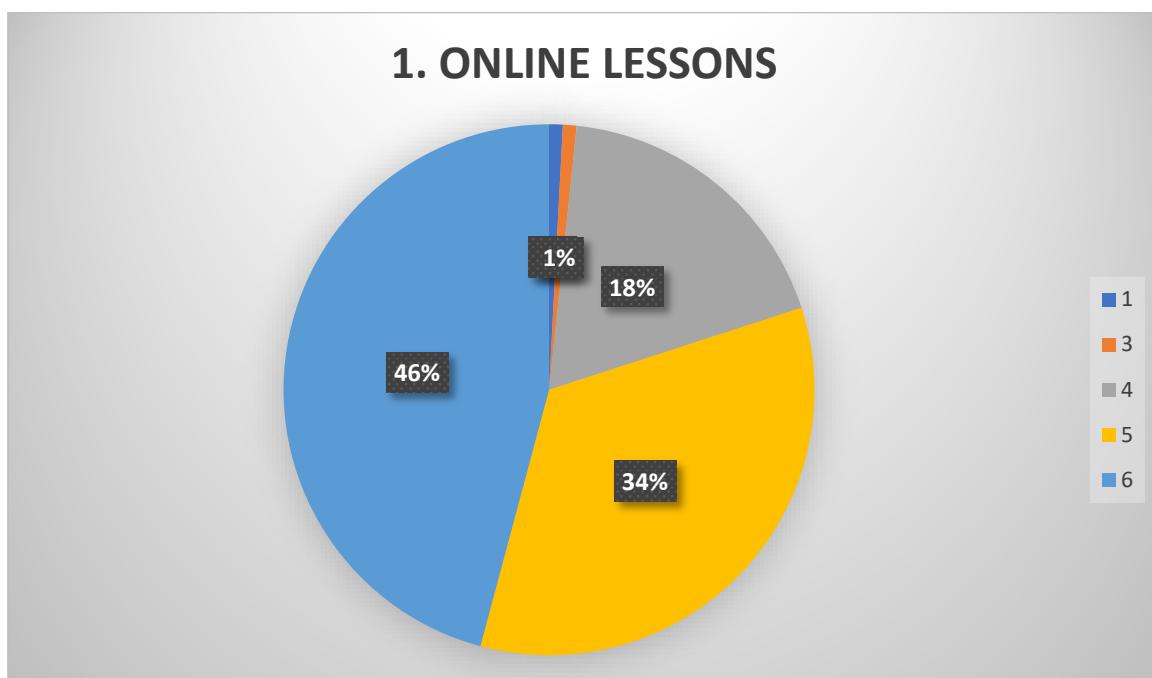
1 2 3 4 5 6

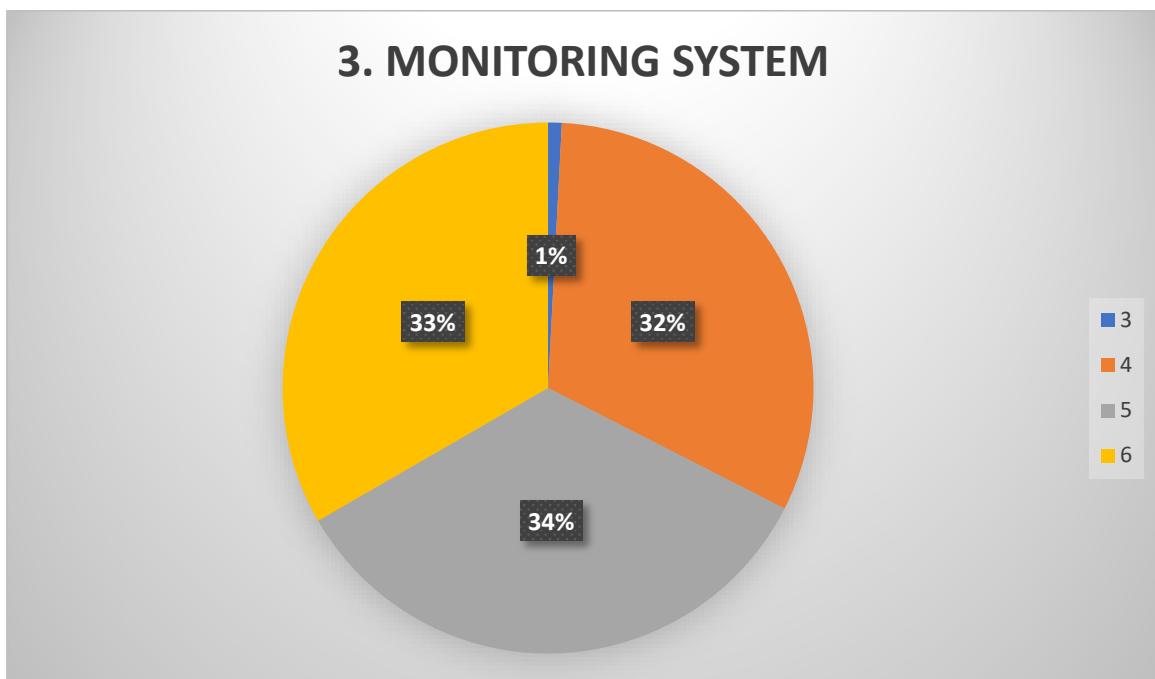
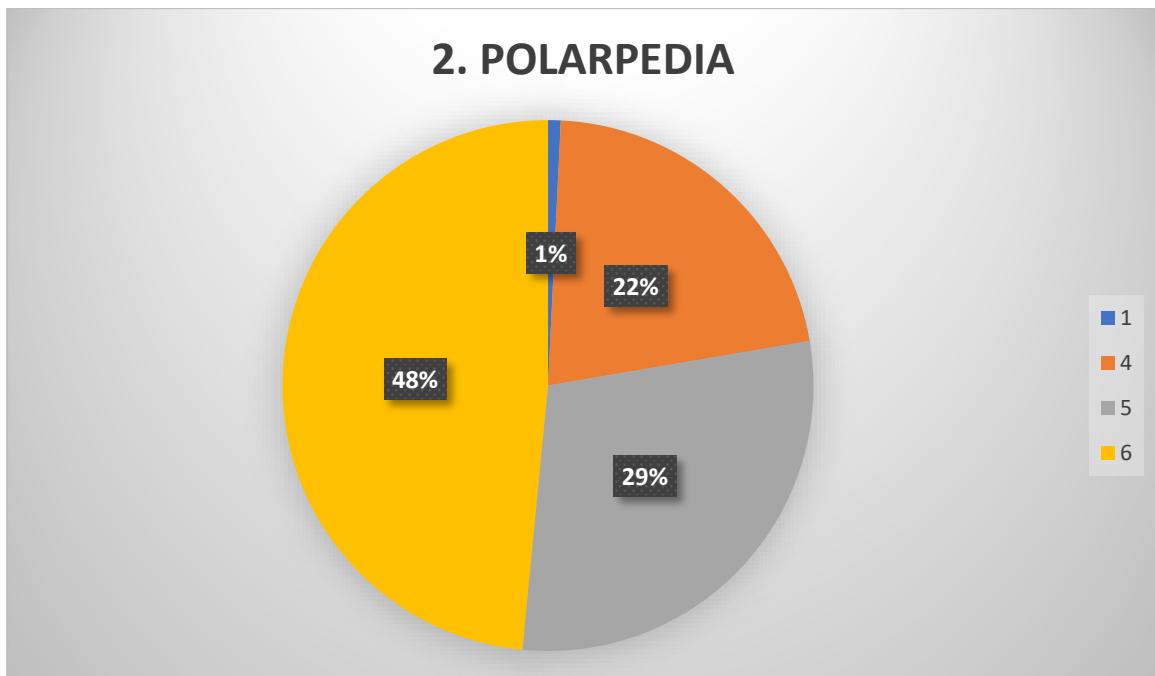
2. POLARPEDIA

1 2 3 4 5 6

3. MONITORING SYSTEM

1 2 3 4 5 6

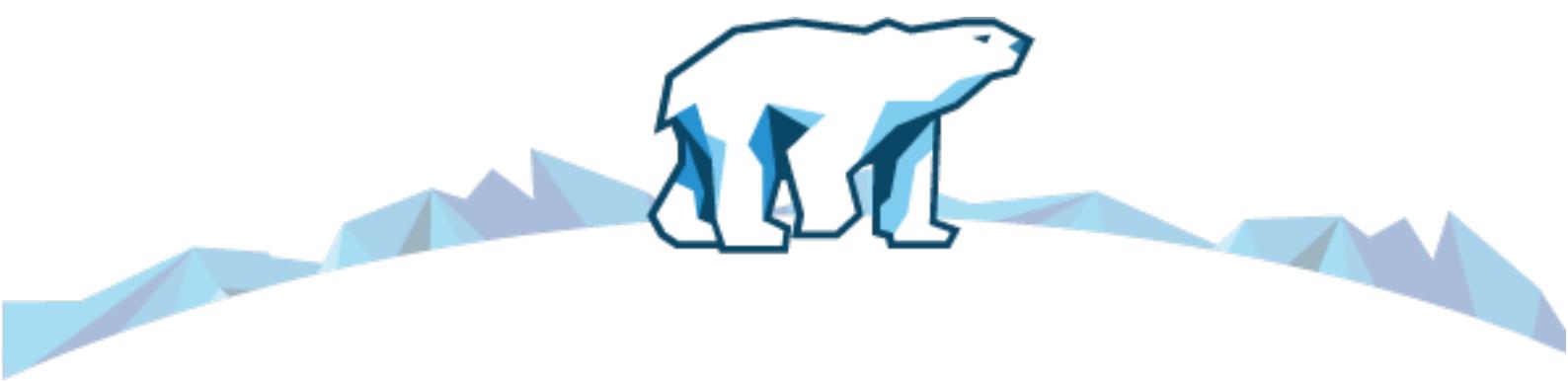




In case your answer is 3 or less, please answer the following questions:

1. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal, which received a mark of 3 or less. Thank you.

1 reply - none



2. What changes would have to be implemented within a given module in terms of its visual attractiveness? Please provide separate ideas for changes for each module of the portal, which received a mark of 3 or less.

1 reply – none

Question 3. How often do you use the following modules of the EDU-ARCTIC portal?

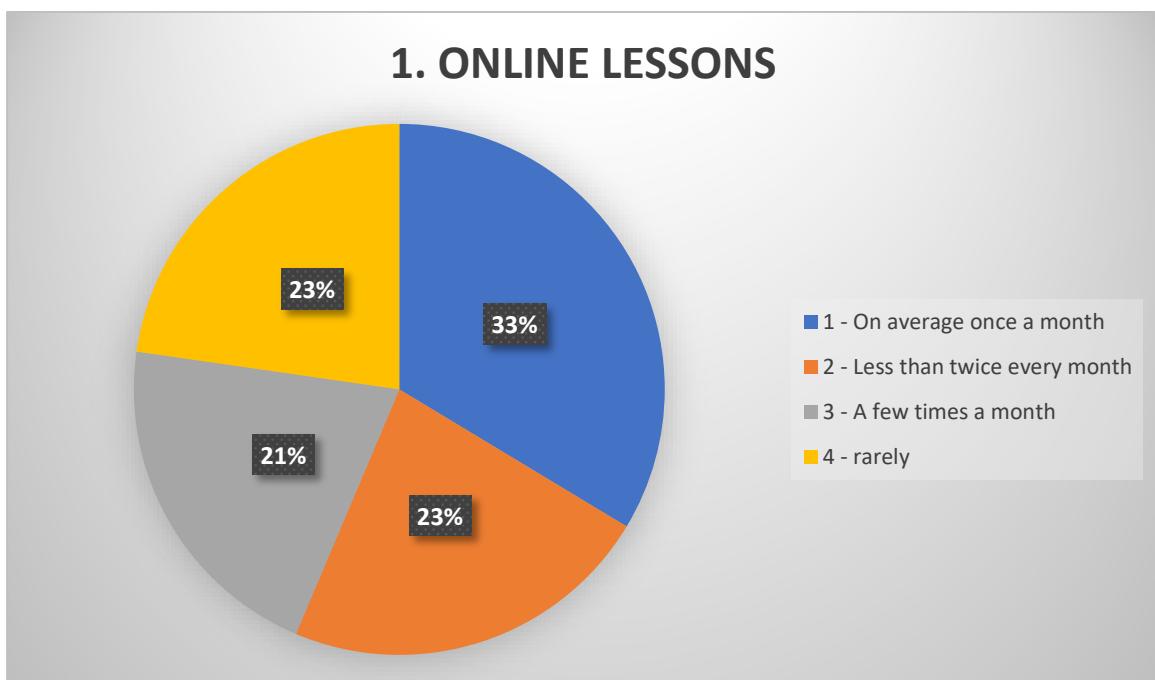
1. ONLINE LESSONS

3 - A few times a month

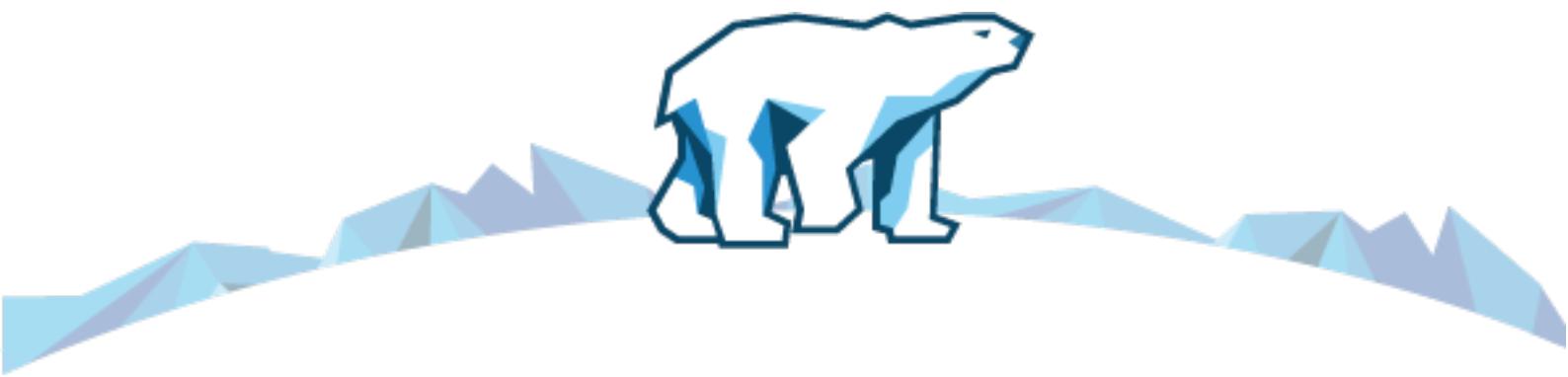
2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given



If you have selected 4, please justify your answer. In particular, please identify the main factors that determine your school's non-participation in ONLINE LESSONS (e.g. whether this depends on transmission time, technical issues you are facing while connecting on-line, materials prepared by a didactician, subject or any other factors - please specify)?



46 – replies – 45 in English, 1 in Russian

1. Teachers are involved in other projects and school activities
2. Problems with fitting the online-lessons, transmission time
3. Technical problems/ infrastructure problems
4. Holidays
5. No related lesson to the subject
6. English problems
7. Lack of didactic materials

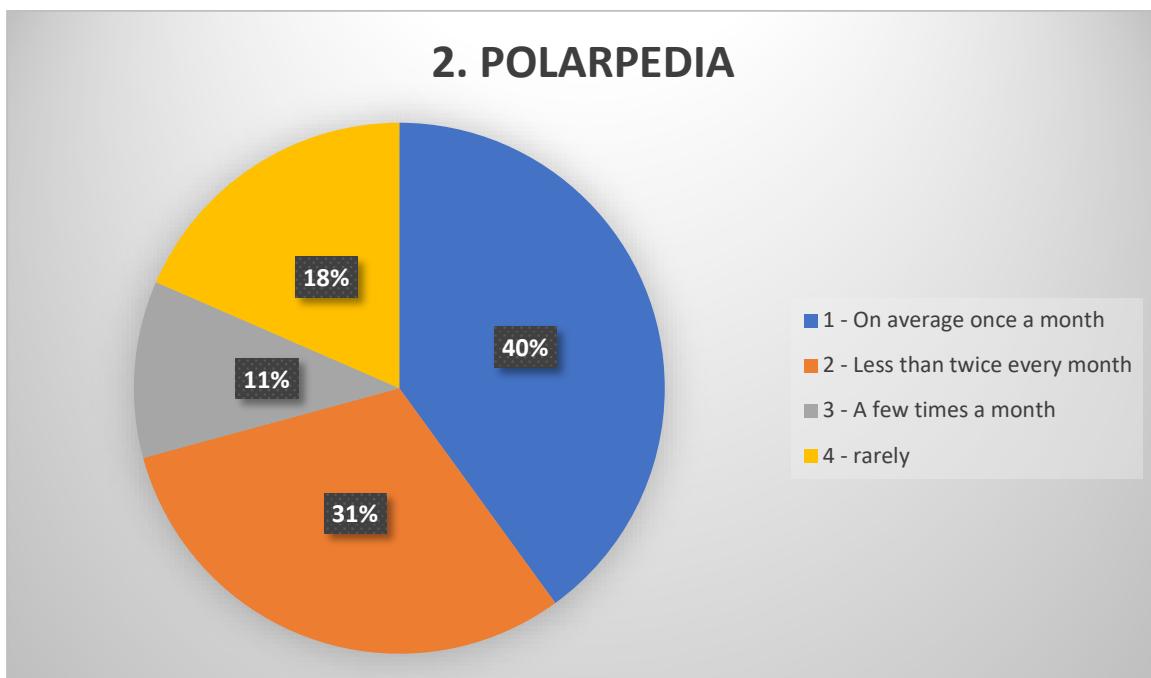
2. POLARPEDIA

3 - A few times a month

2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given



If you have selected 4, please justify your answer. In particular, please identify the main factors that determine your lack of use of POLARPEDIA (e.g. whether this depends on dictionary entries, quality of published materials, graphical quality, easy search or any other



factors - please specify)?

35 replies – 33 in English, 1 in Polish, 1 in Russian

1. Terms are known by teachers
2. Online lessons were more important
3. Language difficulties; teachers prefer terms in their mother tongue
4. Holidays
5. Not according to the lesson/ subject
6. Pupils use other materials
7. Not interesting for teachers
8. Not relevant for pupils
9. Lack of time
10. More work for teachers

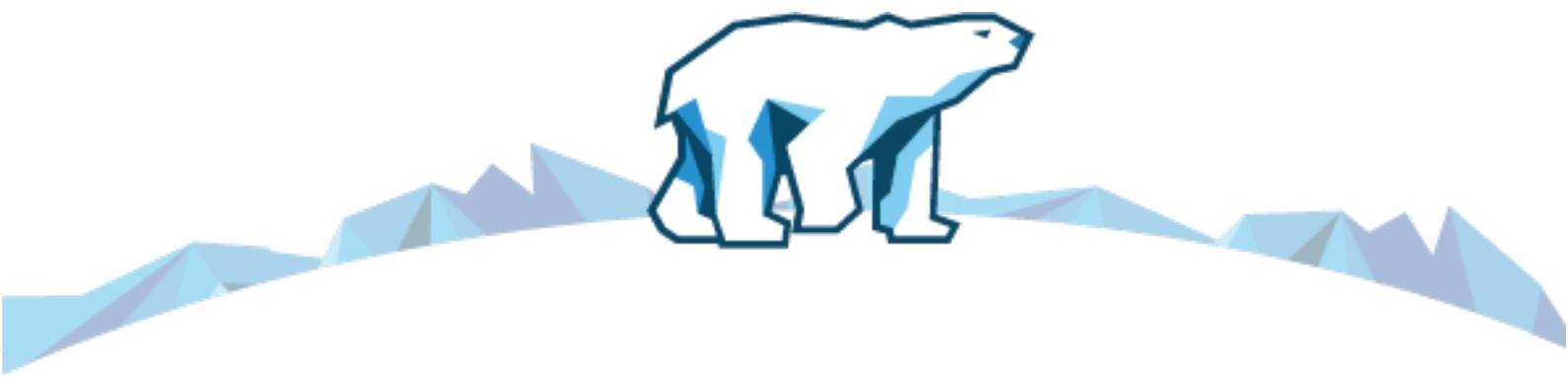
3. MONITORING SYSTEM

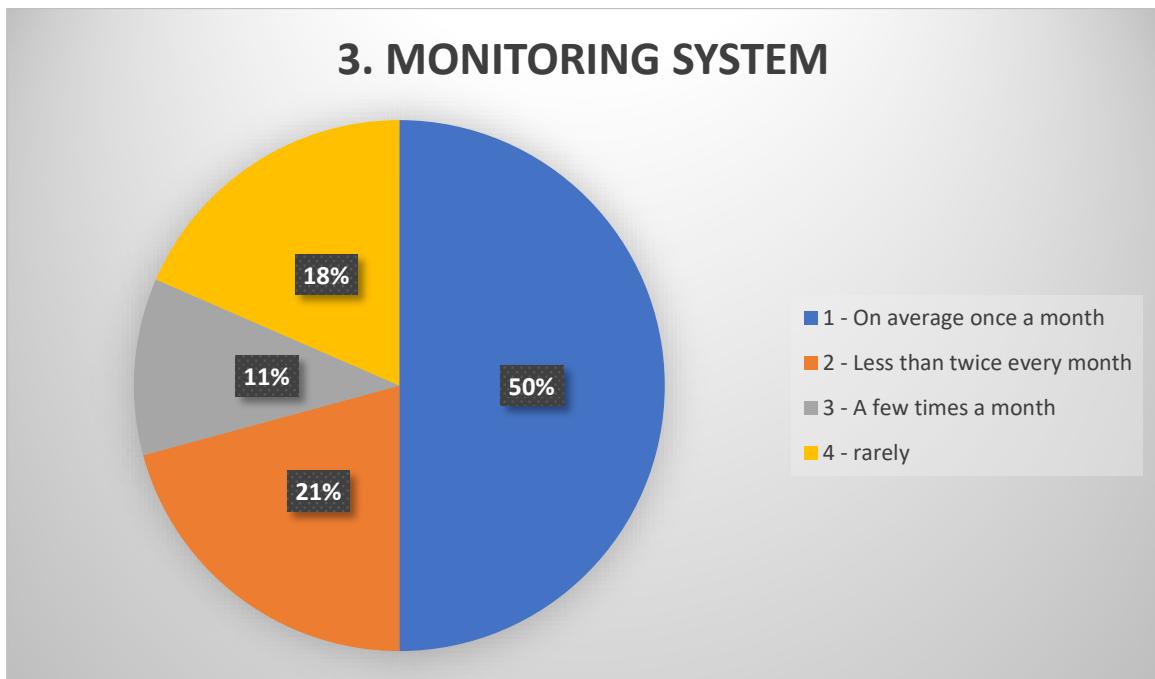
3 - A few times a month

2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given

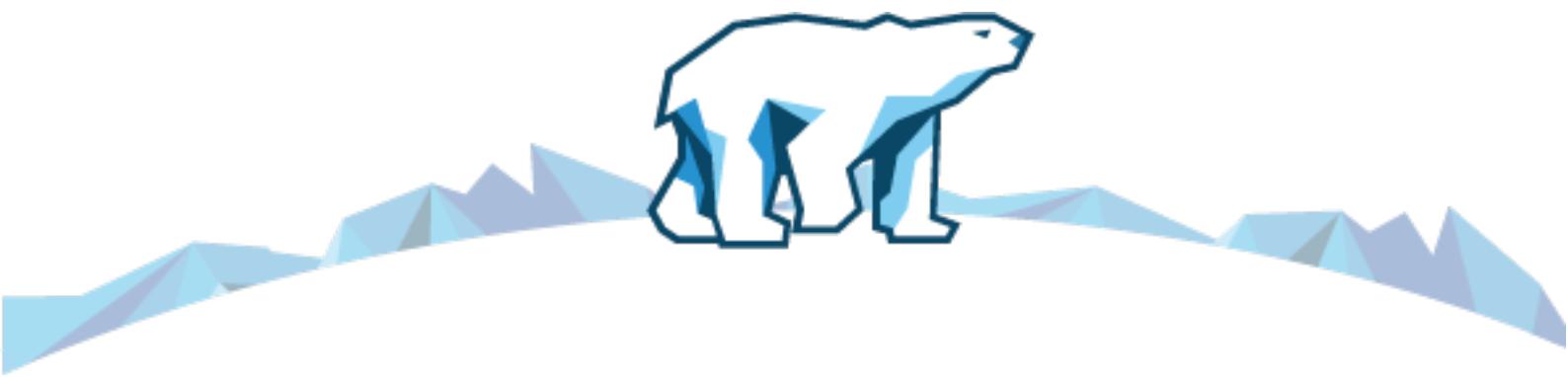




If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your school's lack of interest in the MONITORING SYSTEM (e.g. whether this depends on module quality, purpose of the module or any other factors - please specify)?

34 – replies, 32 in English, 1 in Polish, 1 in Russian

1. Online lessons are more important
2. Lack of pupils' interest and motivation
3. Lack of time
4. Holidays
5. Forgetfulness
6. Lack of internet connection
7. Inadequate data
8. Too difficult
9. Not relevant for all subjects



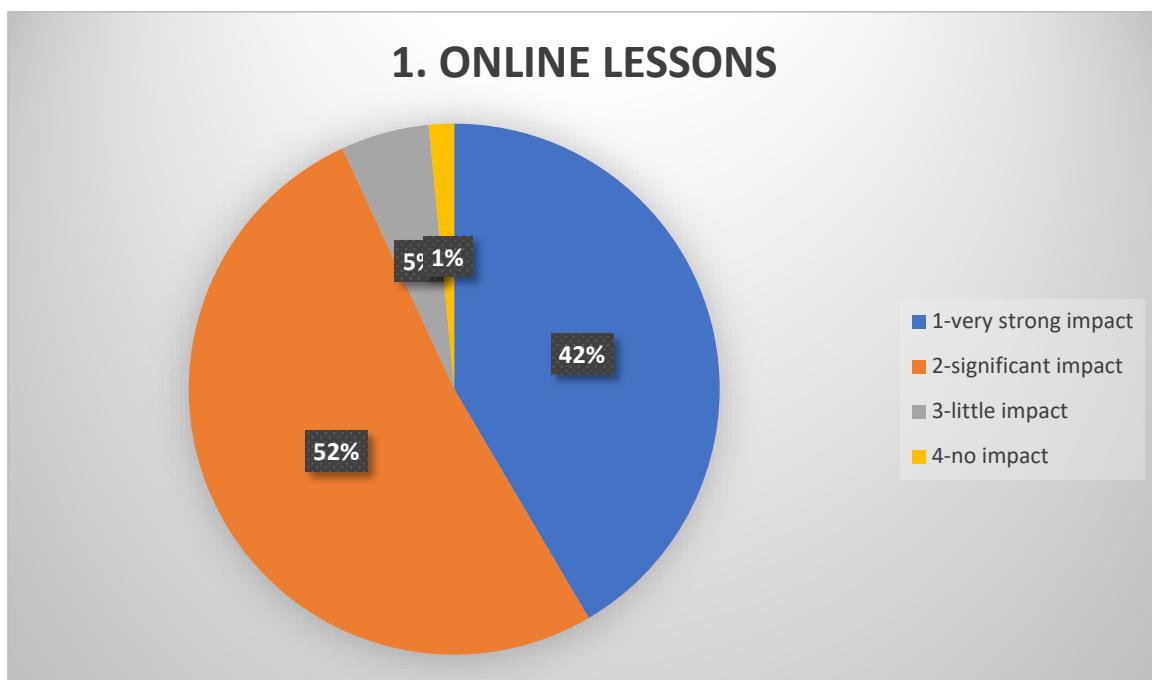
(2) FACTUAL

Question 1. What is the impact of each of the EDU-ARCTIC modules on your pupils' knowledge about issues related to the Arctic (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?

(1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

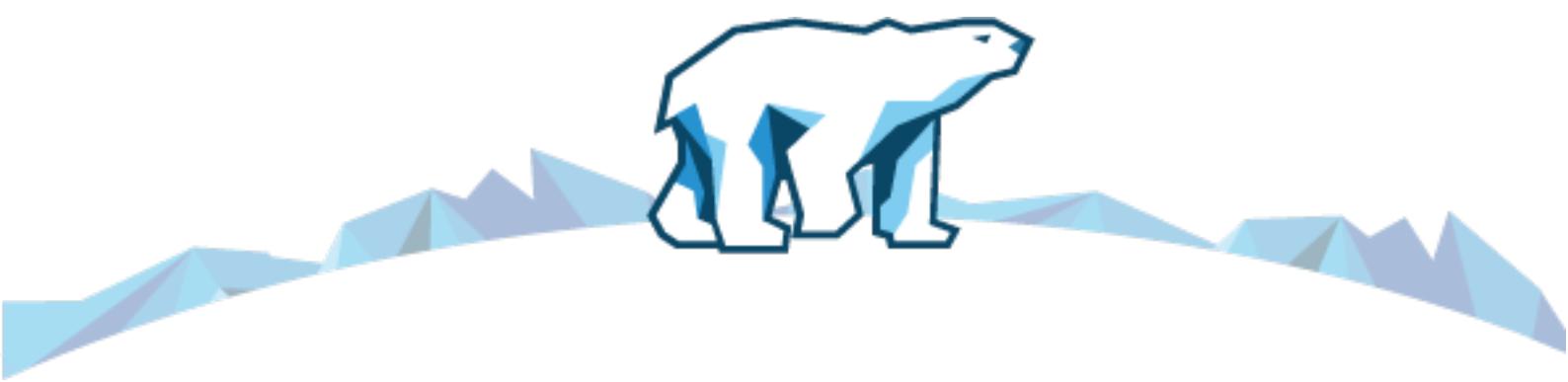
1. ONLINE LESSONS

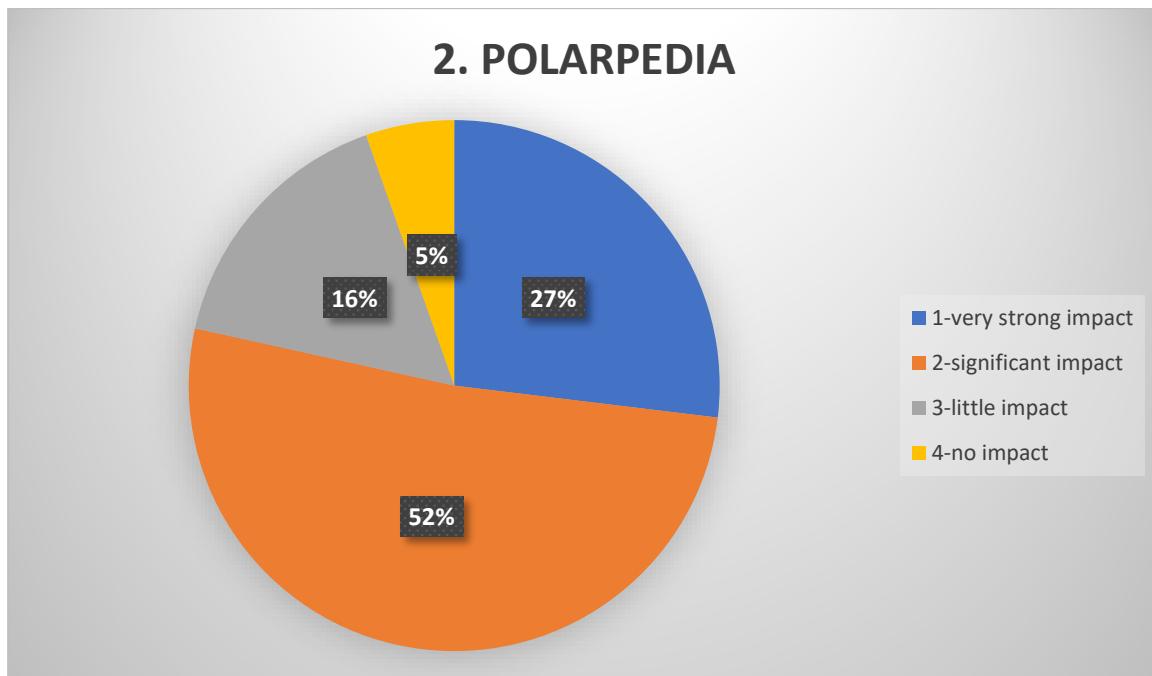
1 2 3 4



2. POLARPEDIA

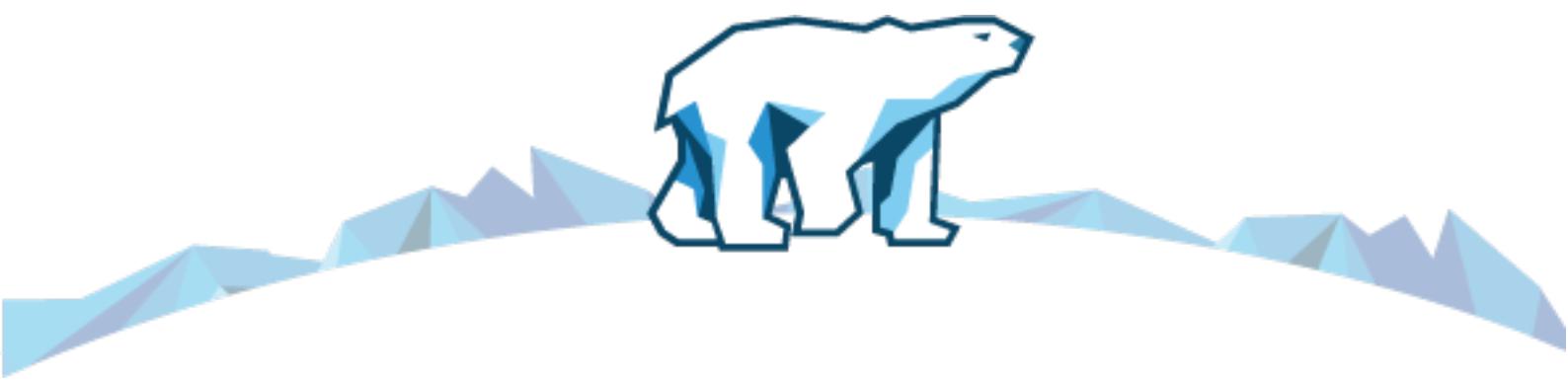
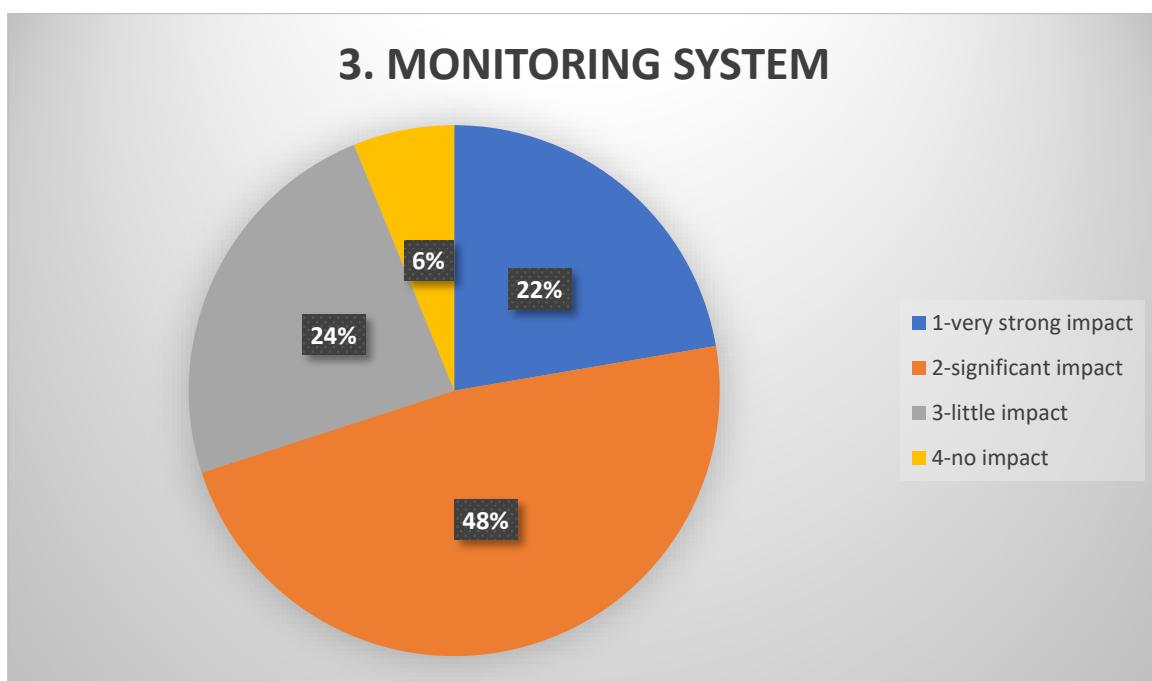
1 2 3 4





3. MONITORING SYSTEM

1 2 3 4

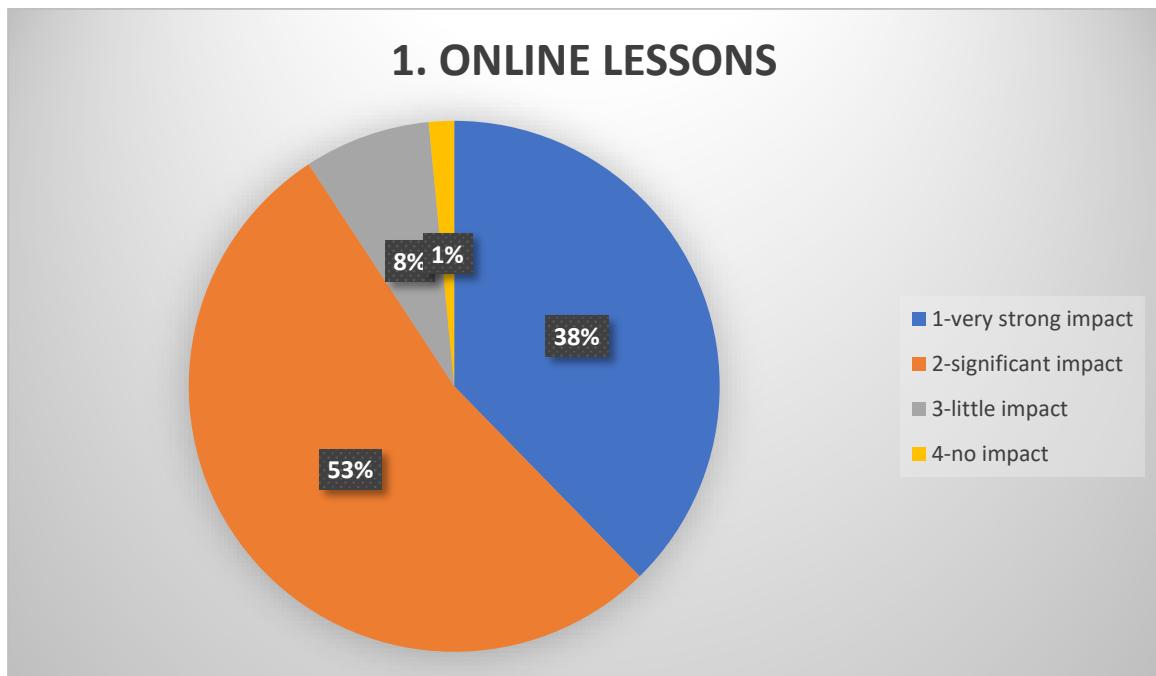


Question 2. What is the impact of each of the EDU-ARCTIC modules on the level of understanding of scientific issues and scientific language among your pupils?

(1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

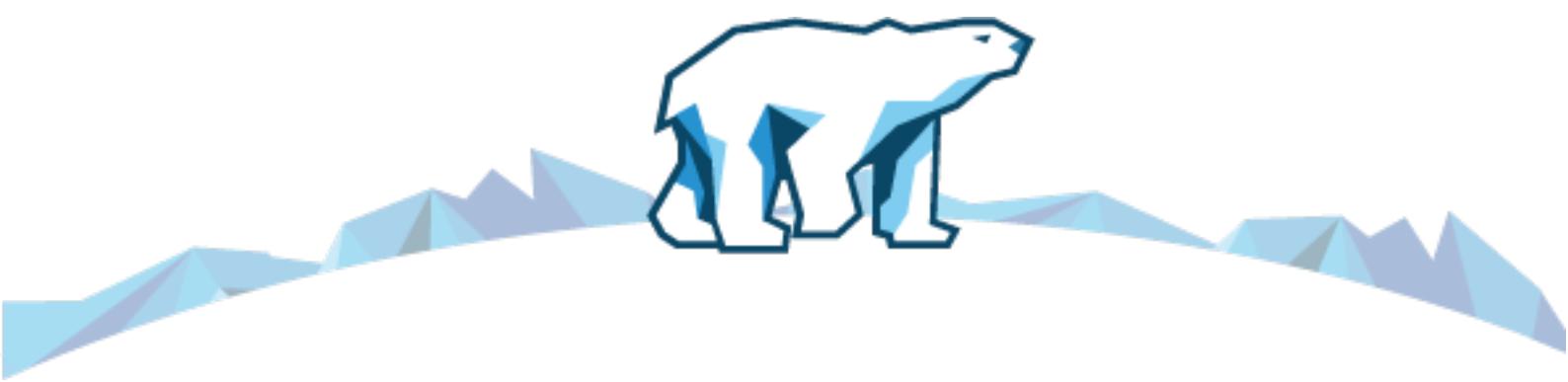
1. ONLINE LESSONS

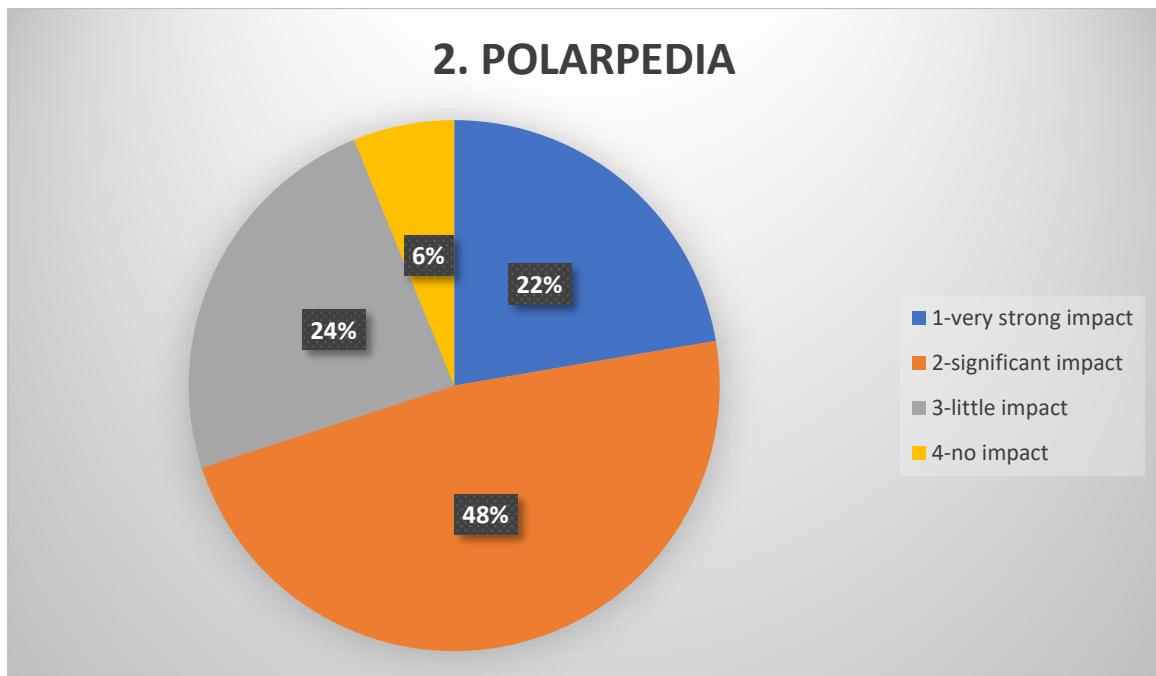
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2. POLARPEDIA

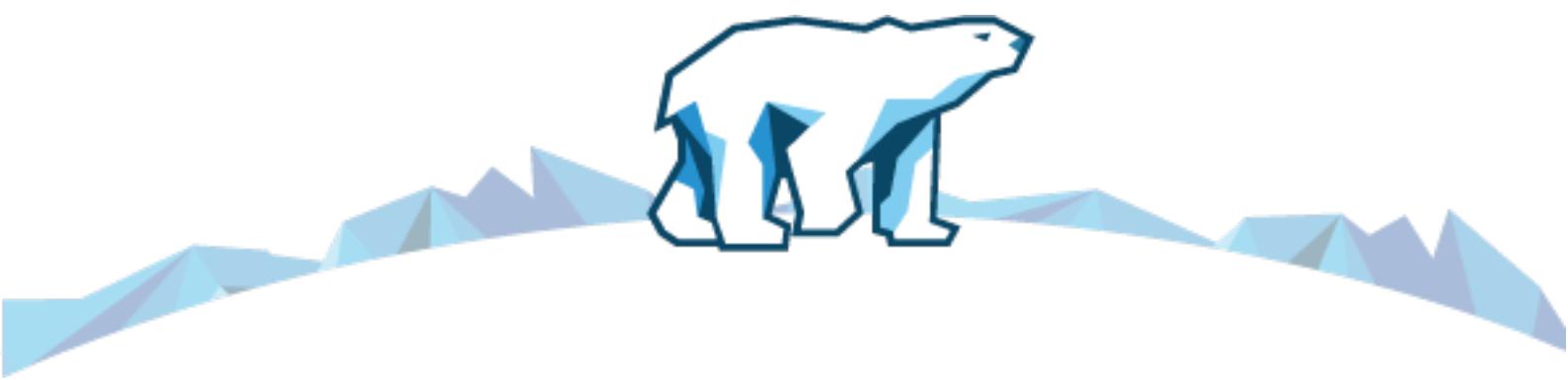
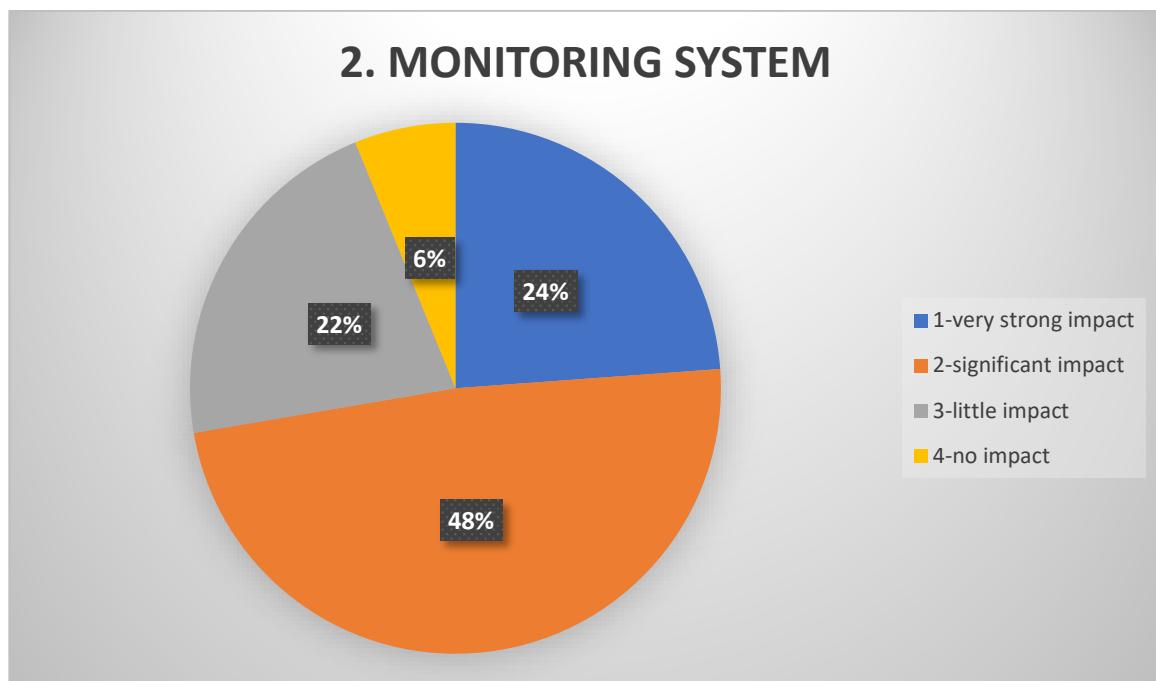
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3. MONITORING SYSTEM

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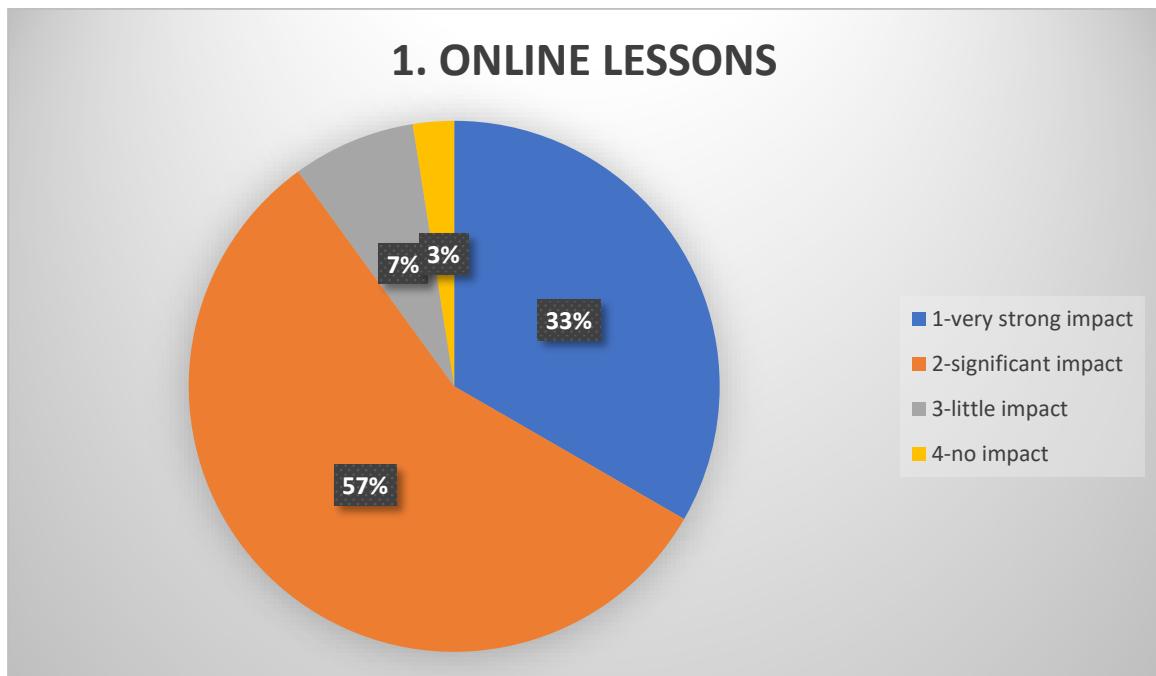


Question 3. What is the impact of each of the EDU-ARCTIC modules on the level of interest in STEM and scientific careers among your pupils?

(1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

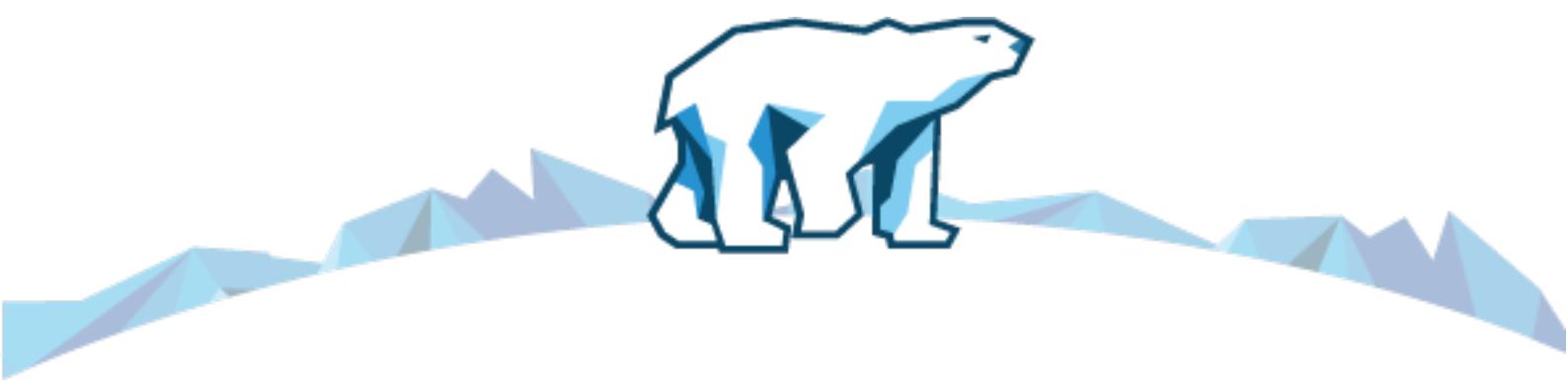
1. ONLINE LESSONS

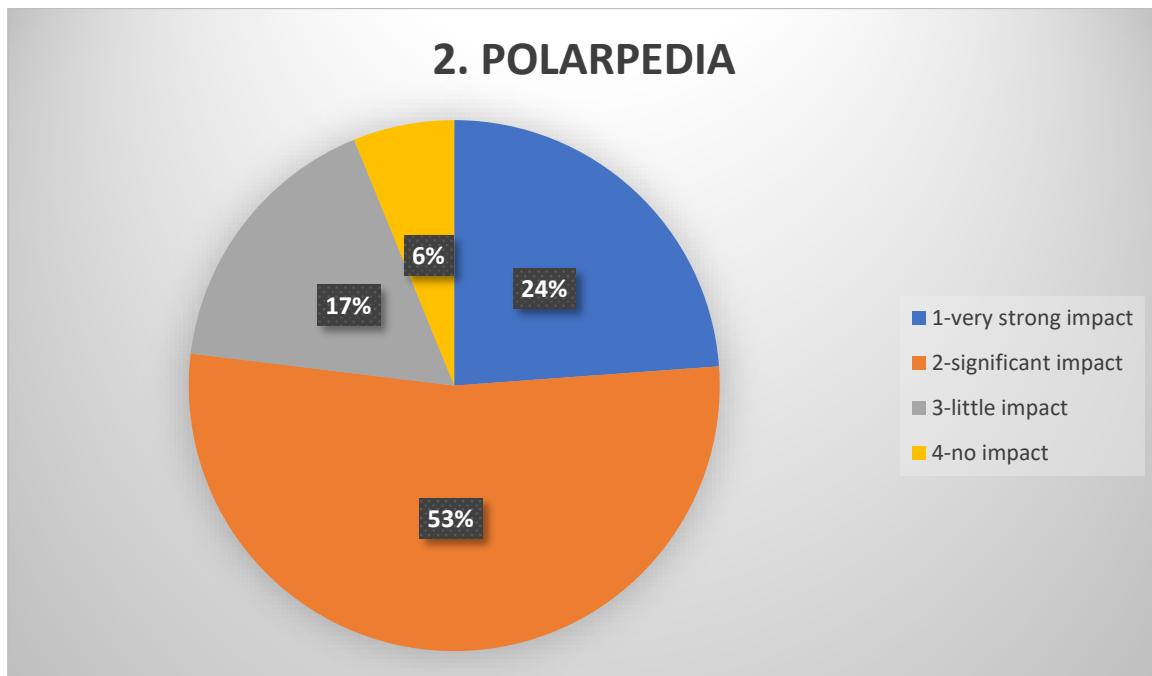
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2. POLARPEDIA

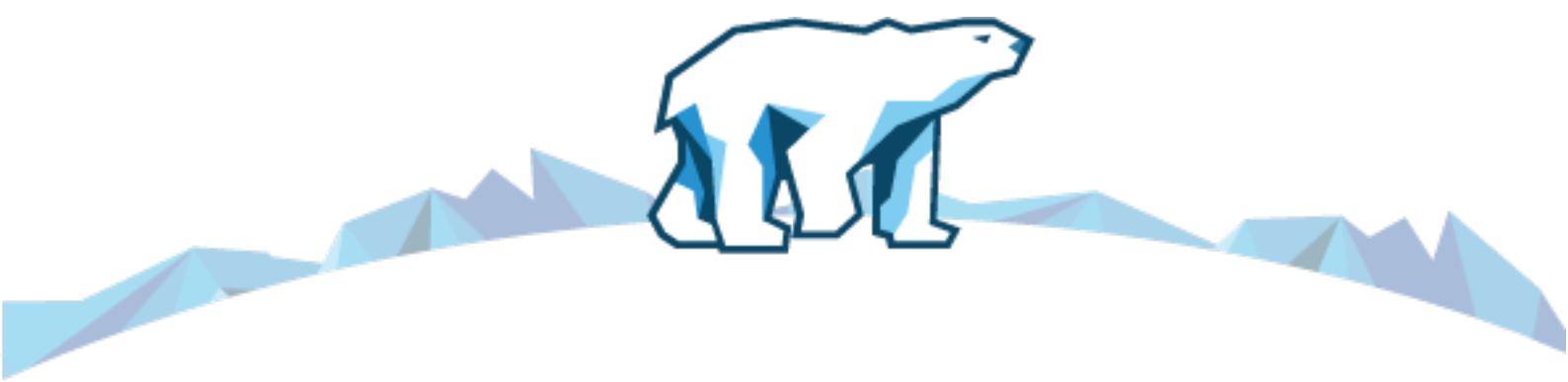
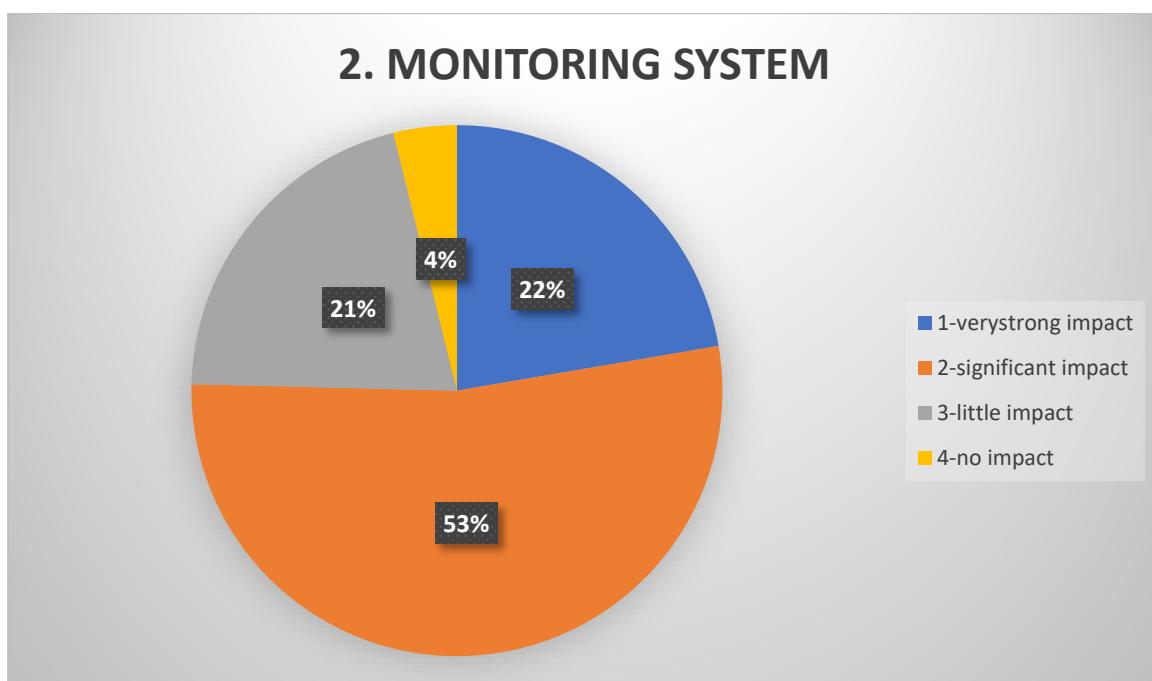
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3. MONITORING SYSTEM

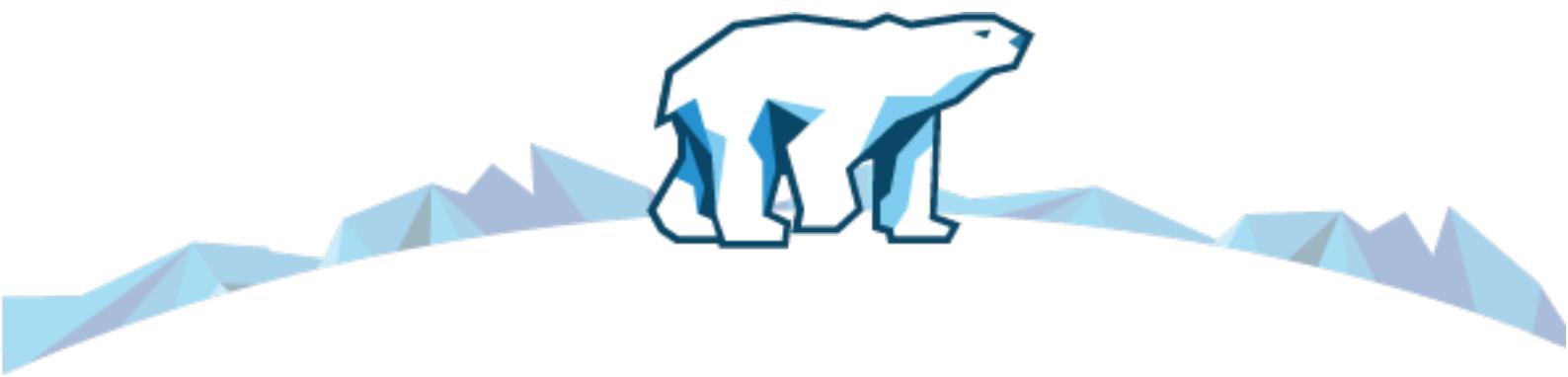
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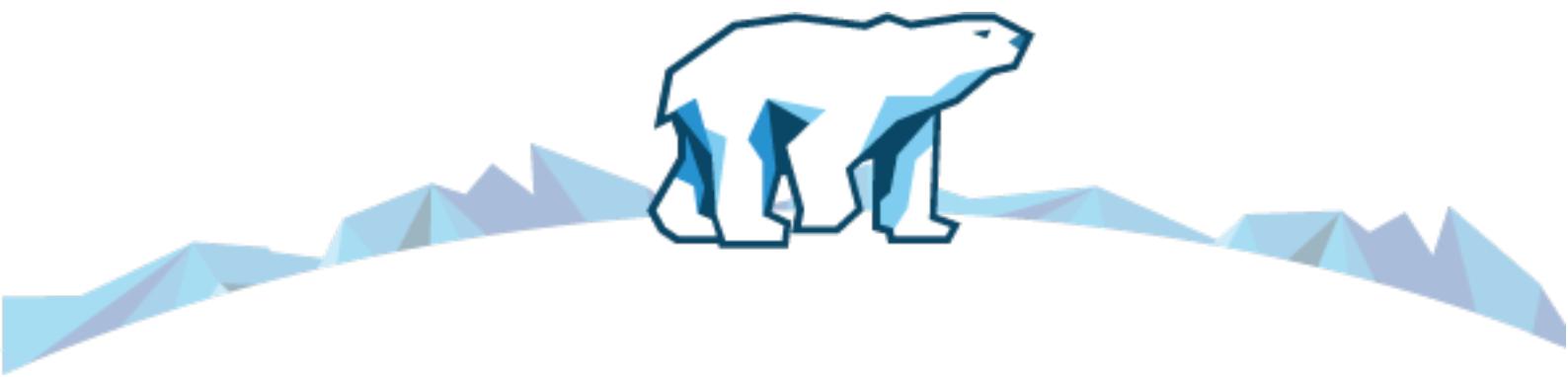
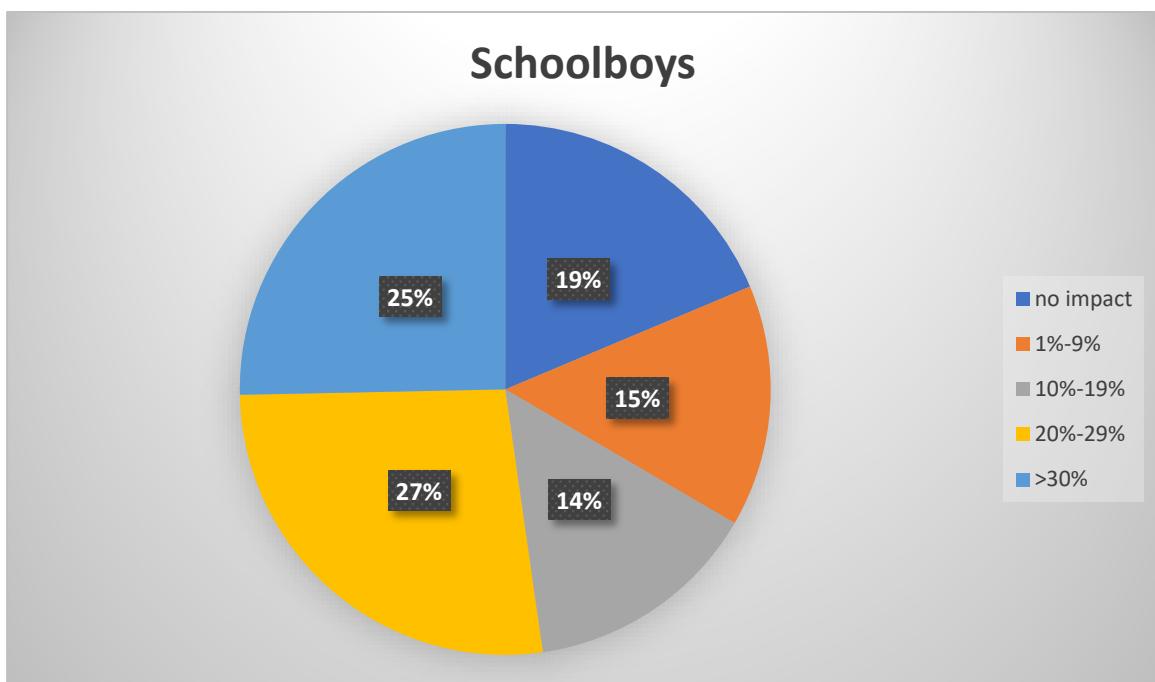
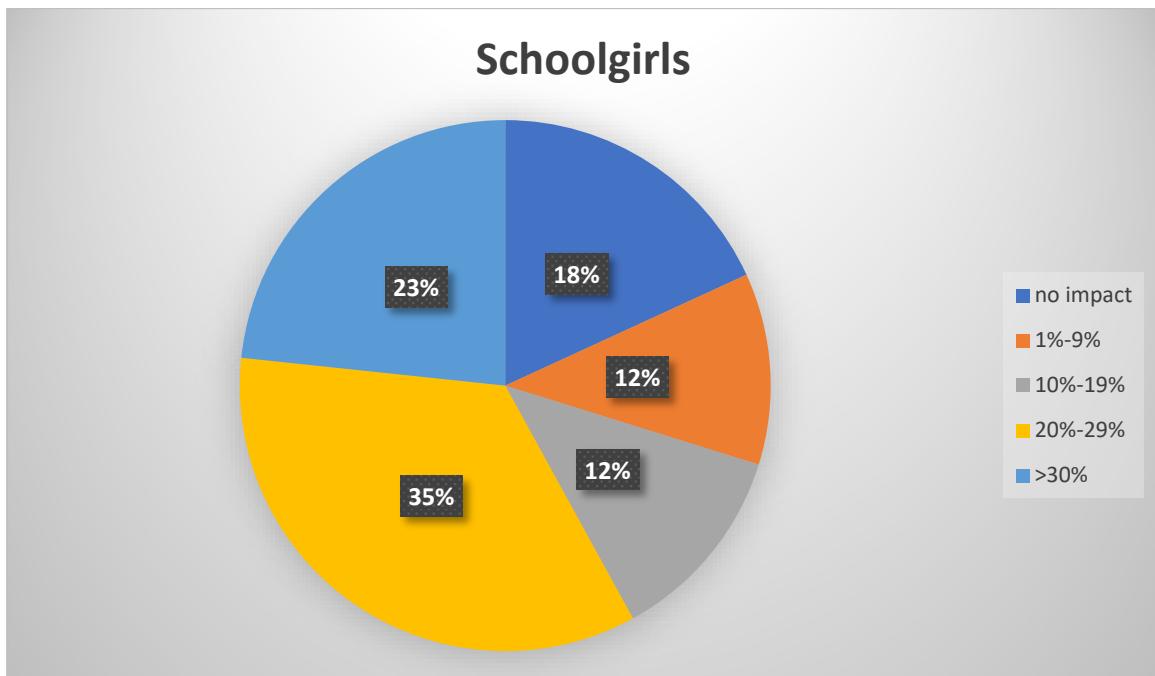


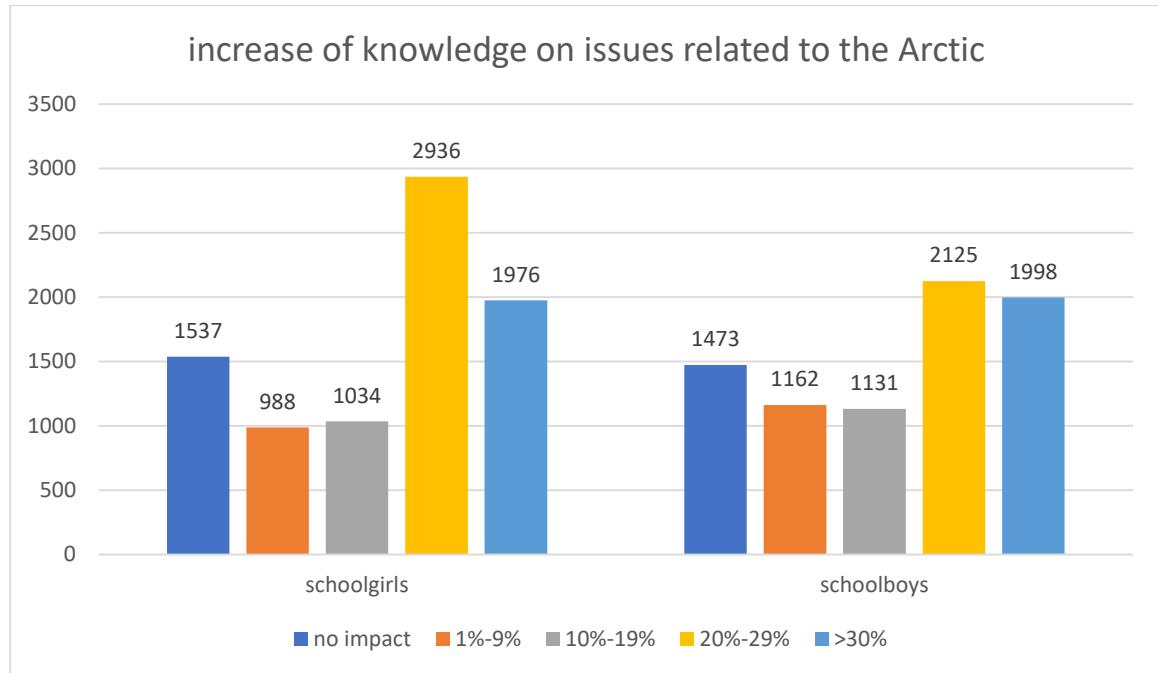
Question 4. To what extent does the project contribute as far as their increase of knowledge on issues related to the Arctic is concerned (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?

Scroll-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.	1537	1473
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 1% to 9%.	988	1162
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 10% to 19%.	1034	1131
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 20% to 29%.	2936	2125
The level of knowledge increased compared to the prior state before the EDUARCTIC project by 30% and more.	1976	1998



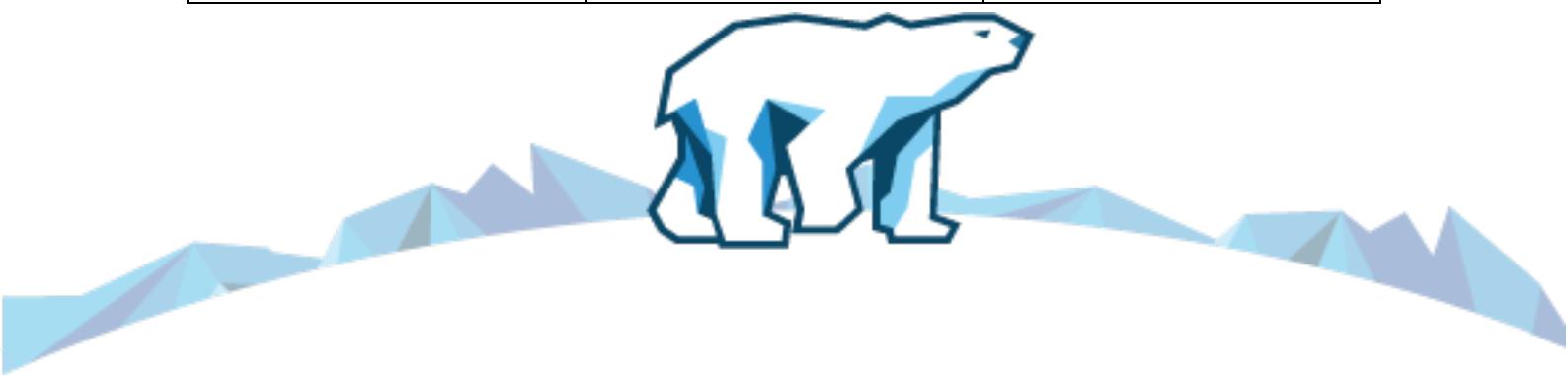




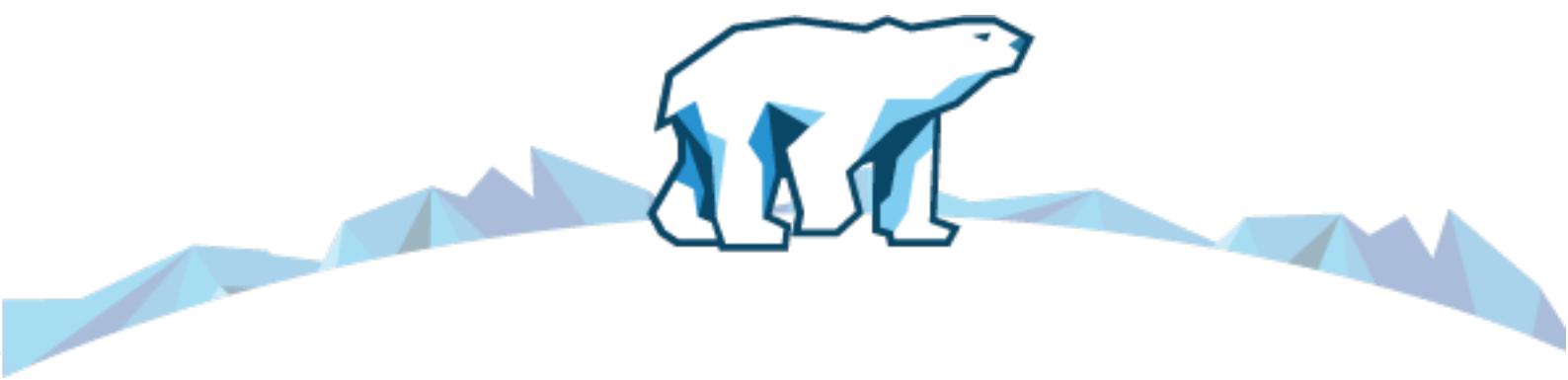
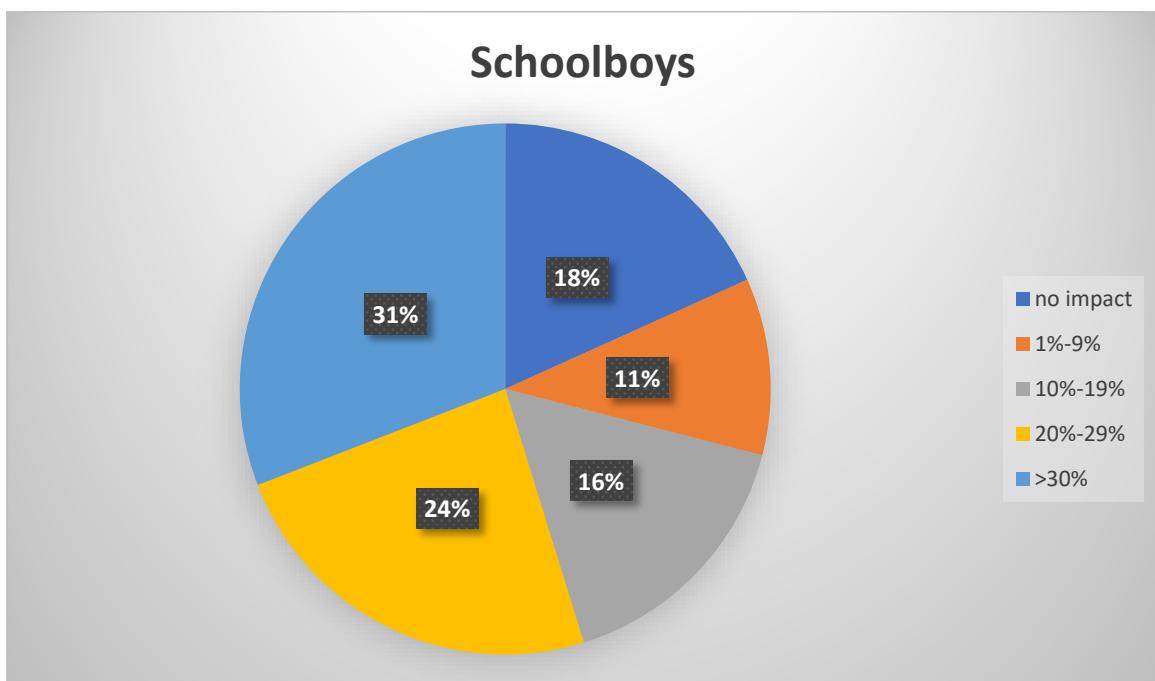
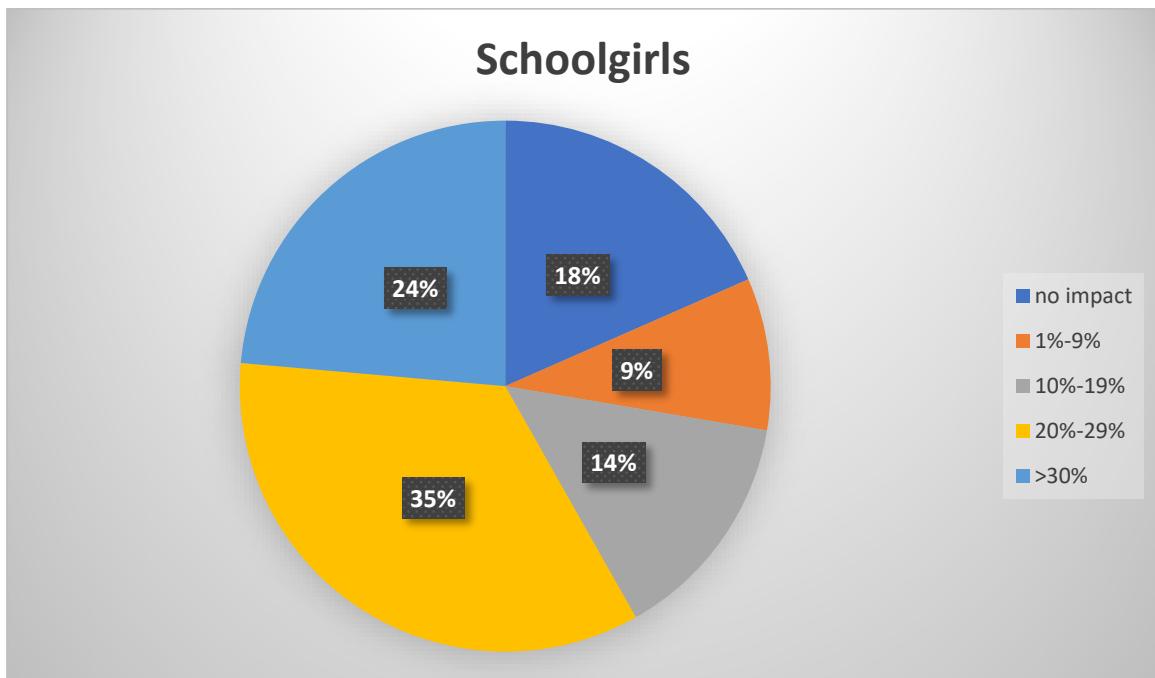
Question 5: To what extent does the project contribute to improve the level of understanding of the world of science and scientific language?

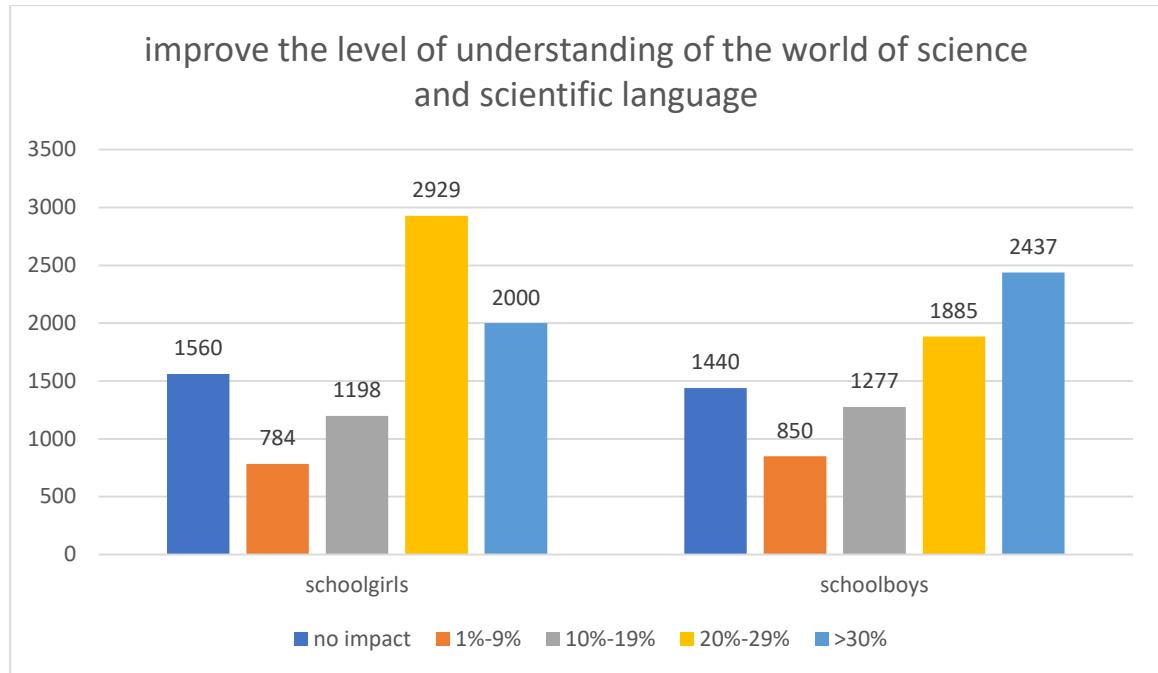
Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.	1560	1440
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 1% to 9%.	784	850
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 10% to 19%.	1198	1277
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 20% to 29%.	2929	1885
The level of knowledge increased compared to the	2000	2437



prior state before the EDUARCTIC project by 30% and more.		
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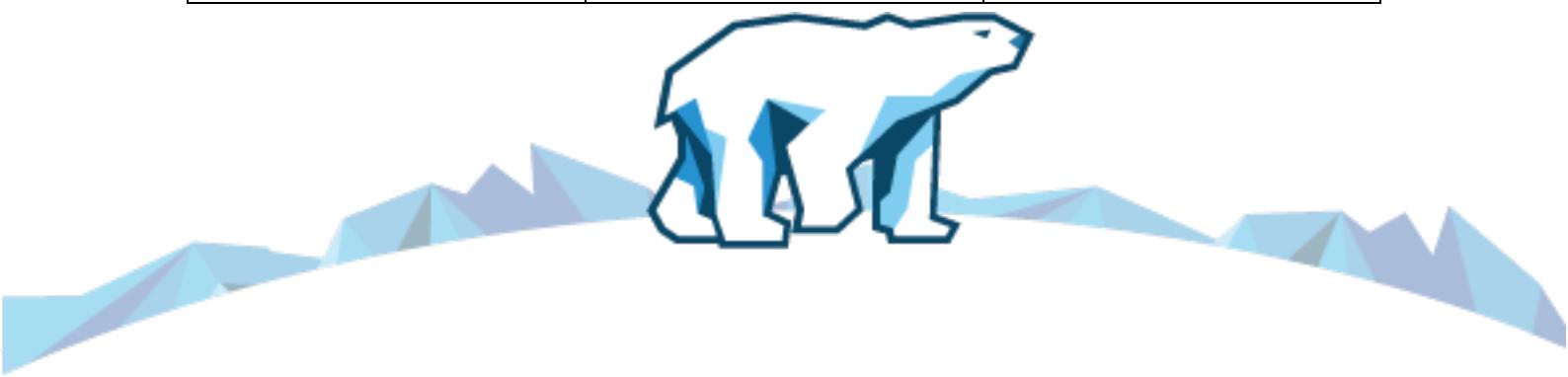




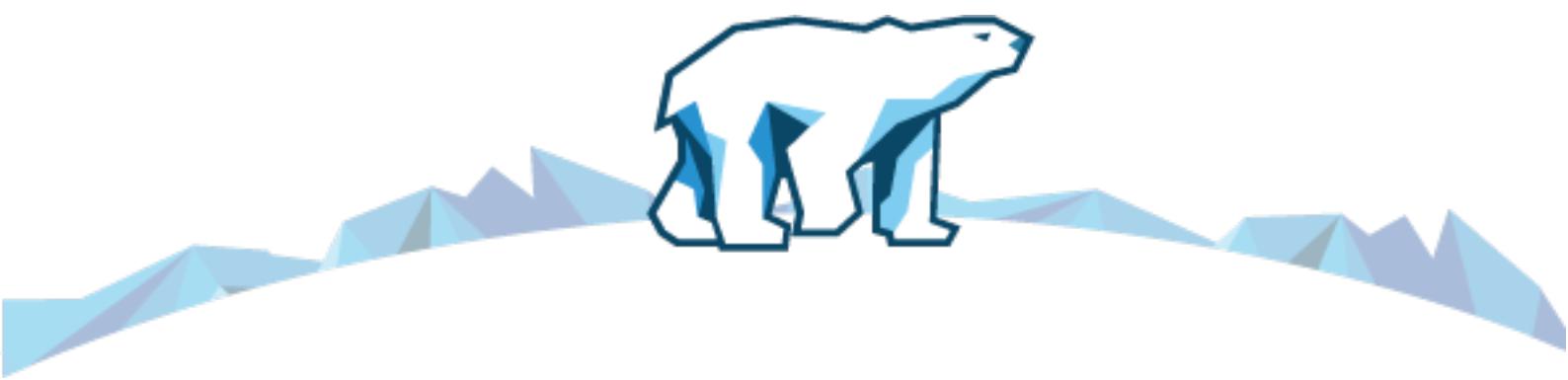
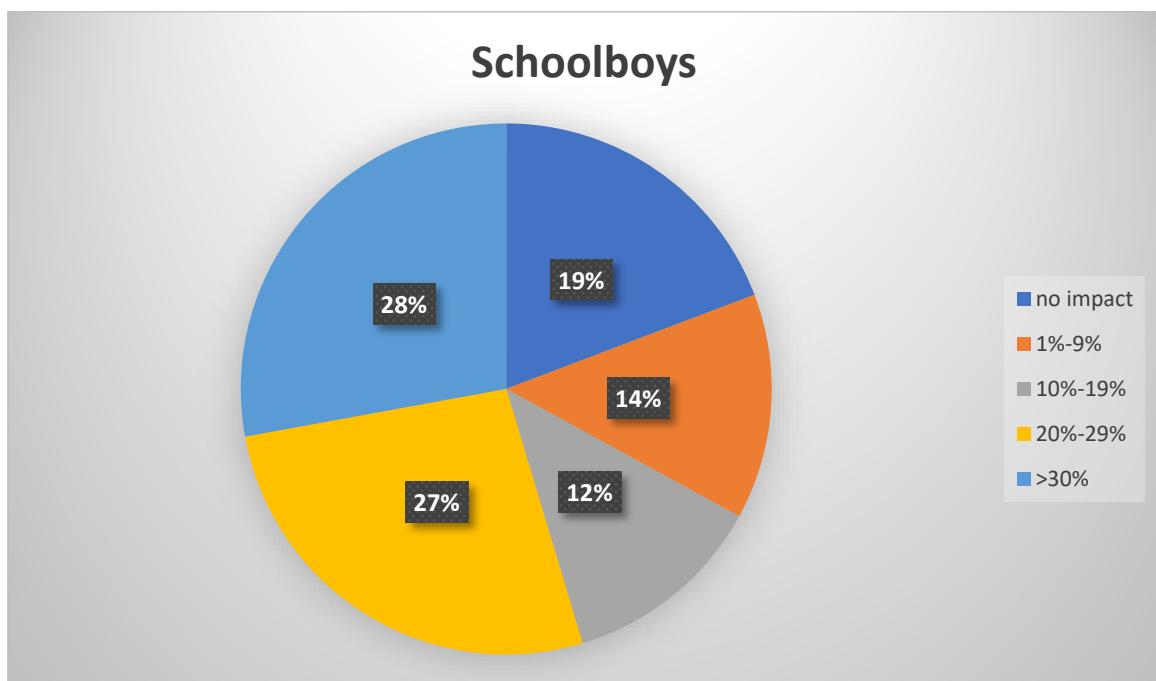
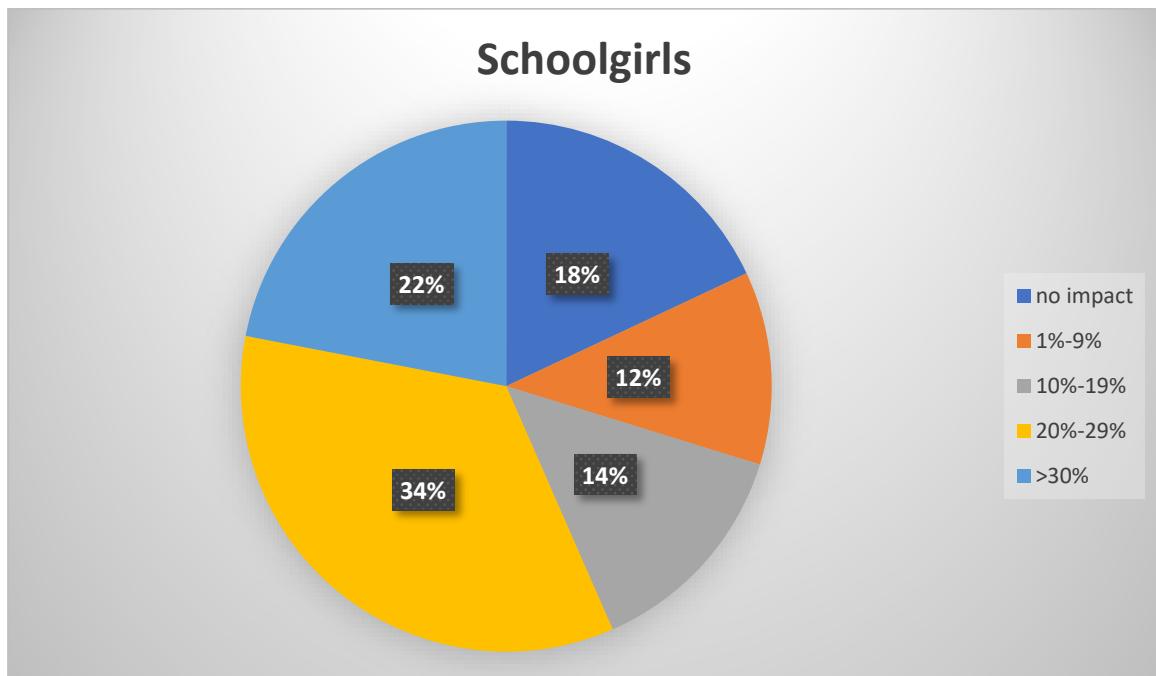
Question 6. To what extent does the project contribute to the increase of interest in STEM and scientific careers among your pupils?

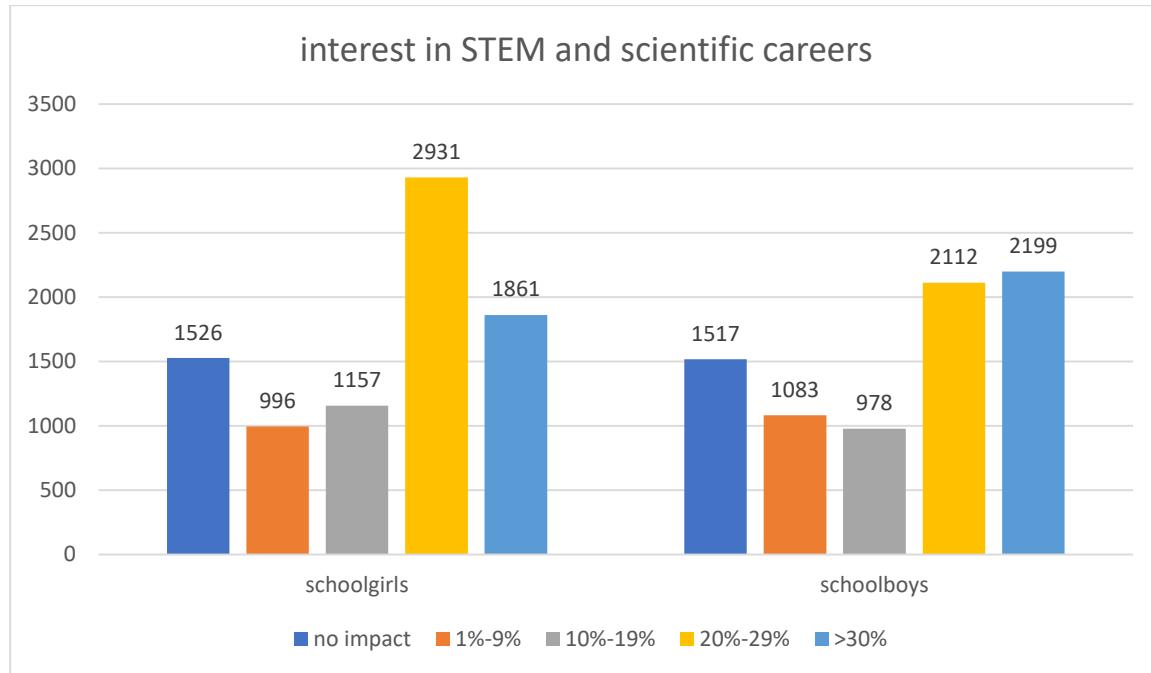
Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.	1526	1517
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 1% to 9%.	996	1083
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 10% to 19%.	1157	978
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 20% to 29%.	2931	2112
The level of knowledge increased compared to the	1861	2199



prior state before the EDUARCTIC project by 30% and more.		
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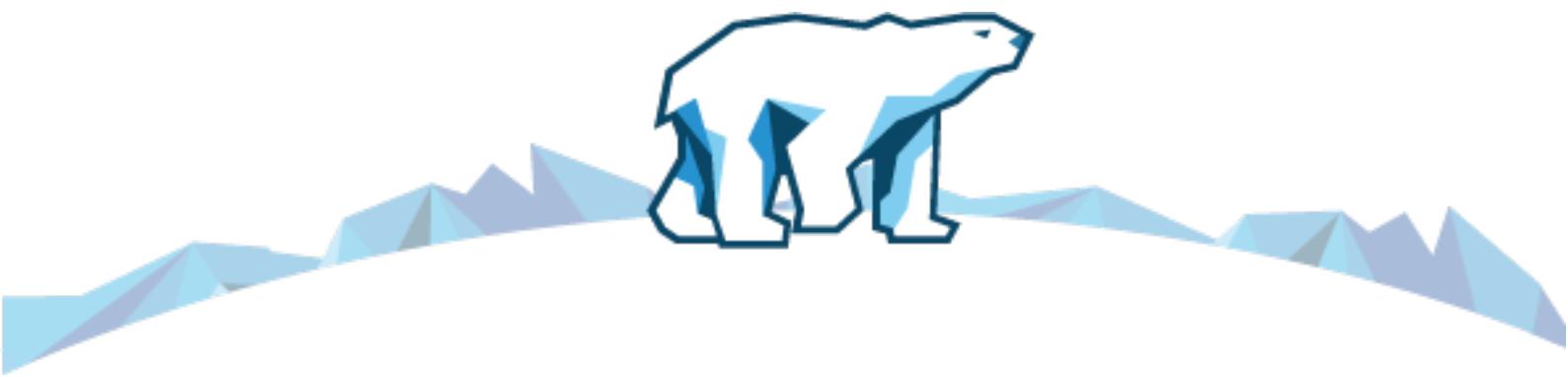
6. Evaluation question by question - description

(1) TECHNOLOGY

Question 1. Utility of (1) online lessons, (2) Polarpedia and (3) monitoring system in conducting various activities within the EDU-ARCTIC project

(1) online lessons: 45% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 6 points, 31% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 5 points, 19% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 4 points, 2% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 1, 2 and 3 points

(2) Polarpedia: 46% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 6 points, 22% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 5 points, 26% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 4



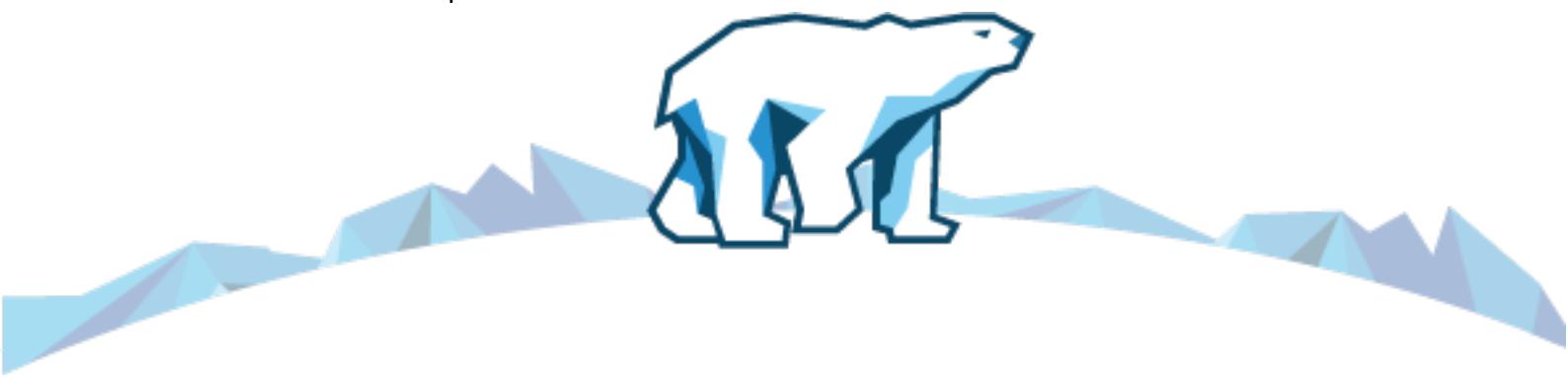
points, 3% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 1 and 3 points, no interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 2 points

(3) monitoring system: 39% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 6 points, 31% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 5 points, 23% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 4 points, 3% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 1 and 3 points, 1% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 2 points

Question 2: visual attractiveness of (1) online lessons, (2) Polarpedia and (3) monitoring system

(1) online lessons: 46% of interviewed teachers assess visual attractiveness of online lessons on the scale 1-6 with 6 points, 34% of interviewed teachers assess visual attractiveness of online lessons on the scale 1-6 with 5 points, 18% of interviewed teachers assess visual attractiveness of online lessons on the scale 1-6 with 4 points, 1% of interviewed teachers assess the visual attractiveness of online lessons on the scale 1-6 with 1 and 3 points, no of interviewed teachers assess the visual attractiveness of online lessons on the scale 1-6 with 2 points

(2) Polarpedia: 48% of interviewed teachers assess visual attractiveness of Polarpedia on the scale 1-6 with 6 points, 29% of interviewed teachers assess visual attractiveness of Polarpedia on the scale 1-6 with 5 points, 22% of interviewed teachers assess visual attractiveness of Polarpedia on the scale 1-6 with 4 points, 1% of interviewed teachers assess the visual attractiveness of Polarpedia on the scale 1-6 with 1 point, no of interviewed teachers assess the visual attractiveness of Polarpedia on the scale 1-6 with 2 and 3 points



(3) monitoring system: 33% of interviewed teachers assess visual attractiveness of monitoring system on the scale 1-6 with 6 points, 34% of interviewed teachers assess visual attractiveness of monitoring system on the scale 1-6 with 5 points, 32% of interviewed teachers assess visual attractiveness of monitoring system on the scale 1-6 with 4 points, 1% of interviewed teachers assess the visual attractiveness of monitoring system on the scale 1-6 with 3 points, no of interviewed teachers assess the visual attractiveness of monitoring system on the scale 1-6 with 1 and 2 points

Question 3: Frequency of using of (1) online lessons, (2) Polarpedia and (3) monitoring system

(1) online lessons: 33% of interviewed teachers use online lessons on average once a month, 23% of interviewed teachers use online lessons less than twice every month, 21% of interviewed teachers use online lessons a few times a month, 23% of interviewed teachers give an answer marked with the number 4 which is not specified

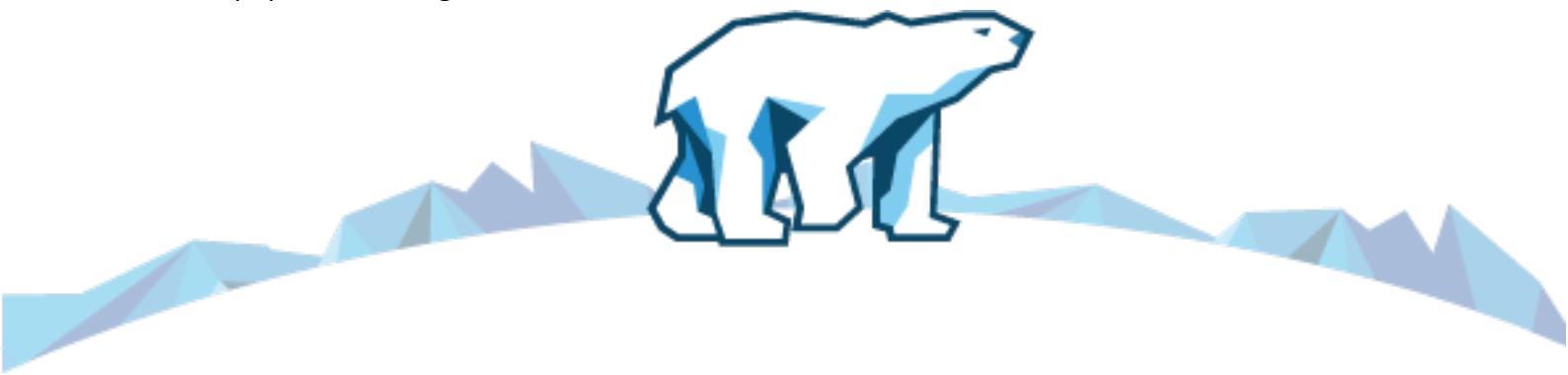
(2) Polarpedia: 40% of interviewed teachers use Polarpedia on average once a month, 31% of interviewed teachers use Polarpedia less than twice every month, 11% of interviewed teachers use Polarpedia a few times a month, 18% of interviewed teachers give an answer marked with the number 4 which is not specified

(3) monitoring system: 50% of interviewed teachers use monitoring system on average once a month, 21% of interviewed teachers use monitoring system less than twice every month, 11% of interviewed teachers use monitoring system a few times a month, 18% of interviewed teachers give an answer marked with the number 4 which is not specified

(2) FACTUAL

Question 1: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on pupils' knowledge about issues related to the Arctic

(1) online lessons: 1% of interviewed teachers assess, that online lessons have no impact on pupils' knowledge about issues related to the Arctic, 5% of interviewed teachers assess, that online lessons have little impact on pupils' knowledge about issues related to the Arctic, 52% of interviewed teachers assess, that online lessons have significant impact on pupils' knowledge about issues related to the Arctic, 42% of interviewed teachers assess,

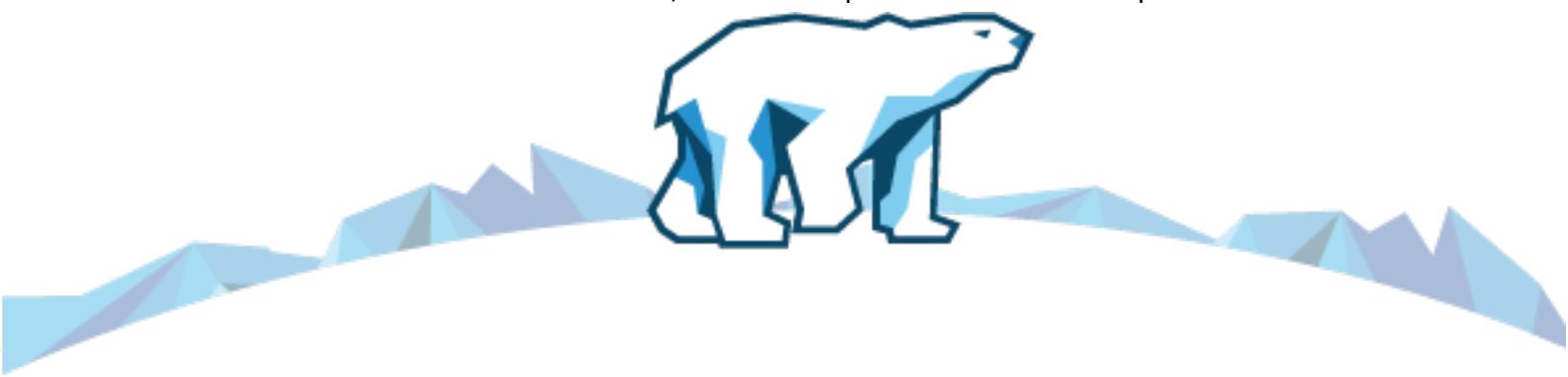


that online lessons have a very strong impact on pupils' knowledge about issues related to the Arctic

- (2) Polarpedia: 5% of interviewed teachers assess, that Polarpedia have no impact on pupils' knowledge about issues related to the Arctic, 16% of interviewed teachers assess, that Polarpedia have little impact on pupils' knowledge about issues related to the Arctic, 52% of interviewed teachers assess, that Polarpedia have significant impact on pupils' knowledge about issues related to the Arctic, 27% of interviewed teachers assess, that Polarpedia have a very strong impact on pupils' knowledge about issues related to the Arctic
- (3) monitoring system: 6% of interviewed teachers assess, that monitoring system have no impact on pupils' knowledge about issues related to the Arctic, 24% of interviewed teachers assess, that monitoring system have little impact on pupils' knowledge about issues related to the Arctic, 48% of interviewed teachers assess, that monitoring system have significant impact on pupils' knowledge about issues related to the Arctic, 22% of interviewed teachers assess, that monitoring system have a very strong impact on pupils' knowledge about issues related to the Arctic

Question 2: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on level of understanding of scientific issues and scientific language among pupils

- (1) online lessons: 1% of interviewed teachers assess, that online lessons have no impact on level of understanding of scientific issues and scientific language among pupils, 8% of interviewed teachers assess, that online lessons have little impact on level of understanding of scientific issues and scientific language among pupils, 53% of interviewed teachers assess, that online lessons have significant impact on level of understanding of scientific issues and scientific language among pupils, 38% of interviewed teachers assess, that online lessons have a very strong impact on level of understanding of scientific issues and scientific language among pupils
- (2) Polarpedia: 6% of interviewed teachers assess, that Polarpedia have no impact on level of understanding of scientific issues and scientific language among pupils, 24% of interviewed teachers assess, that Polarpedia have little impact on level of



understanding of scientific issues and scientific language among pupils, 48% of interviewed teachers assess, that Polarpedia have significant impact on level of understanding of scientific issues and scientific language among pupils, 24% of interviewed teachers assess, that Polarpedia have a very strong impact on level of understanding of scientific issues and scientific language among pupils

- (3) monitoring system: 6% of interviewed teachers assess, that monitoring system have no impact on level of understanding of scientific issues and scientific language among pupils, 22% of interviewed teachers assess, that monitoring system have little impact on level of understanding of scientific issues and scientific language among pupils, 48% of interviewed teachers assess, that monitoring system have significant impact on level of understanding of scientific issues and scientific language among pupils, 24% of interviewed teachers assess, that monitoring system have a very strong impact on level of understanding of scientific issues and scientific language among pupils

Question 3: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on level of interest in STEM and scientific careers among pupils

- (1) online lessons: 3% of interviewed teachers assess, that online lessons have no impact on level of interest in STEM and scientific careers among pupils, 7% of interviewed teachers assess, that online lessons have little impact on level of interest in STEM and scientific careers among pupils, 57% of interviewed teachers assess, that online lessons have significant impact on level of interest in STEM and scientific careers among pupils, 33% of interviewed teachers assess, that online lessons have a very strong impact on level of interest in STEM and scientific careers among pupils

- (2) Polarpedia: 6% of interviewed teachers assess, that Polarpedia have no impact on level of interest in STEM and scientific careers among pupils, 17% of interviewed teachers assess, that Polarpedia have little impact on level of interest in STEM and scientific careers among pupils, 53% of interviewed teachers assess, that Polarpedia have significant impact on level of interest in STEM and scientific careers among pupils, 24% of interviewed teachers assess, that Polarpedia have a very impact on level of interest in STEM and scientific careers among pupils



(3) monitoring system: 4% of interviewed teachers assess, that monitoring system have no impact on level of interest in STEM and scientific careers among pupils, 21% of interviewed teachers assess, that monitoring system have little impact on level of interest in STEM and scientific careers among pupils, 53% of interviewed teachers assess, that online lessons have significant impact on level of interest in STEM and scientific careers among pupils, 22% of interviewed teachers assess, that online lessons have a very strong impact on level of interest in STEM and scientific careers among pupils

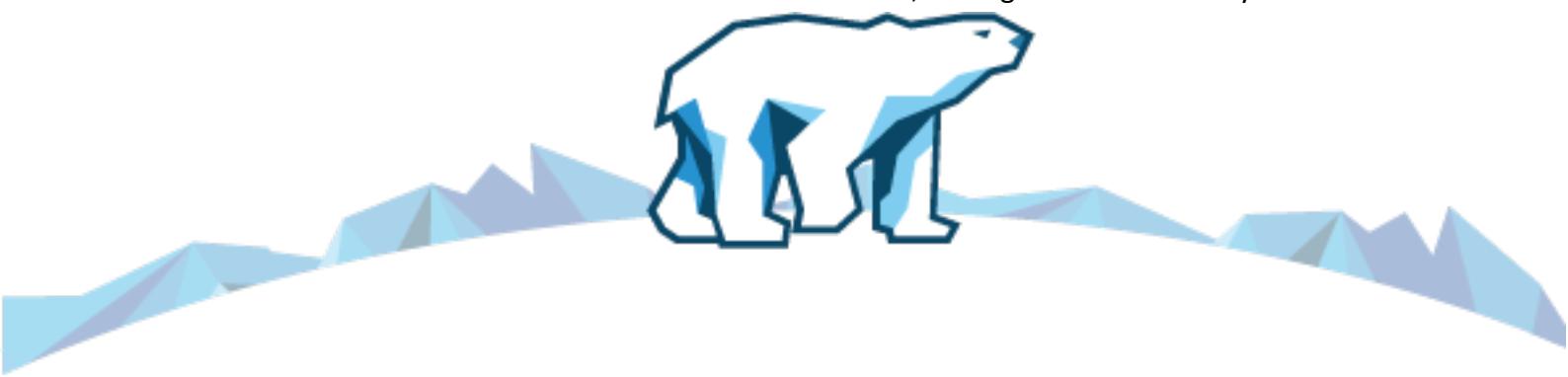
Question 4: Differences between schoolgirls and schoolboys in extension of increasing knowledge on issues related to the Arctic after the participation in EDU_ARCTIC project

schoolgirls

1. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 18% of schoolgirls
2. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 82% of schoolgirls:
among 12 % of schoolgirl the level of knowledge on issues related to the Arctic increased from 1%-9%; among 12 % of schoolgirl the level of knowledge on issues related to the Arctic increased from 10%-19%; among 35 % of schoolgirl the level of knowledge on issues related to the Arctic increased from 20%-29%; among 23 % of schoolgirl the level of knowledge on issues related to the Arctic increased from more than 30%

schoolboys

1. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 19% of schoolboys
2. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 81% of schoolboys:
among 15 % of schoolboys the level of knowledge on issues related to the Arctic increased from 1%-9%; among 14 % of schoolboys the level of knowledge on issues related to the Arctic increased from 10%-19%; among 27 % of schoolboys the level



of knowledge on issues related to the Arctic increased from 20%-29%; among 25 % of schoolboys the level of knowledge on issues related to the Arctic increased from more than 30%

Question 5: Differences between schoolgirls and schoolboys in understanding of the world of science and scientific language after taking part in the EDU-ARCTIC project

schoolgirls

1. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 18% of schoolgirls

2. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 82% of schoolgirls:

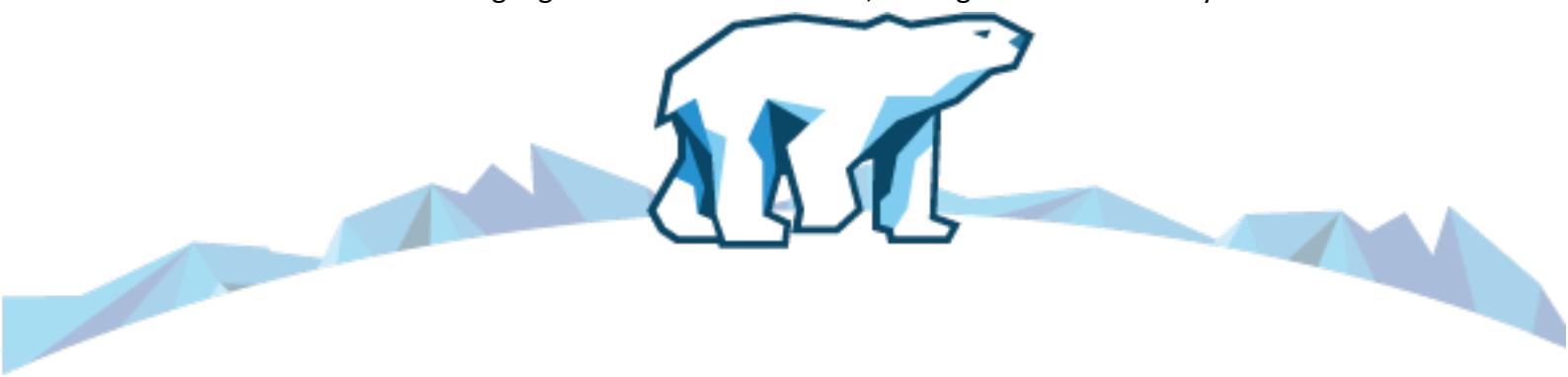
among 9 % of schoolgirl the level of understanding of the world of science and scientific language increased from 1%-9%; among 14 % of schoolgirl the level of understanding of the world of science and scientific language increased from 10%-19%; among 35 % of schoolgirl the level of understanding of the world of science and scientific language increased from 20%-29%; among 29 % of schoolgirl the level of understanding of the world of science and scientific language increased from more than 30%

schoolboys

1. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 18% of schoolboys

2. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 82% of schoolboys:

among 11 % of schoolboys the level of understanding of the world of science and scientific language increased from 1%-9%; among 16 % of schoolboys the level of



understanding of the world of science and scientific language increased from 10%-19%; among 24 % of schoolboys the level of understanding of the world of science and scientific language increased from 20%-29%; among 31 % of schoolboys the level of understanding of the world of science and scientific language increased from more than 30%

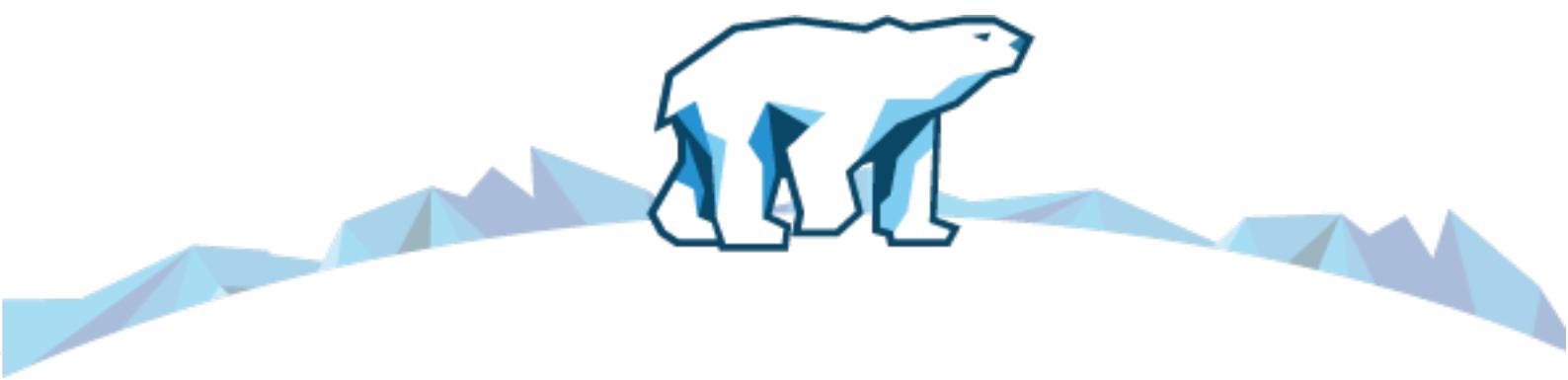
Question 6: Differences between schoolgirls and schoolboys in increase of interest in STEM and scientific careers after taking part in the EDU-ARCTIC project

schoolgirls

1. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 18% of schoolgirls
2. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 82% of schoolgirls:
among 12 % of schoolgirl the level of interest in STEM and scientific careers increased from 1%-9%; among 14 % of schoolgirl the level of interest in STEM and scientific careers increased from 10%-19%; among 34 % of schoolgirl the level of interest in STEM and scientific careers increased from 20%-29%; among 22 % of schoolgirl the level of interest in STEM and scientific careers increased from more than 30%

schoolboys

1. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 19% of schoolboys
2. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 81% of schoolboys:
among 14 % of schoolboys the level of interest in STEM and scientific careers increased from 1%-9%; among 12 % of schoolboys the level of interest in STEM and scientific careers increased from 10%-19%; among 27 % of schoolboys the level of interest in STEM and scientific careers increased from 20%-29%; among 28 % of schoolboys the level of interest in STEM and scientific careers increased from more than 30%

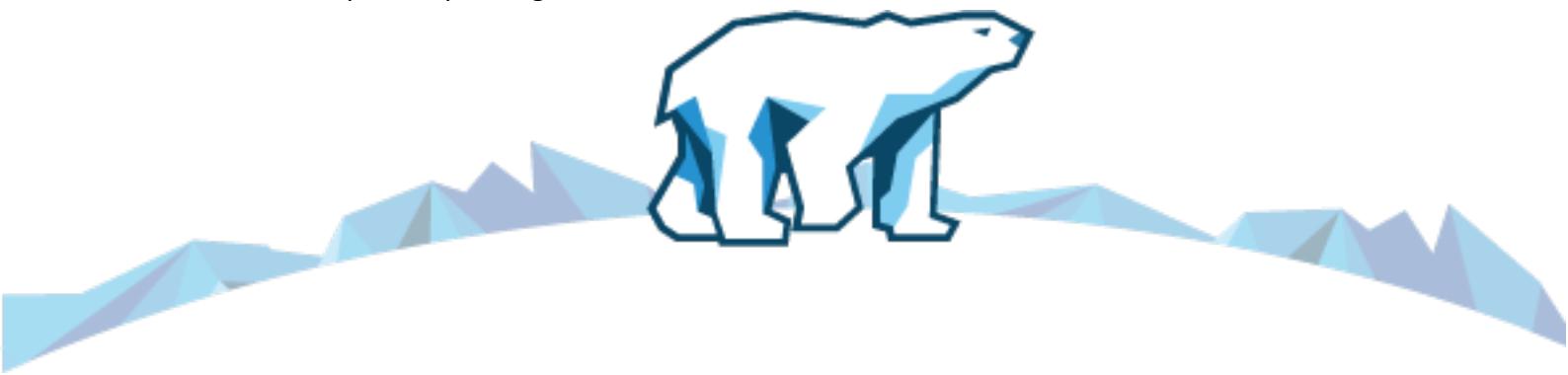


7. General evaluation of the “During EDU-ARCTIC” survey

The survey permits remarks about factual aspects of the EDU-ARCTC project like utility, visual attractiveness and frequency of using of on-line lessons, Polarpedia and monitoring system and technical aspects of the EDU-ARCTIC project like opinion of interviewed teachers about the impact of online lessons, Polarpedia and the monitoring system on pupils' knowledge about issues related to the Arctic, on the level of understanding of scientific issues and scientific language among pupils and the level of interest in STEM and scientific careers among pupils. The survey also allows to trace the differences between schoolgirls and schoolboys in extension of increasing knowledge on issues related to the Arctic, in their understanding of the world of science and scientific language and increase of interest in STEM and scientific careers after taking part in the EDU-ARCTIC project. The largest group of teachers who filled in the survey comes from Central and Eastern Europe.

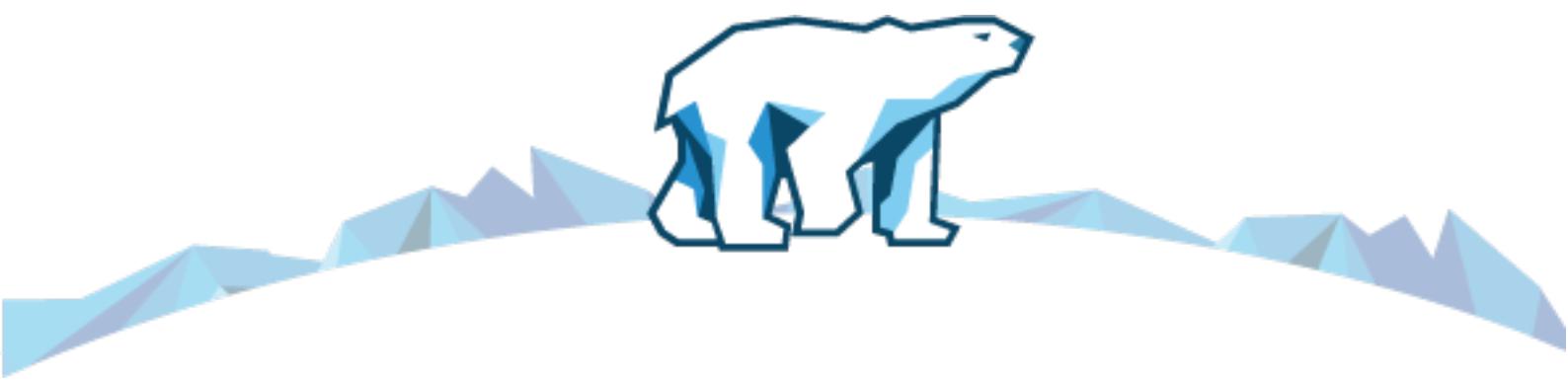
A clear majority of interviewed teachers esteem that all modules of the project are useful in conducting various activities within the project. The most useful module are the online lessons (76%). 70% of interviewed teachers esteem that the monitoring system and 68% that Polarpedia are useful in conducting various activities within the project. The reasons for assessing the modules as not so useful are determined by working conditions of teachers in a number of schools: problems with organising activities outside the classroom, fitting the online lesson into the plan, no time to organise monitoring activities, not enough staff or new staff at school; problems that pupils have can also be a notable factor, such as lacking English-language skills, the difficulty to create the habit of visiting the Polarpedia pages, lack of interest among pupils, monitoring system considered too difficult; problems concerning the realization of project activities: technical problems, recorded lessons considered difficult to locate online.

The clear majority of interviewed teachers esteems that in terms of visual attractivity the most efficient modules are the online lessons (80%) and Polarpedia (77%). 67% of interviewed teachers assess the monitoring system as the most visual attractive module. There are no evaluable replies explaining reasons for other assessments. The module which is most used



by interviewed teachers are the online lessons (21%). Most of interviewed teachers esteem that they use the online lessons (33%), Polarpedia (40%) and monitoring system (50%) on average once a month. The reason for using the projects' modules rarely are determined by working conditions of teachers in a number of schools: teachers are involved in other projects and school activities, they lack time, have problems with fitting the online lessons into the syllabus, transmission time, school holidays, no related lessons to the syllabus, infrastructure problems, teachers are already familiar with Polarpedia terms, preparing/ explaining/ translating Polarpedia terms means extra work for teachers, missing internet connexion; problems that pupils have can also be a notable factor: lacking English-language skills, teachers prefer using terms in their mother tongue, pupils use other materials than Polarpedia, not enough interested and motivated pupils, pupils' forgetfulness, the monitoring system considered too difficult; problems concerning the realization of project activities: technical problems, lack of didactic materials.

Most interviewed teachers assess that online lessons (94%), Polarpedia (91%) and the monitoring system have (90%) a significant or very strong impact on pupils' knowledge about issues related to the Arctic. Concerning the question of no impact, 1% of interviewed teachers assess that there is no impact of online lessons, 5% as far as Polarpedia is concerned and 6% in relation to the monitoring system. Regarding pupils' knowledge about issues related to the Arctic, the largest percentages concerning the answer that the impact is little are 5%, 16% and 24% respectively. As to the level of understanding of scientific issues and scientific language among pupils, the largest numbers of teachers considering that the impact is only little are: 8% regarding online lessons, 24% Polarpedia and 22% concerning the monitoring system. Just a few teachers assess that all modules have no impact on the level of understanding of scientific issues and scientific language among pupils (1%, 6%, 6%). The interviewed teachers consider that online lessons (7%), Polarpedia (17%) and the monitoring system (21%) have a little impact on the level of interest in STEM and scientific careers among pupils. Just a few teachers assess that all modules have no impact on the interest in STEM and scientific careers among pupils (3%, 6%, 4%).



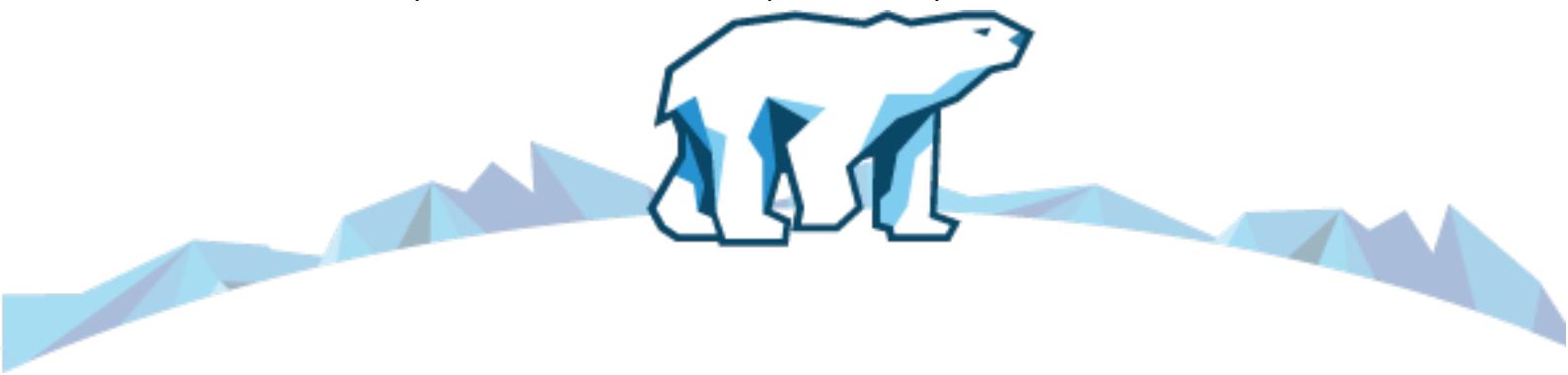
Concerning the increase of the level of knowledge on issues related to the Arctic, teachers esteem that there was no increase at all among 18% of schoolgirls and 19% of schoolboys (i.e. 1% more among boys than girls), an increase of 1 to 9% concerns 15% of all boys and 12% of all girls (i.e. 3% more among boys than girls), an increase of 10 to 19% concerns 14% of all boys and 12% of all girls (i.e. 2% more among boys than girls); in the category 20 to 29% increase, 27% of all boys and 35% of all girls (i.e. 8% more among girls than boys); in the category 30% and above, 25% of all boys and 23% of all girls (i.e. 2% more among boys than girls).

As to the project's impact on the level of understanding of the world of science and scientific language, the interviewed teachers esteem that it no impact whatsoever on 18% of all boys and 18% of all girls; an increase of 1 to 9% concerns 11% of all boys and 9% of all girls (i.e. 2% more among boys than girls); an increase of 10 to 19% concerns 16% of all boys and 14% of all girls (i.e. 2% more among boys than girls); in the category 20 to 29% increase, 24% of all boys and 35% of all girls (i.e. 11% more among girls than boys); in the category 30% and above, 31% of all boys and 29% of all girls (i.e. 2% more among boys than girls).

Concerning increased interest in STEM and scientific careers, teachers esteem that the interest has not risen at all among 19% of all boys and 18% of all girls (i.e. 1% more among boys than girls); an increase of 1 to 9% concerns 14% of all boys and 12% of all girls (i.e. 2% more among boys than girls); an increase of 10 to 19% concerns 12% of all boys and 14% of all girls (i.e. 2% more among girls than boys); in the category 20 to 29% increase, 27% of all boys and 34% of all girls (i.e. 7% more among girls than boys); in the category 30% and above, 28% of all boys and 22% of all girls (i.e. 6% more among boys than girls).

8. Evaluation of the CAWI Main survey – “After EDU-ARCTIC” survey

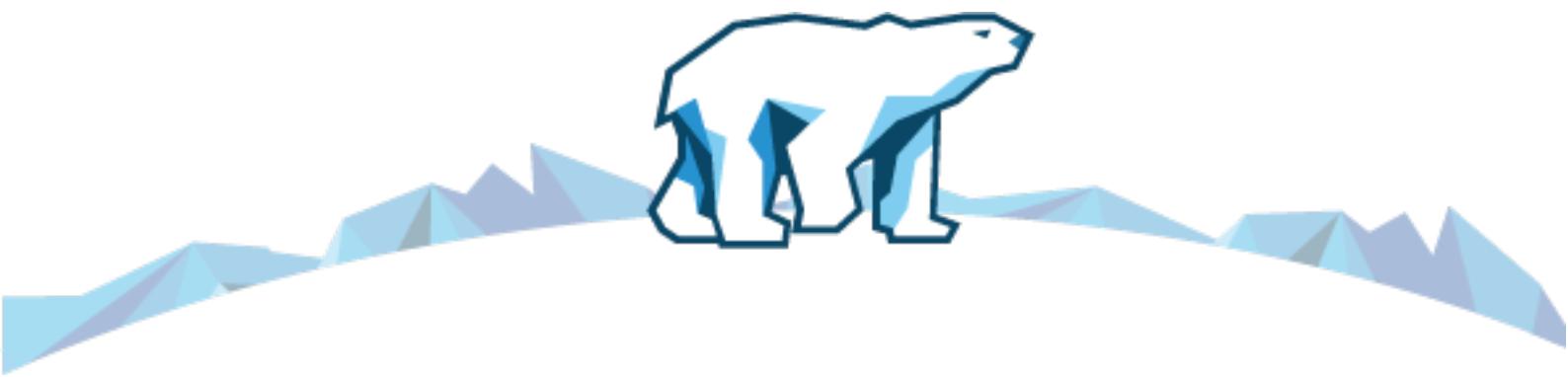
The evaluation report draws on the results of the “teacher_cawi_main_survey_after” (excel-file sent to UVSQ by Agata Goździk, 1.03.2019, 15:56), “20190226_teacher_cawi_main_survey_after_filled_at_least_first_page” (excel-file sent to UVSQ by Agata Goździk, 1.03.2019, 15:56) and “cawi_main_survey_desk” (pdf-file, sent to UVSQ by Agata Goździk, 5.3.2018, 16:37, document created by AG, 25.01.2017). The first file contains 80 anonymous teacher CAWI surveys, filled in by teachers from 19 countries from

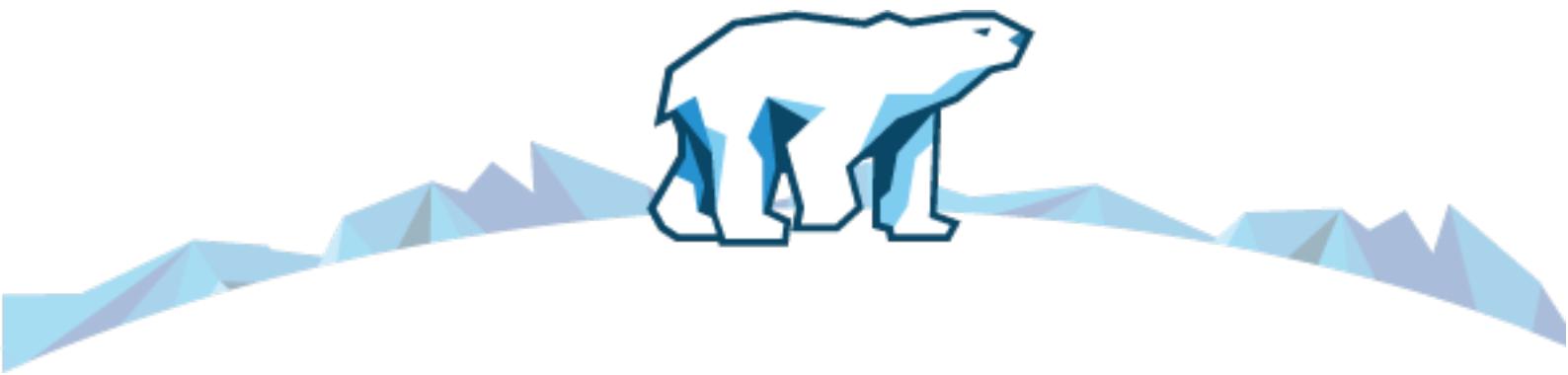
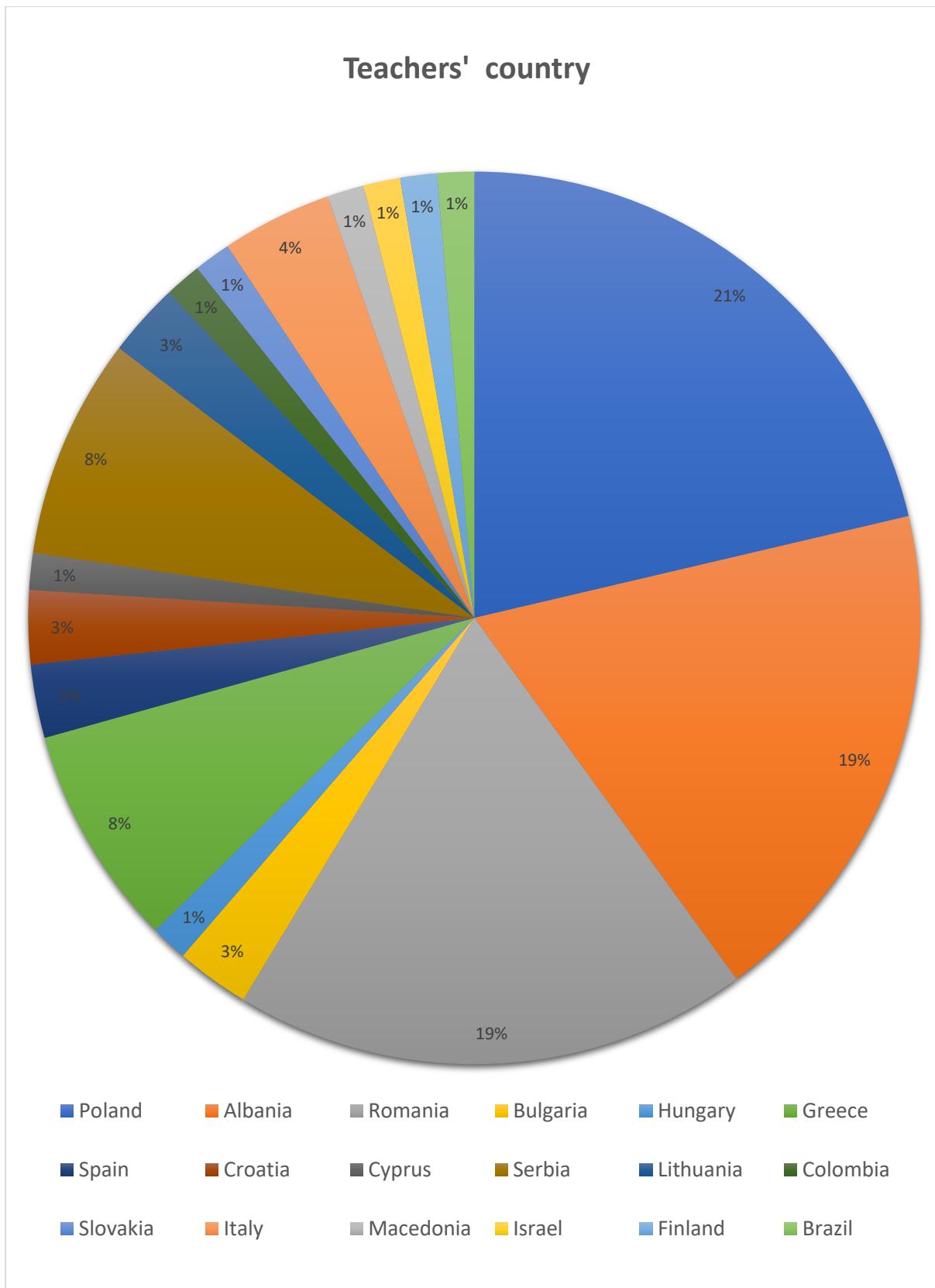


Western and Southern Europe - Greece, Spain, Cyprus, Italy, Israel; Northern Europe – Finland; Central and Eastern Europe – Poland, Albania, Romania, Bulgaria, Hungary, Croatia, Serbia, Lithuania, Slovenia, Macedonia and also from Colombia and Brazil during the period 7.01.2019-20.02.2019. The second document contains 99 anonymous teacher surveys – 80 completed and 19 uncompleted. The third document contains a template/ description of the main survey.

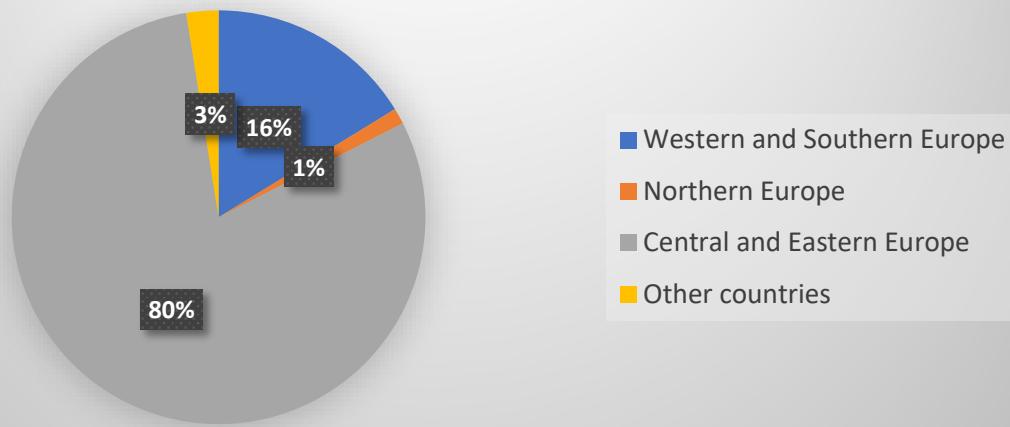
The three countries most largely represented in this survey are Poland (21%), Albania (19%), and Romania (19%). 8% of the survey were filled in by teachers from Greece and Serbia. 4% of the survey were filled in by teachers from Italy. 3% of the survey (2 teachers/ surveys) were filled in by teachers from Bulgaria, Croatia, Spain, Lithuania. 1% of the surveys were filled in by teachers from Cyprus, Latvia, Colombia, Slovakia, Macedonia, Israel, Hungary, Finland, Brazil.

Most of the surveys were filled in by teachers from Central and Eastern Europe (80%). 16% of the surveys were filled in by teachers from Western Europe and 1 survey from Northern Europe, 1 from Colombia and 1 from Brazil. 75% of the teachers who filled in the survey are women and 25% men.

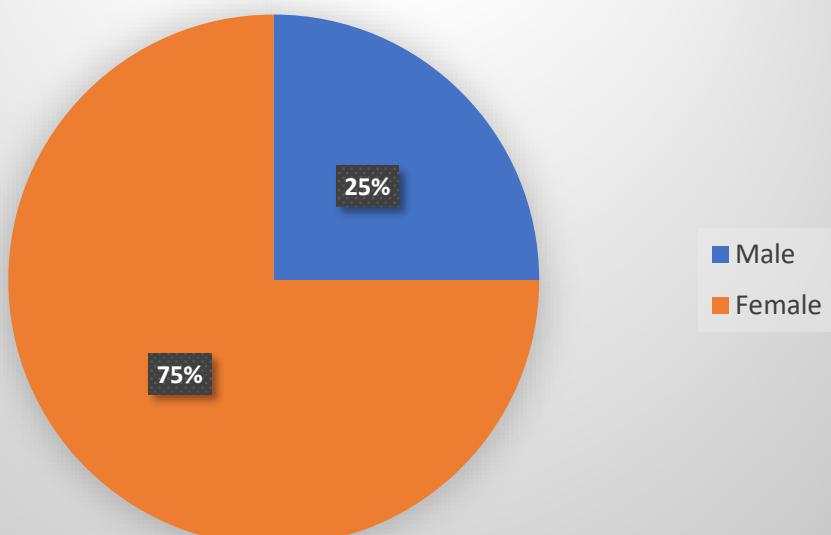




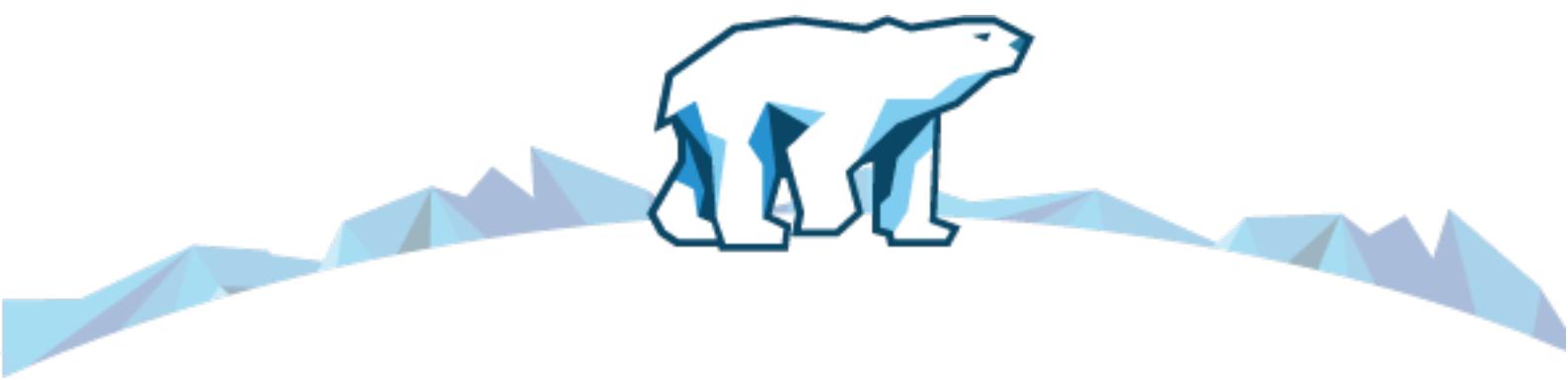
Participation in the main survey in Western and Southern, Northern, Central and Eastern Europe

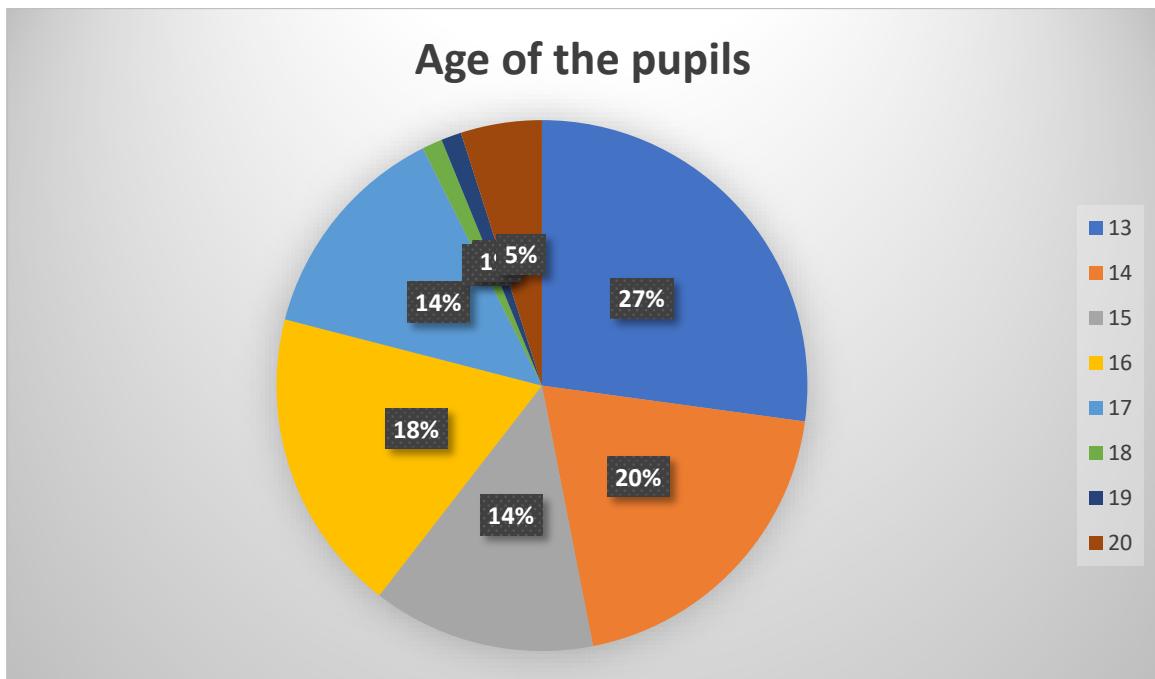


Teachers' sex



Concerning the “age of the pupils in their class”, indications vary between 13-20. The single largest group of interviewed teachers – 22 – indicated the age of 13 years. Only 1 teacher indicated 18 and 19, four 20. Thus, the majority of teachers have pupils in the age of 13 to 17.

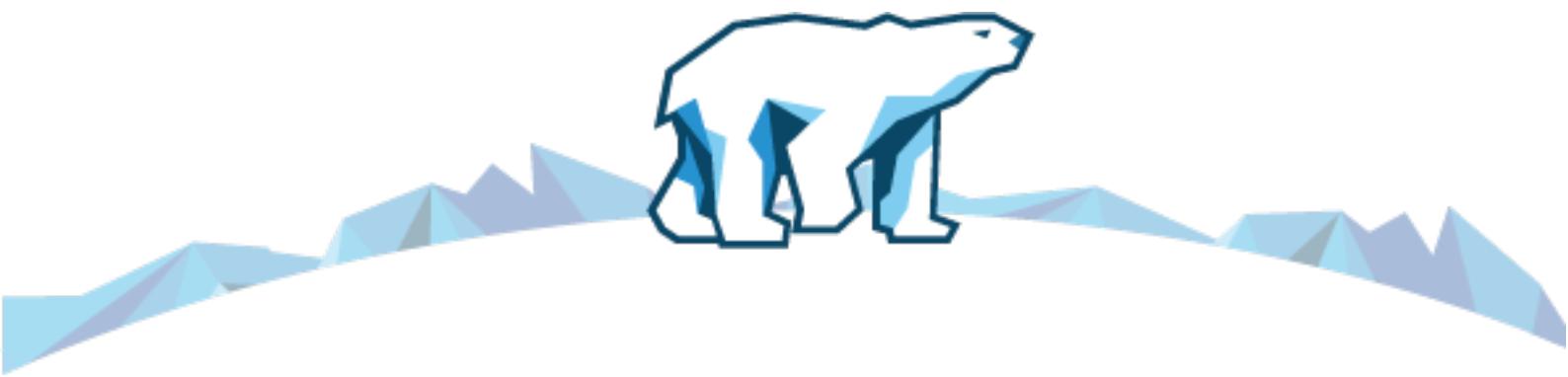




The total number of schoolgirls indicated by teachers is 1412 and 1522 schoolboys. The teachers who filled in the survey all participated in the project for at least a year, though their scores in EDU-GAME vary from 200 points to 24078 points, with 13 teachers scoring above 10000 points and 24 below 1000 points out of a total of 80 teachers participating in the survey.

The survey was divided into 2 parts: (1) TECHNOLOGY including 3 questions about the various modules of the EDU-ARCTIC portal and (2) FACTUAL including 6 questions about the impact of the project on pupils (e.g. interest, understanding, knowledge). The 3 questions dedicated to the technology were multiple choice questions with a descriptive part. According to the given answer teachers had to explain their choice. The category – factual contains 6 multiple choice questions. The last 3 questions distinguish between schoolgirls and schoolboys.

All questions allow to collect the subjective opinion of anonymous teachers from 17 European countries, as well as Colombia and Brazil, on technical aspects of the EDU-ARCTIC project like utility, visual attractiveness and the frequency of using online lessons, Polarpedia and the monitoring system and factual aspects like the impact of online lessons, Polarpedia and the monitoring system on the knowledge, skills and interest of pupils on STEM and increase of knowledge, understanding and interest in STEM as a result of EDU-ARCTIC among schoolgirls



and schoolboys. Teachers were asked to estimate their pupils' knowledge, interest, understanding of STEM and the impact of EDU-ARCTIC on those aspects.

The following items were collected in particular:

(1) TECHNOLOGY:

Question 1: Utility of (1) online lessons, (2) Polarpedia and (3) monitoring system in conducting various activities within the EDU-ARCTIC project; reason for teachers' evaluation and recommended changes; Question 2: visual attractiveness of (1) online lessons, (2) Polarpedia and (3) monitoring system; reason for teachers' evaluation and recommended changes; Question 3: Frequency of using of (1) online lessons, (2) Polarpedia and (3) monitoring system; factors that determine your school's non-participation or lack of use and interest.

(2) FACTUAL

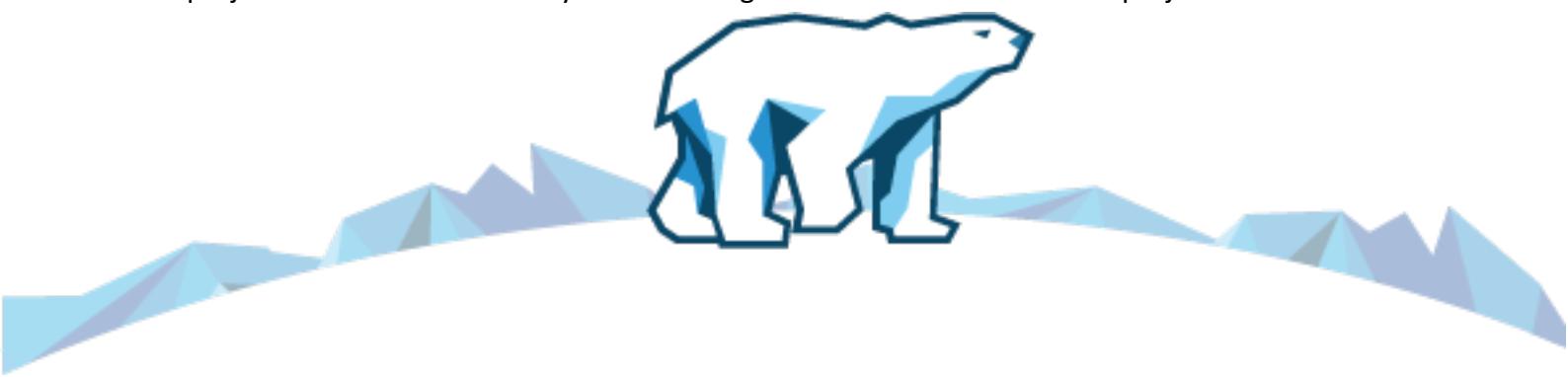
Question 1: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on pupils' knowledge about issues related to the Arctic; Question 2: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on the level of understanding of scientific issues and scientific language among pupils; Question 3: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on the level of interest in STEM and scientific careers among pupils; Question 4: Differences in extension of increasing of pupils' knowledge on issues related to the Arctic between schoolgirls and schoolboys after the participation in EDU-ARCTIC; Question 5: Differences in contribution of EDU-ARCTIC to improve the level of pupils' understanding of the world of science and scientific language between schoolgirls and schoolboys; Question 6: Differences in contribution of the EDU-ARCTIC project to the increase of interest in STEM and scientific careers among schoolgirls and schoolboys.

The values to be chosen from vary from question to question.

9. Evaluation question by question

(1) TECHNOLOGY

Question 1. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal and the whole EDU-ARCTIC project in terms of their utility in conducting various activities within the project:



1. ONLINE LESSONS

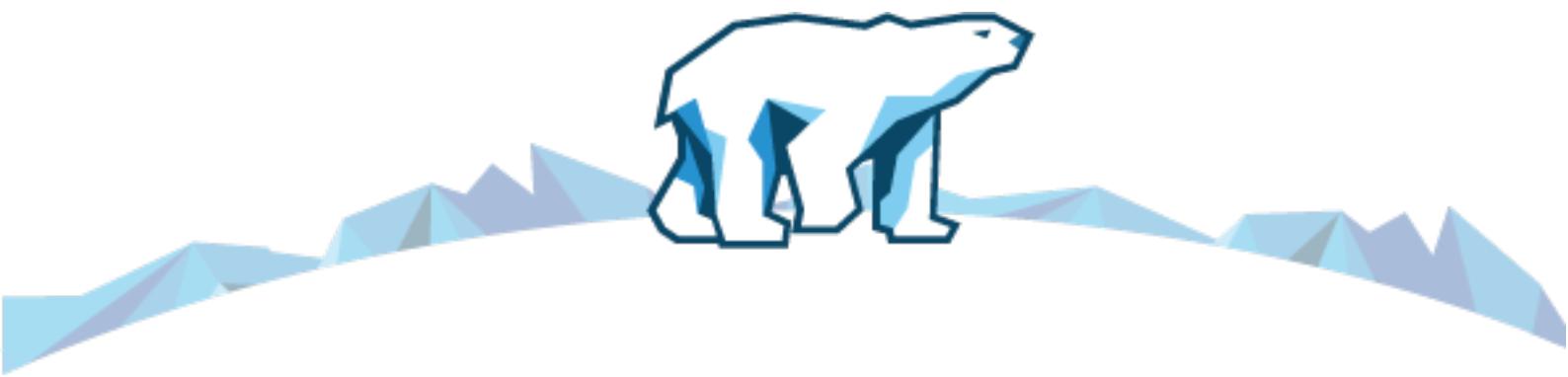
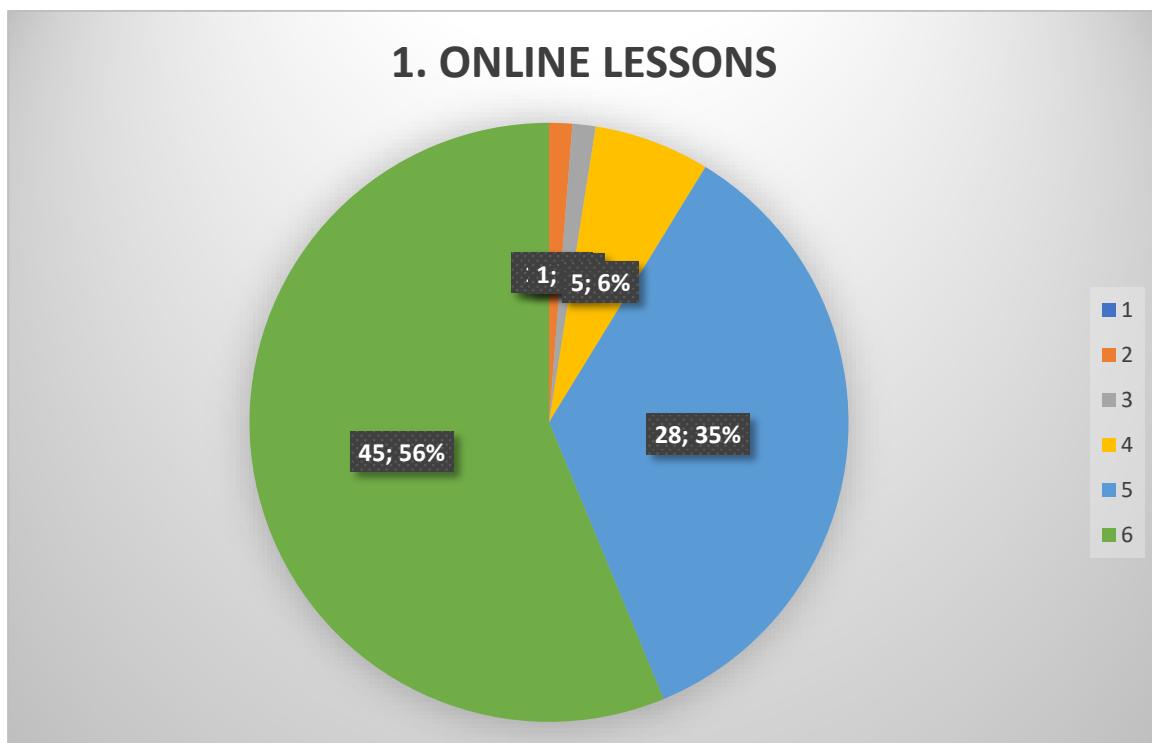
1 2 3 4 5 6

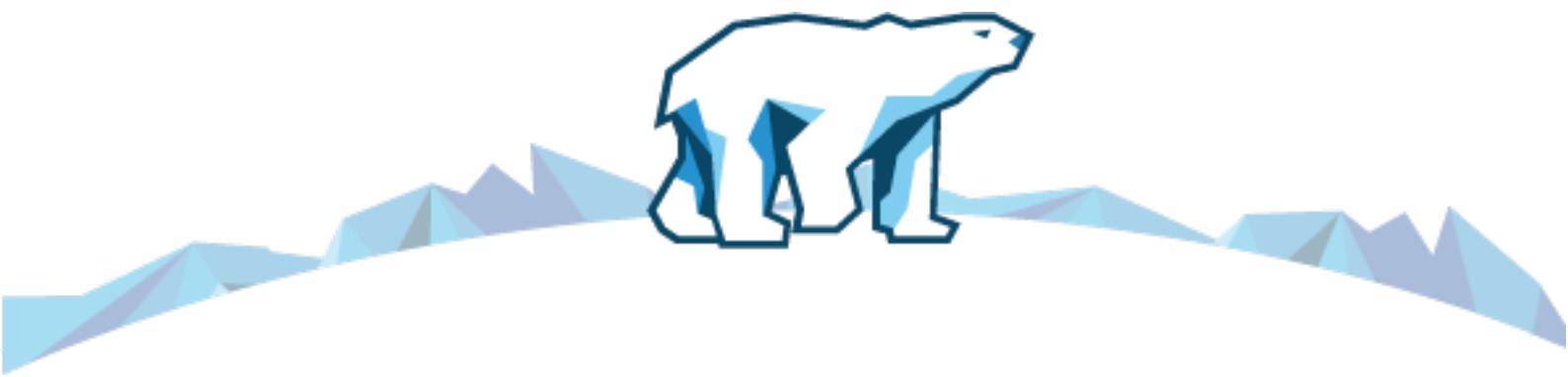
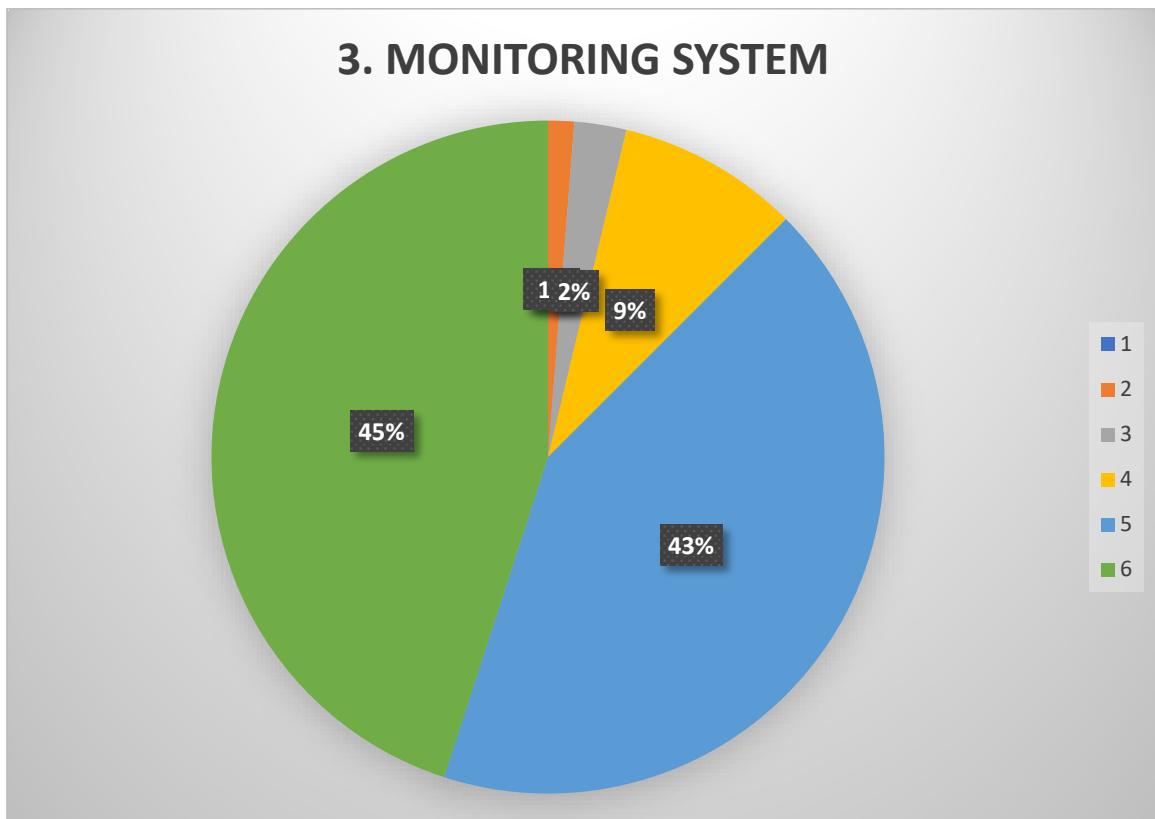
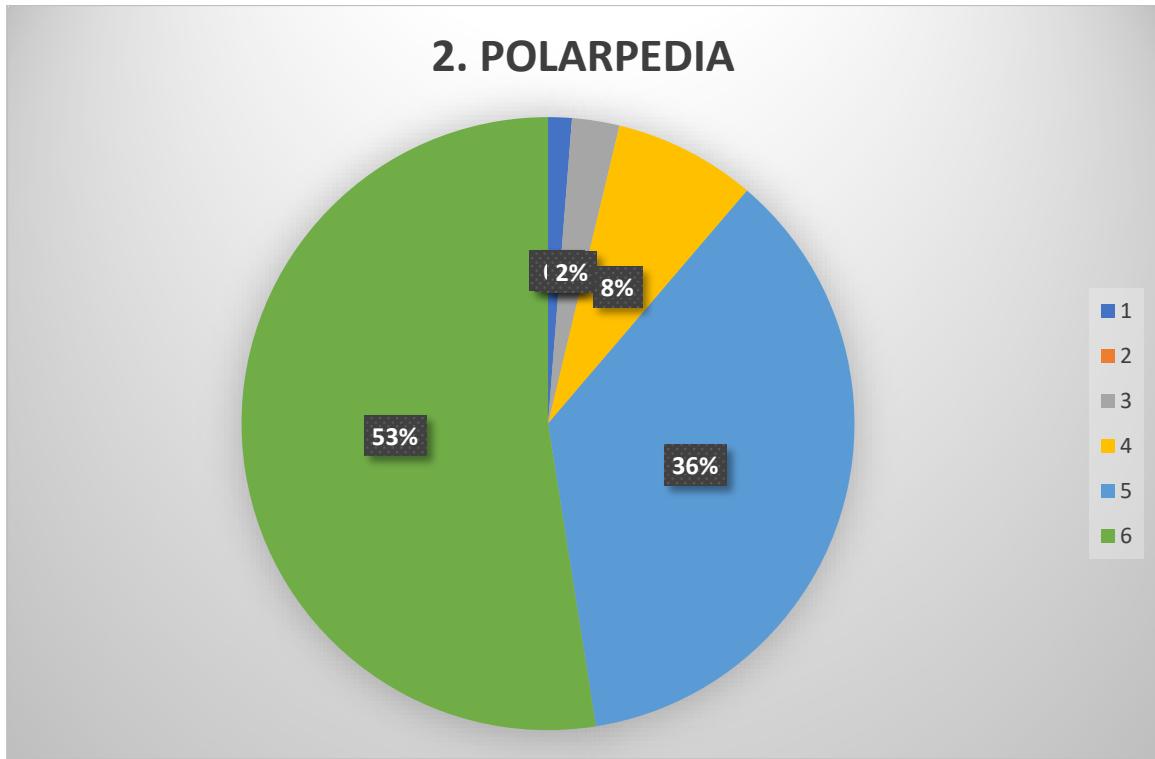
2. POLARPEDIA

1 2 3 4 5 6

3. MONITORING SYSTEM

1 2 3 4 5 6





In case your answer is 3 or less for any of the modules, please answer the following questions:

3. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal that received a mark of 3 or less. Thank you.

4 replies from teachers + 1 non-valid reply (all written in English)

- The process has just started last year with a lot of problems.
- Some topics are difficult to study due to local conditions.
- They work in many other projects that ask for their attention.
- Big problems trying to show the Online lessons/Polarpedia does not have texts in Finnish which makes it difficult to use
- Error (response indicated number 4 but no comment)

4. What changes would have to be implemented within a given module in terms of its utility in conducting various activities within the project? Please provide a separate idea for changes for each module of the portal, which received a mark of 3 or less.

4 replies + 1 non-valid reply:

- 1. Opportunity to watch the lessons later on if the group does not have a lesson with me that time.
- 2. The texts could be translated to Finnish as well.
- Implement strategies about studies in situ about climate change.
Write papers about search in situ next to school.
- Students come in our school in afternoon and lessons have to be attended in the morning time.
- Error (response indicated number 4 but no comment)

Question 2. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal in terms of their visual attractiveness:

1. ONLINE LESSONS

1 2 3 4 5 6

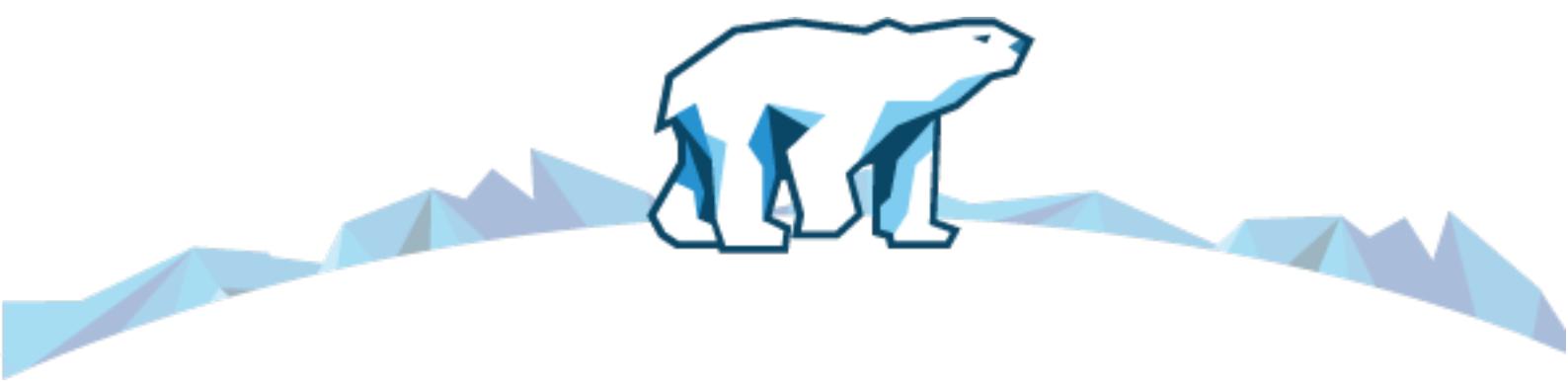
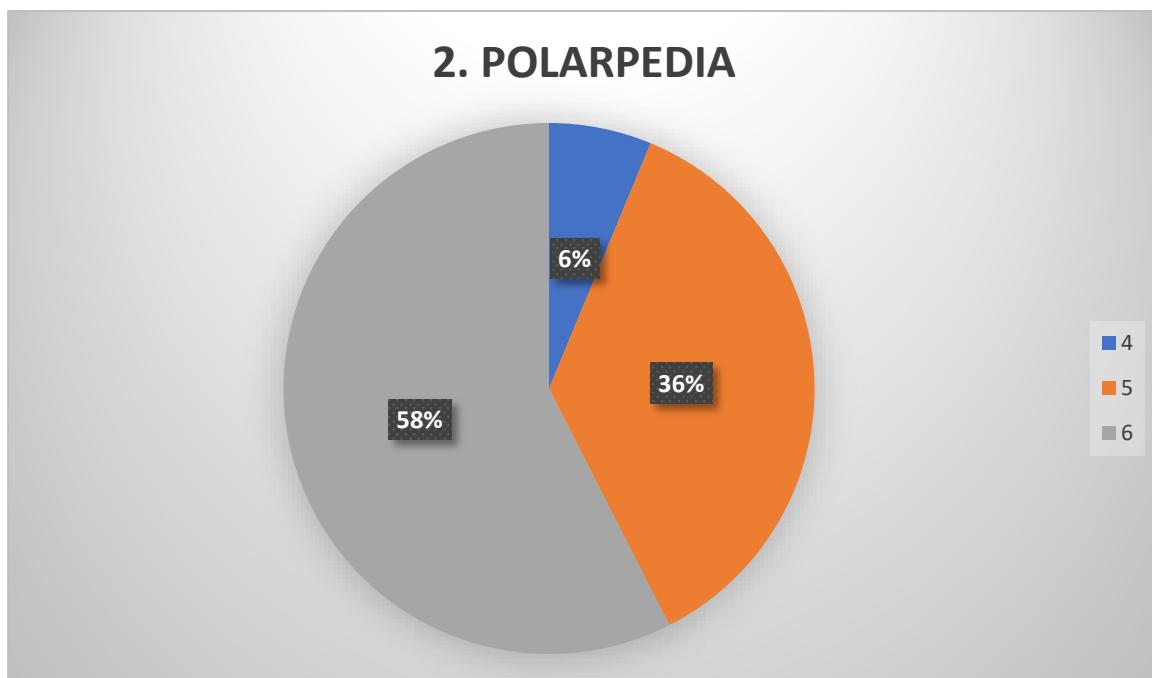
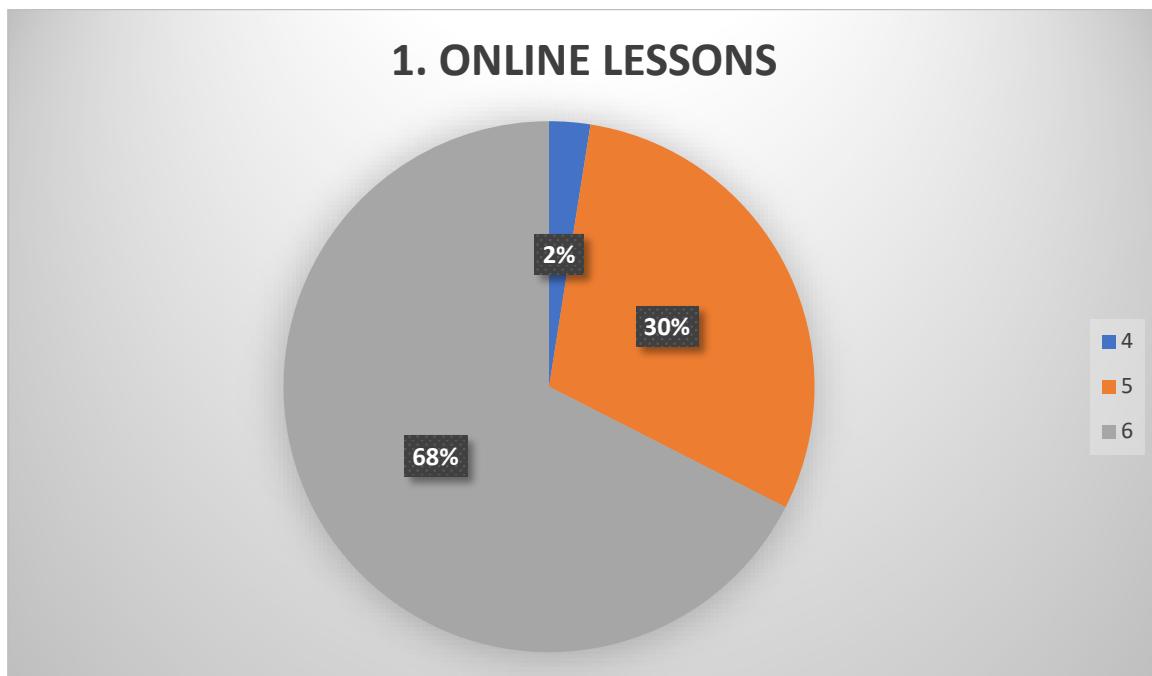


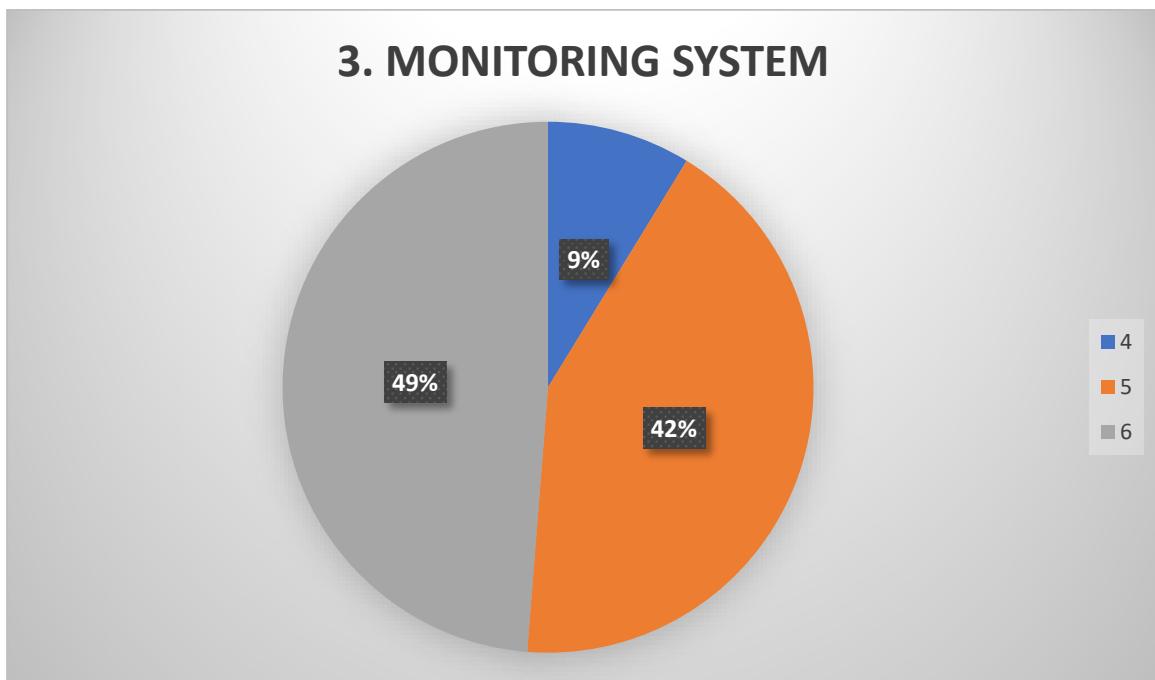
2. POLARPEDIA

1 2 3 4 5 6

3. MONITORING SYSTEM

1 2 3 4 5 6





In case your answer is 3 or less, please answer the following questions:

1. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal, which received a mark of 3 or less. Thank you.

no replies

2. What changes would have to be implemented within a given module in terms of its visual attractiveness? Please provide separate ideas for changes for each module of the portal, which received a mark of 3 or less.

no replies

Question 3. How often do you use the following modules of the EDU-ARCTIC portal?

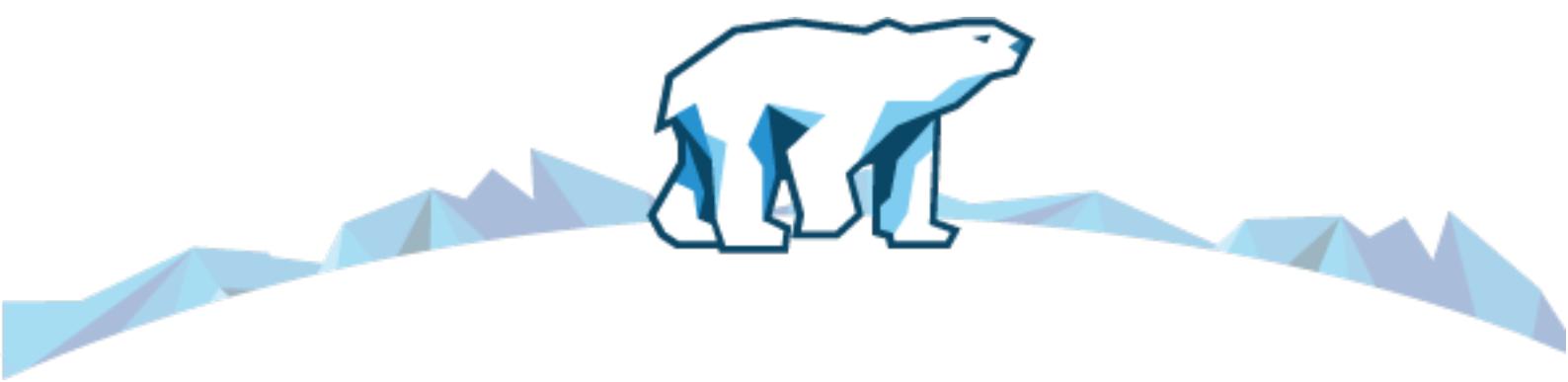
1. ONLINE LESSONS

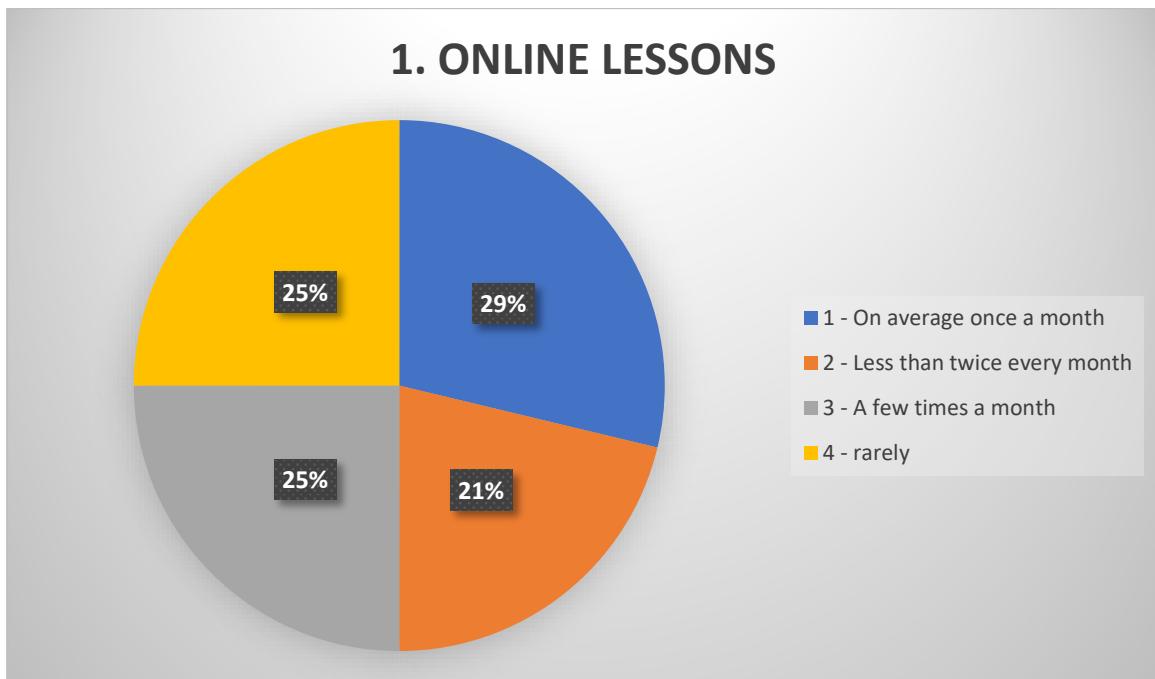
3 - A few times a month

2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given





If you have selected 4, please justify your answer. In particular, please identify the main factors that determine your school's non-participation in ONLINE LESSONS (e.g. whether this depends on transmission time, technical issues you are facing while connecting on-line, materials prepared by didactician, subject or any other factors - please specify)?

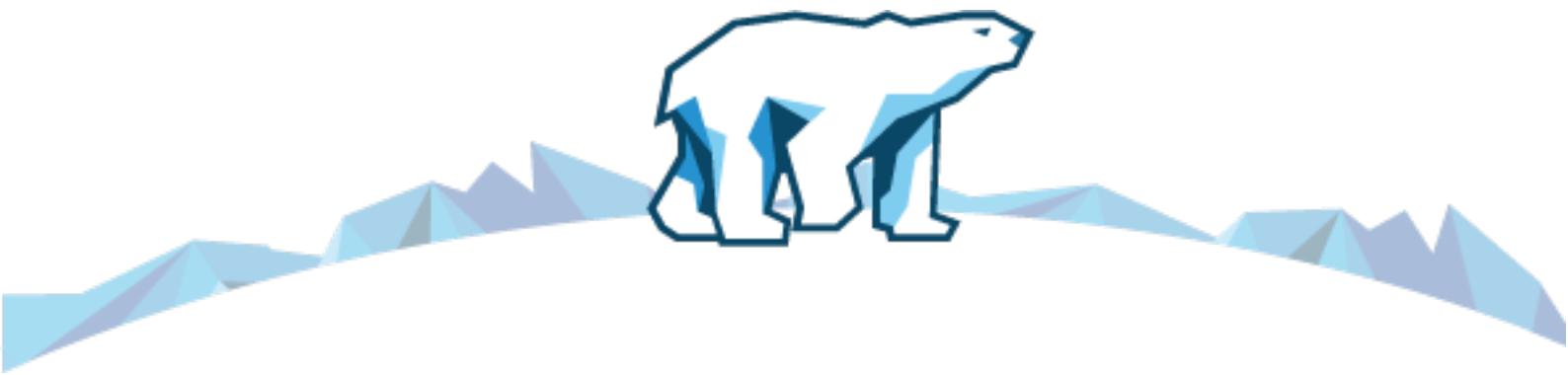
38 – replies – 37 in English, 1 in Polish

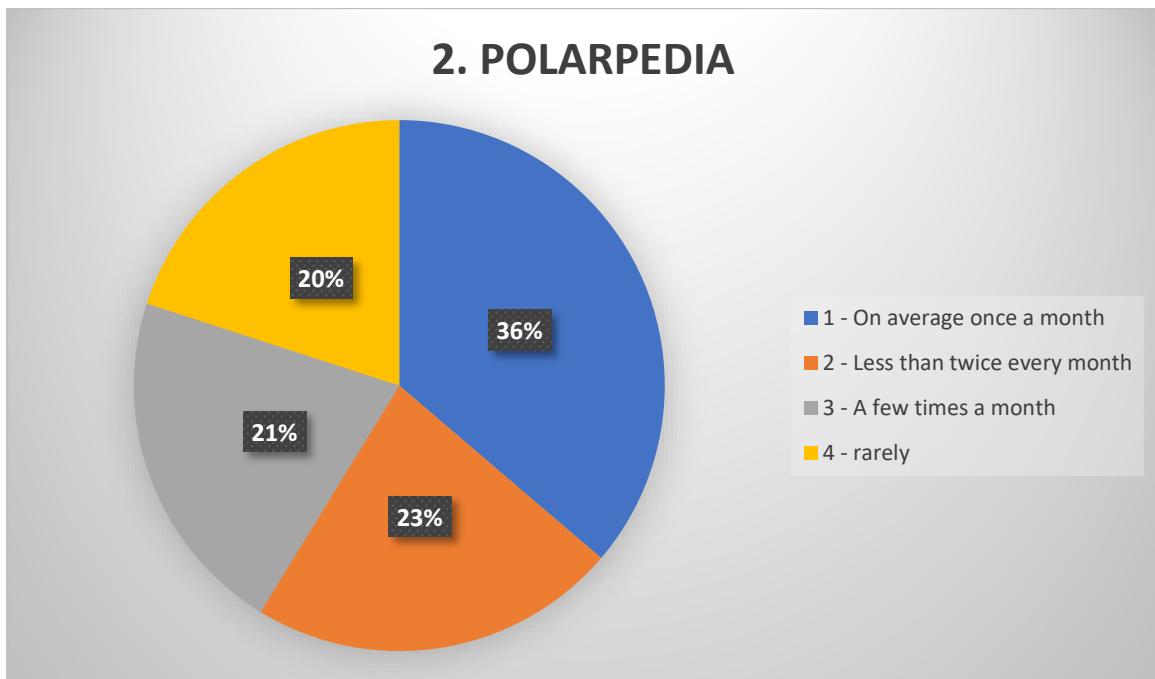
8. Students are involved in other projects and school activities
9. Problems with fitting the online-lessons, transmission time
10. Technical problems/ infrastructure problems
11. National curricula

2. POLARPEDIA

- 3 - A few times a month
2 - Less than twice every month
1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given





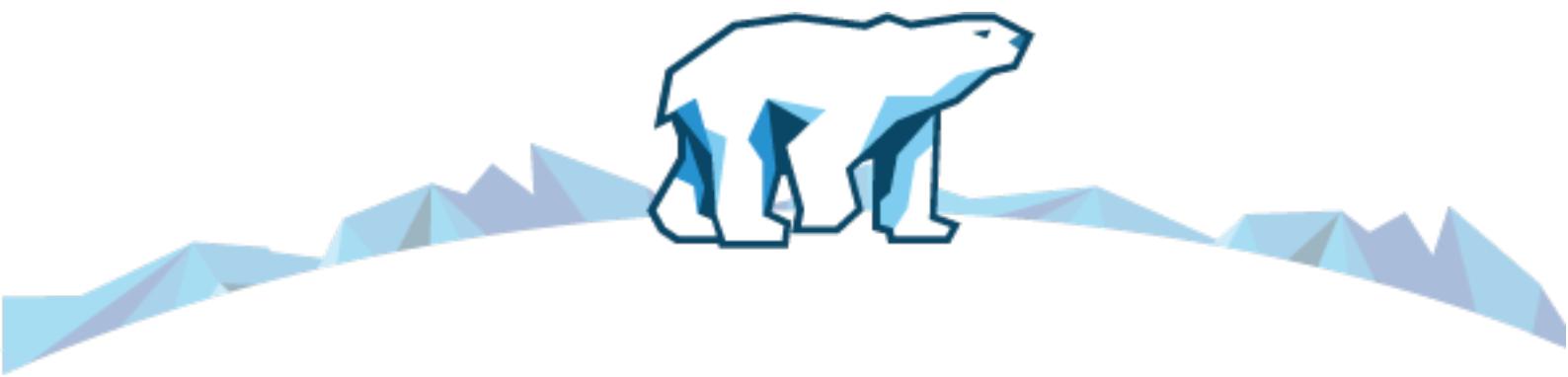
If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your lack of use of POLARPEDIA (e.g. whether this depends on dictionary entries, quality of published materials, graphical quality, easy search or any other factors - please specify)?

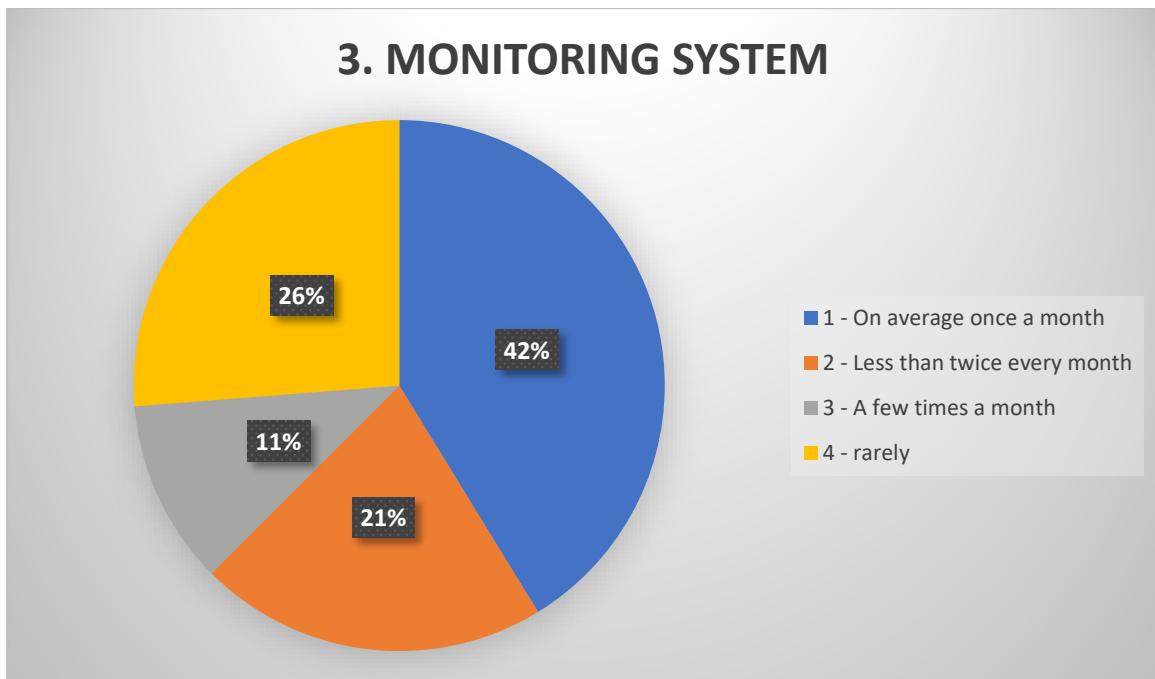
32 replies – 31 in English, 1 in Polish

- 11. Language difficulties
- 12. Not according to the curriculum
- 13. Pupils use other materials
- 14. Not interesting for teachers and pupils
- 15. Lack of time
- 16. Quality of the terms

3. MONITORING SYSTEM

- 3 - A few times a month
 - 2 - Less than twice every month
 - 1 - On average once a month
- Rarely - if option is selected, system will treat this as: no answer given





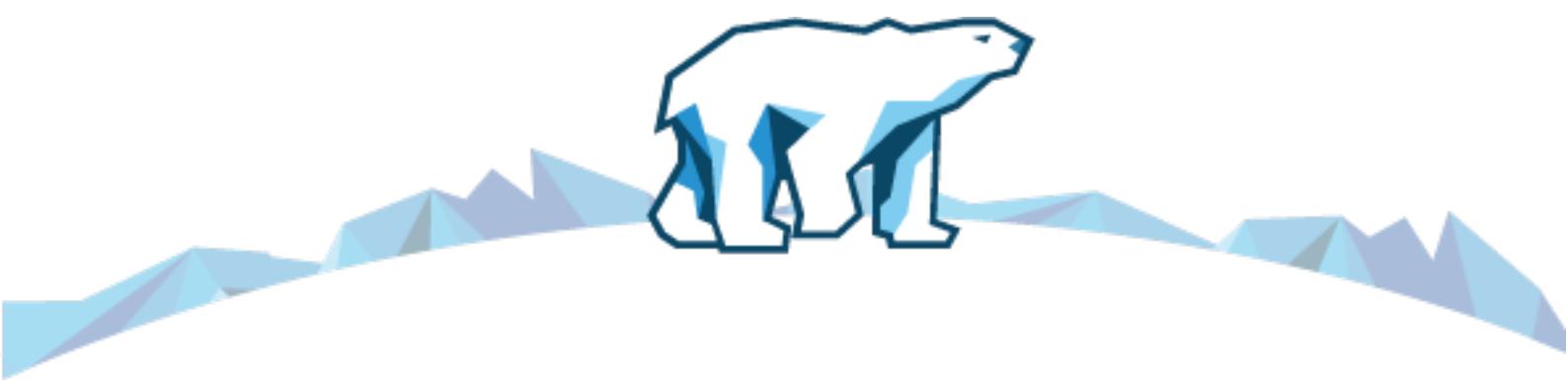
If you have selected 4, please justify your answer. In particular, please identify the main factors that determine your school's lack of interest in the MONITORING SYSTEM (e.g. whether this depends on module quality, purpose of the module or any other factors - please specify)?

29 – replies, 28 in English, 1 in Polish

10. Module quality
11. Lack of pupils' interest and motivation
12. Lack of time
13. Lack of internet connection
14. National curriculum

(2) FACTUAL

Question 1. What is the impact of each of the EDU-ARCTIC modules on your pupils' knowledge about issues related to the Arctic (nature, geography, natural resources, history, social and

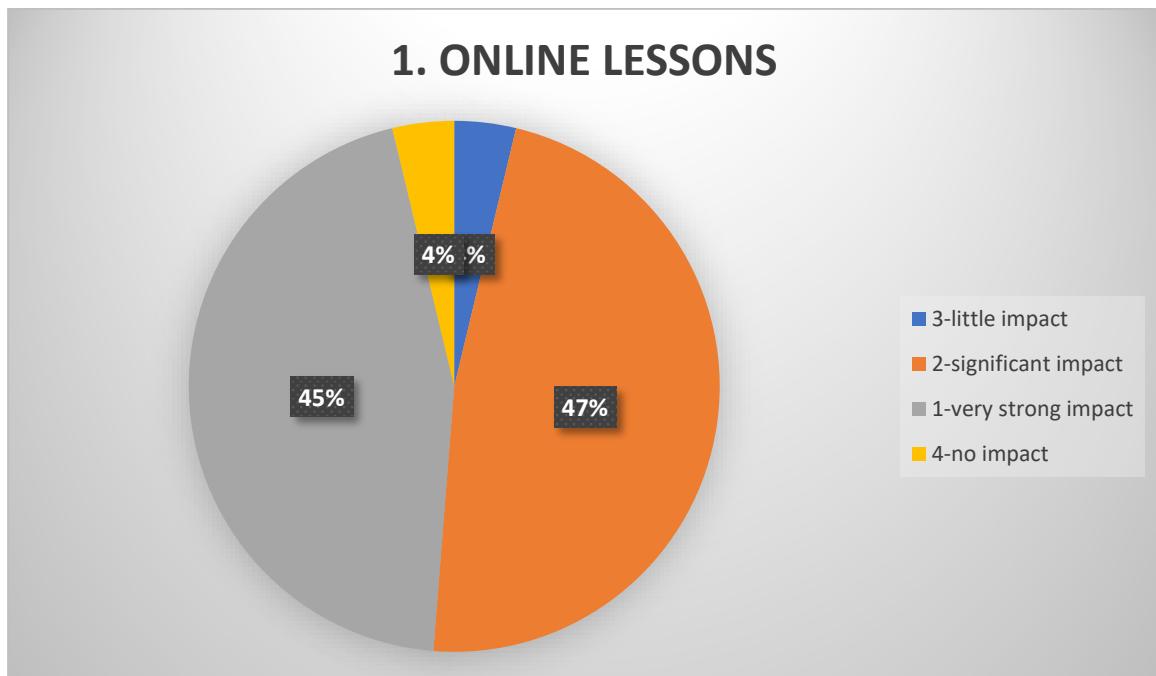


political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?

(1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

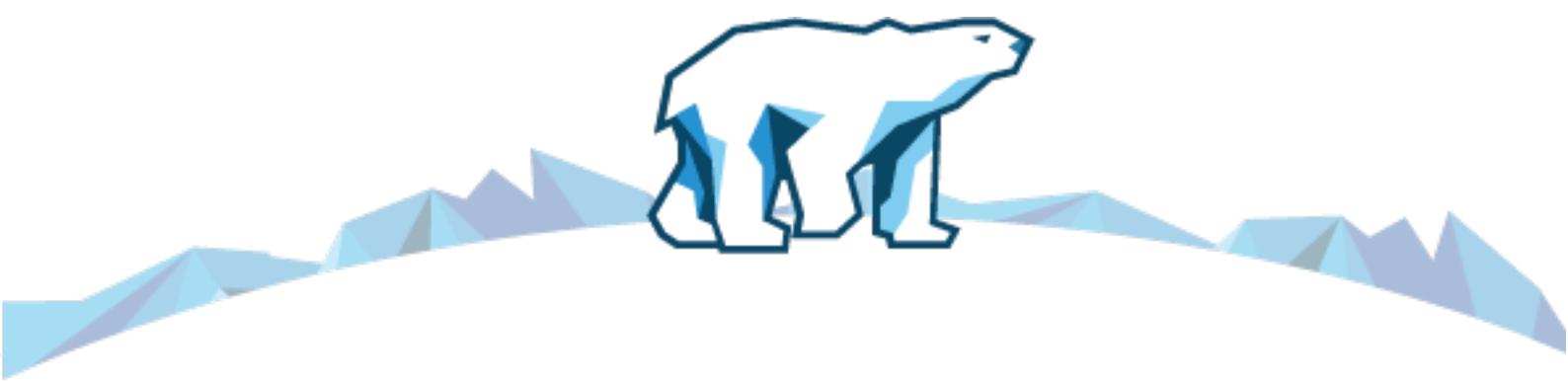
1. ONLINE LESSONS

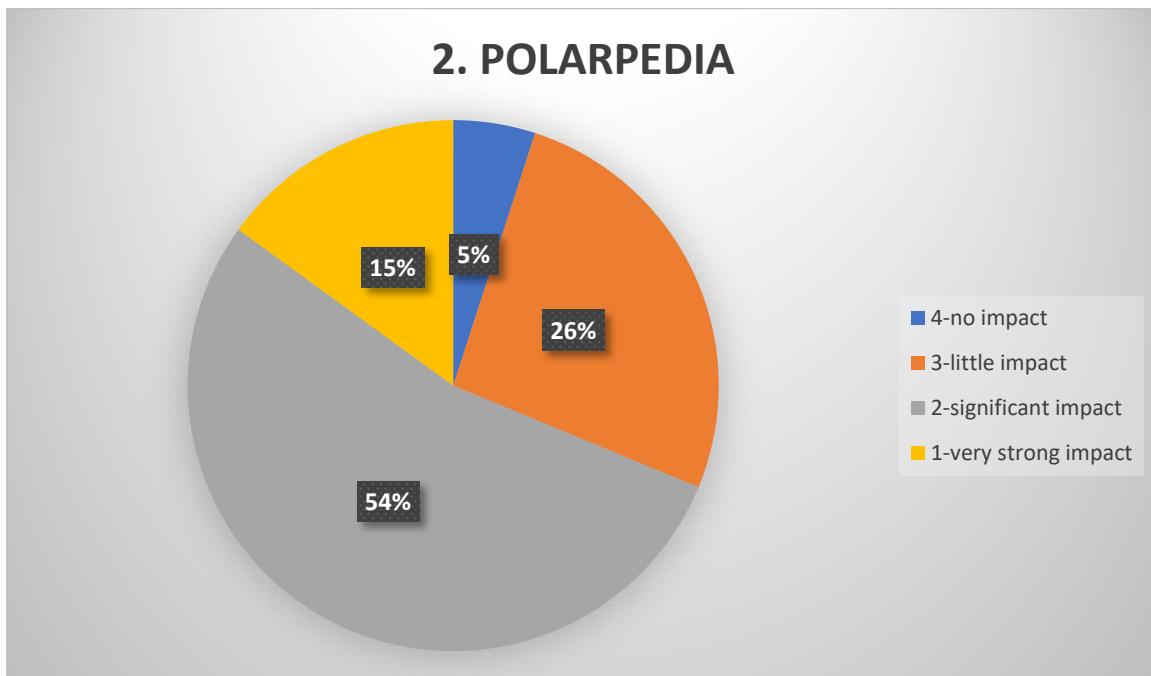
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2. POLARPEDIA

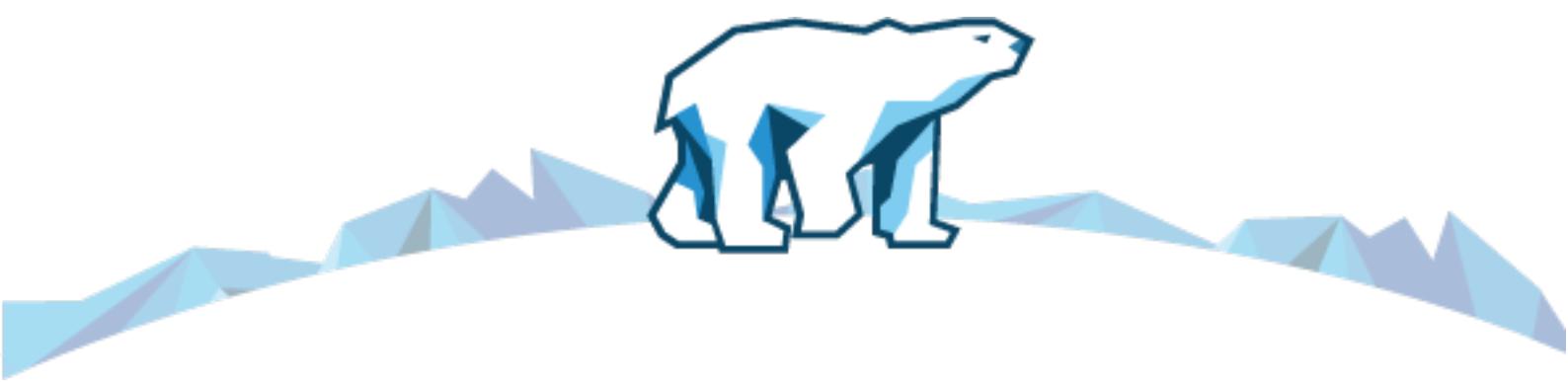
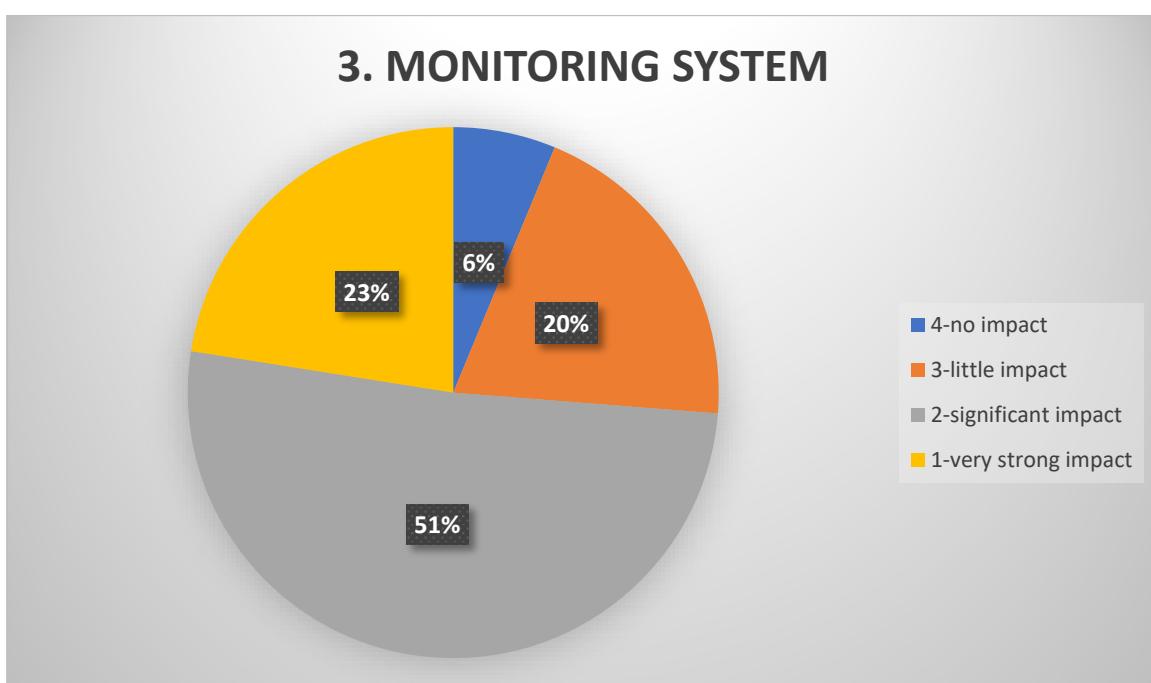
1 2 3 4





3. MONITORING SYSTEM

1 2 3 4

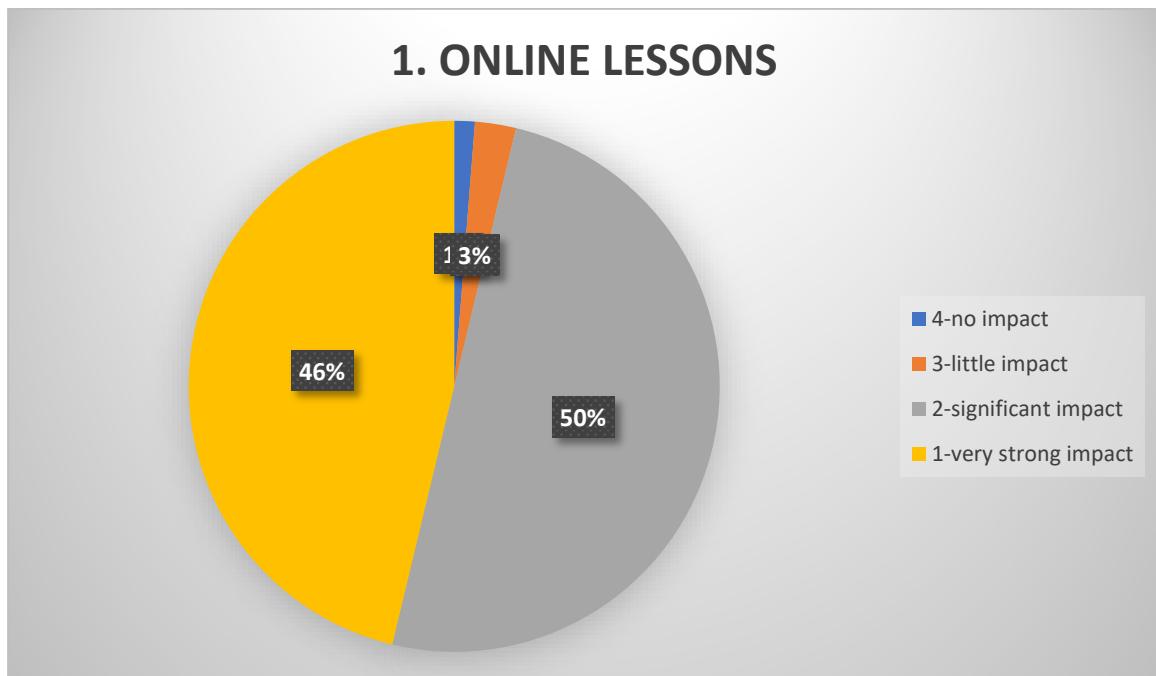


Question 2. What is the impact of each of the EDU-ARCTIC modules on the level of understanding of scientific issues and scientific language among your pupils?

(1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

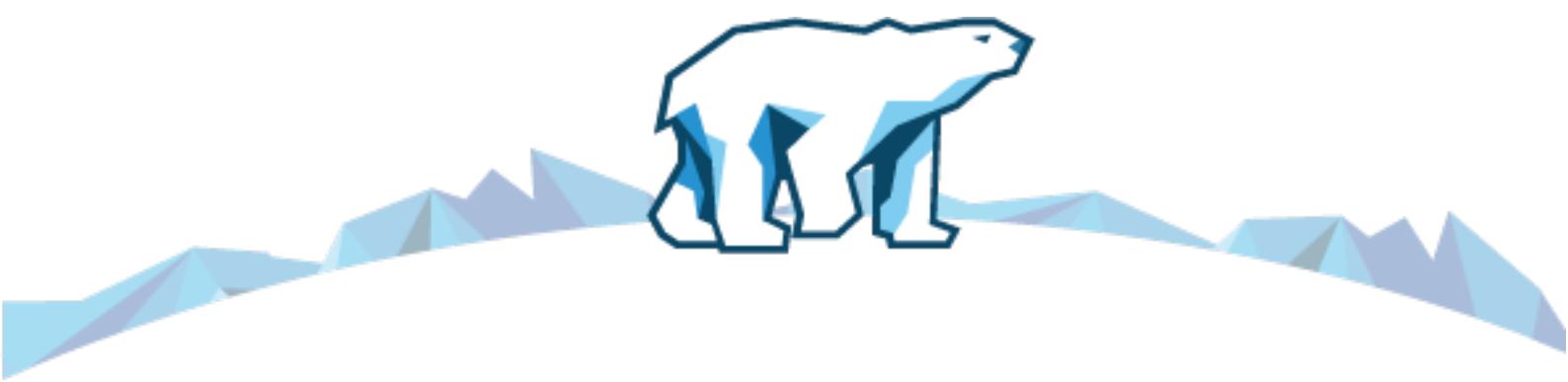
1. ONLINE LESSONS

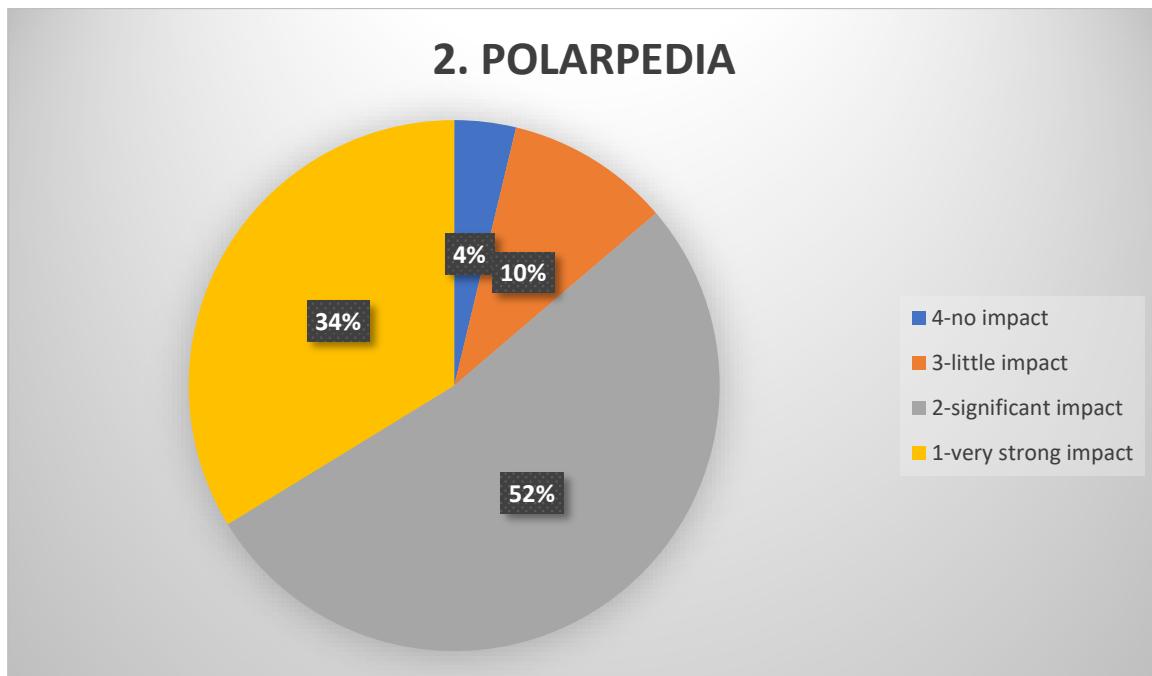
1 2 3 4



2. POLARPEDIA

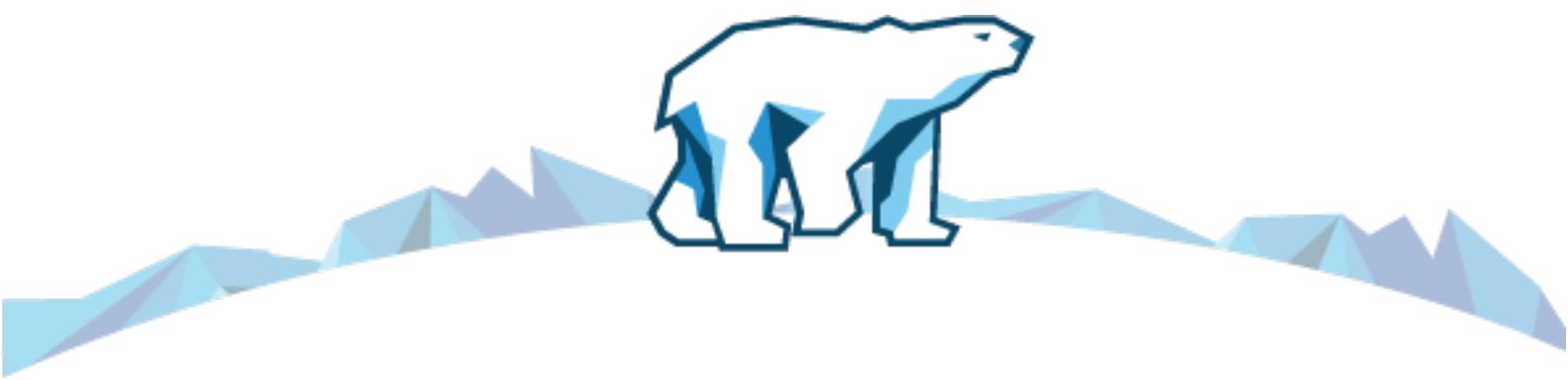
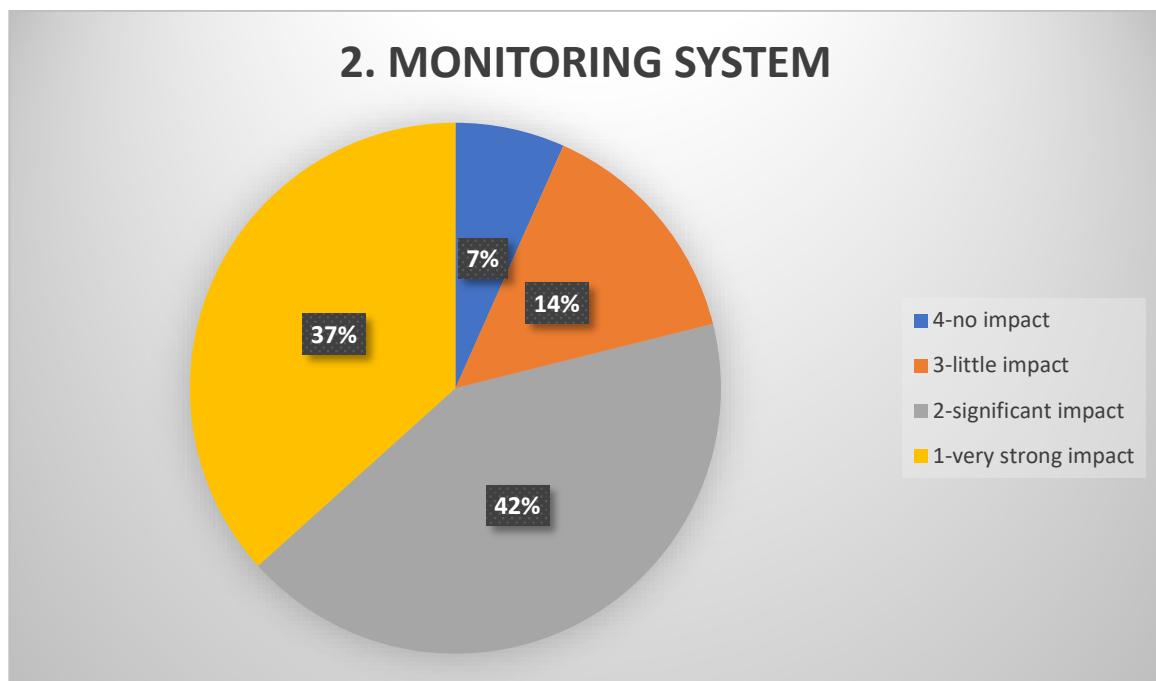
1 2 3 4





3. MONITORING SYSTEM

1 2 3 4

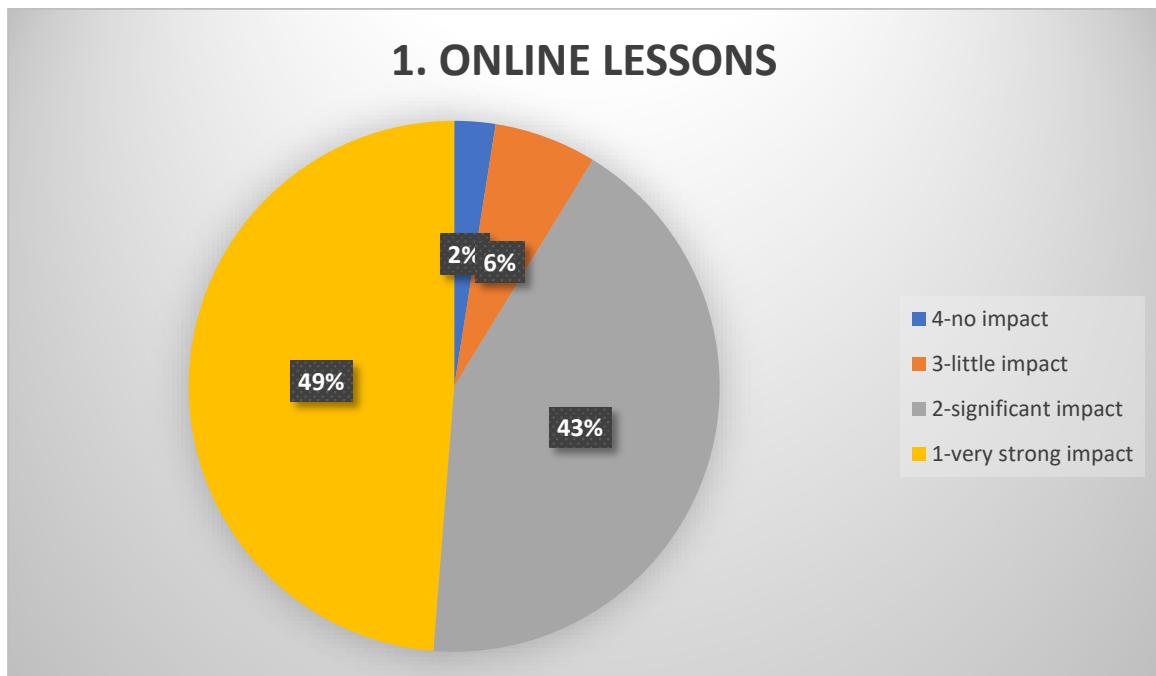


Question 3. What is the impact of each of the EDU-ARCTIC modules on the level of interest in STEM and scientific careers among your pupils?

(4-very strong impact, 3-significant impact, 2-little impact, 1-no impact) [choose from the scroll-down list].

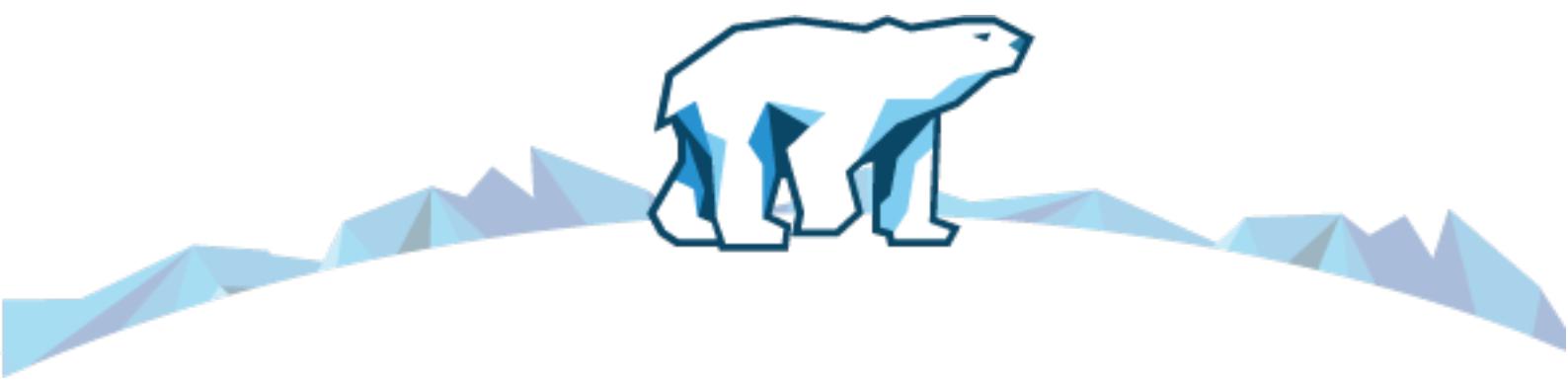
1. ONLINE LESSONS

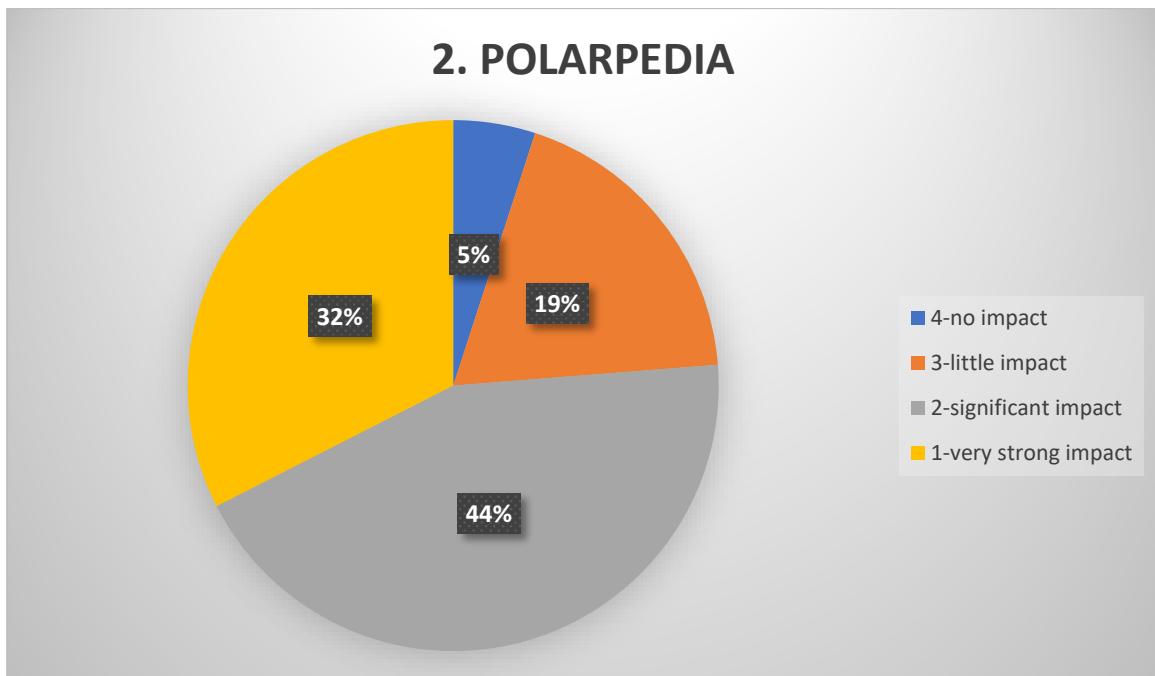
1 2 3 4



2. POLARPEDIA

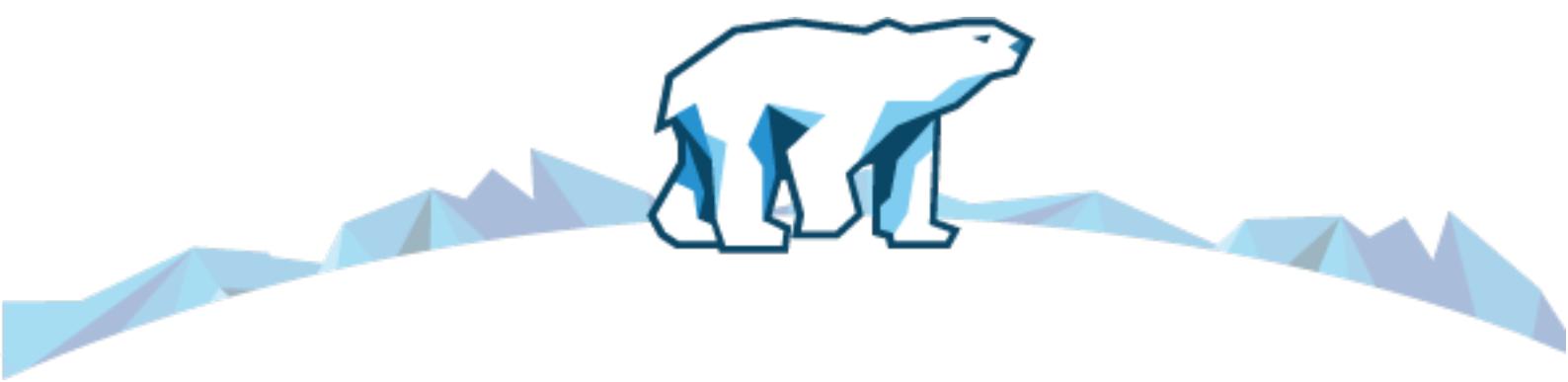
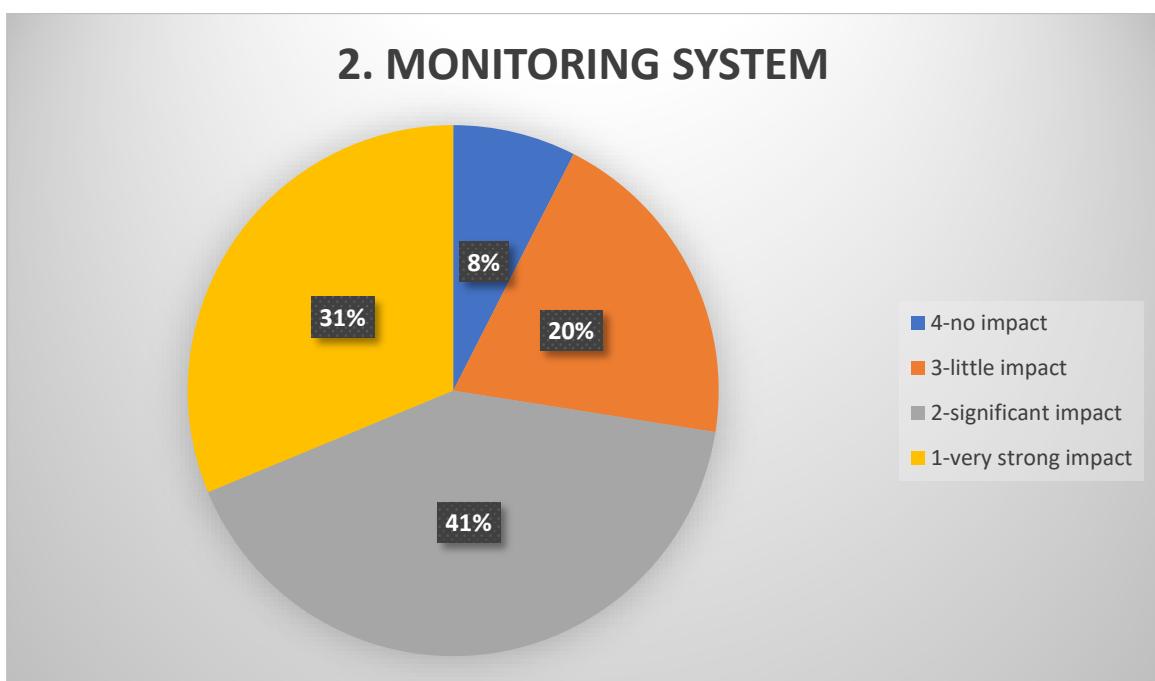
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3. MONITORING SYSTEM

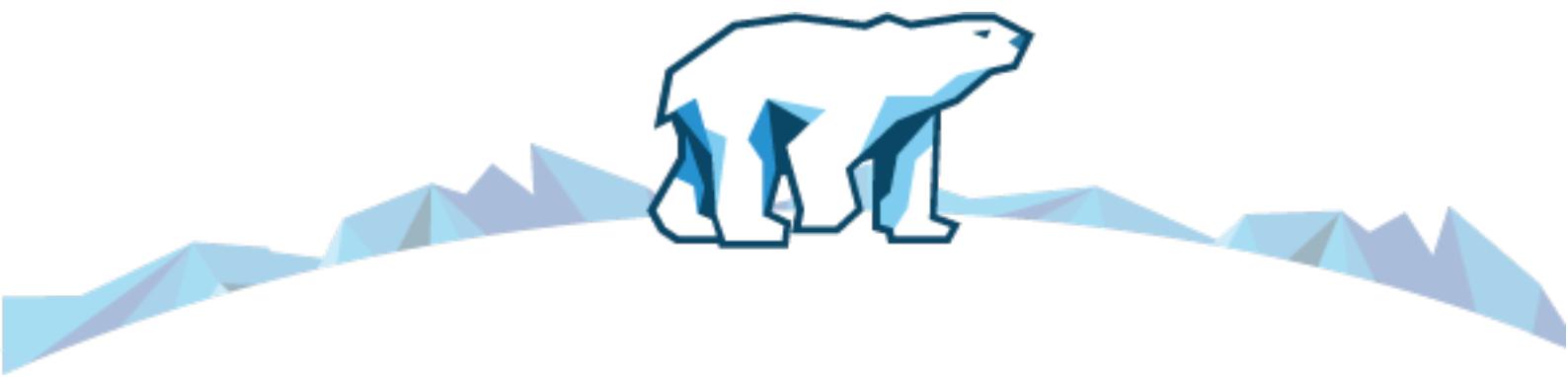
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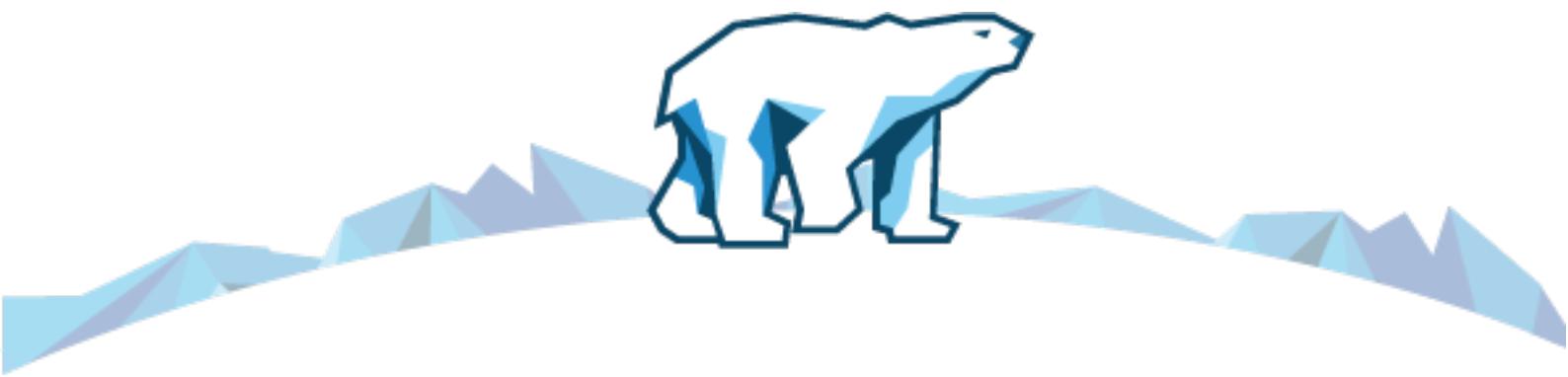
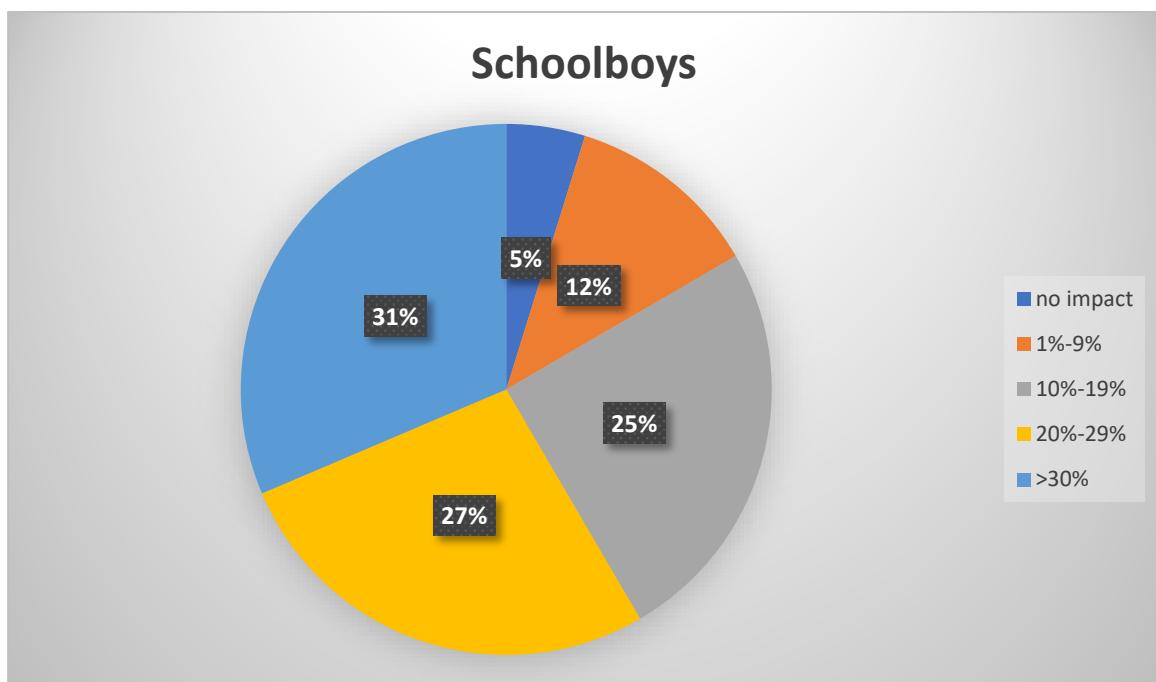
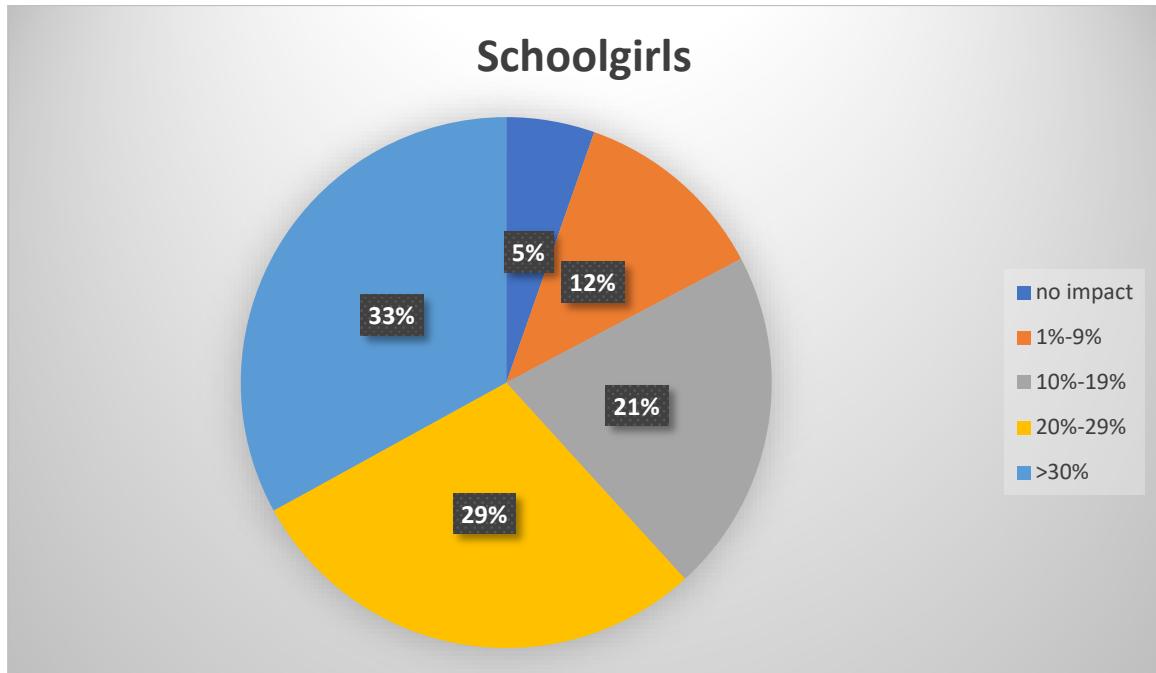


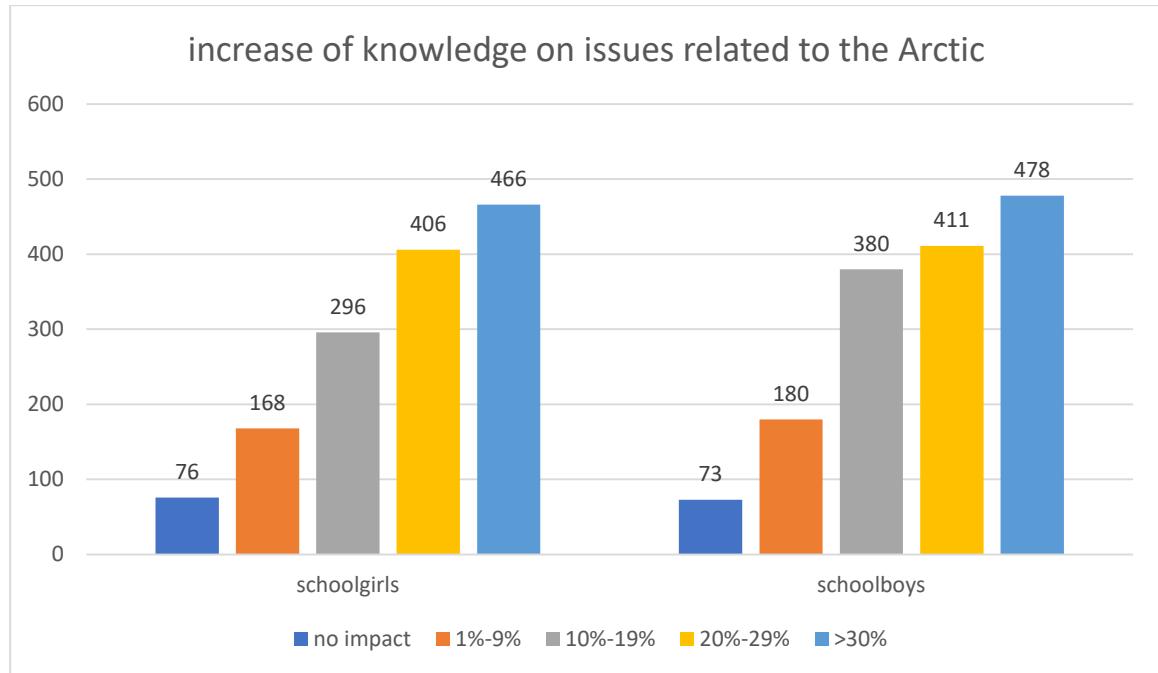
Question 4. To what extent does the project contribute as far as their increase of knowledge on issues related to the Arctic is concerned (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?

Scroll-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.	76	73
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 1% to 9%.	168	180
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 10% to 19%.	296	380
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 20% to 29%.	406	411
The level of knowledge increased compared to the prior state before the EDUARCTIC project by 30% and more.	466	478



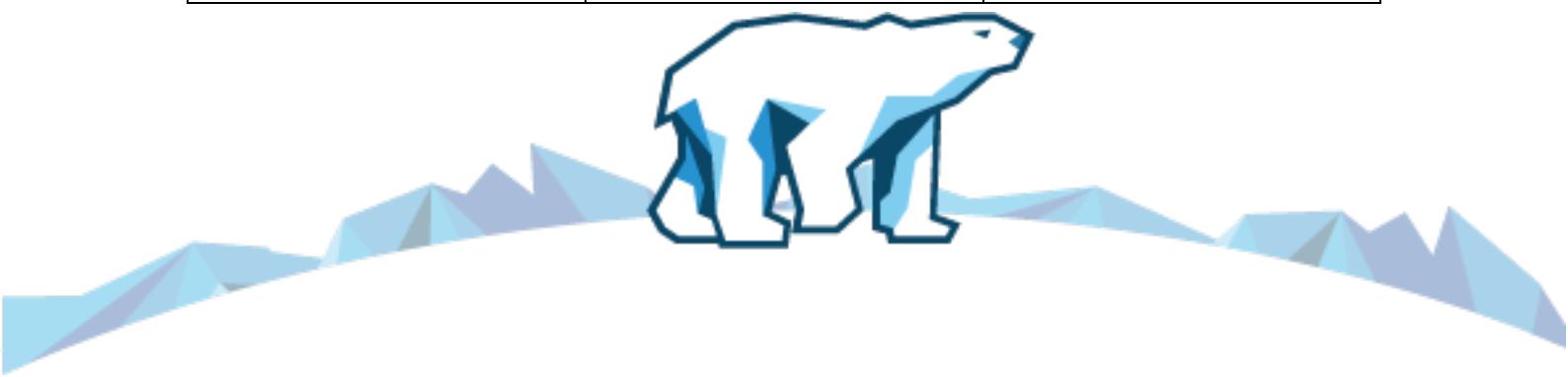




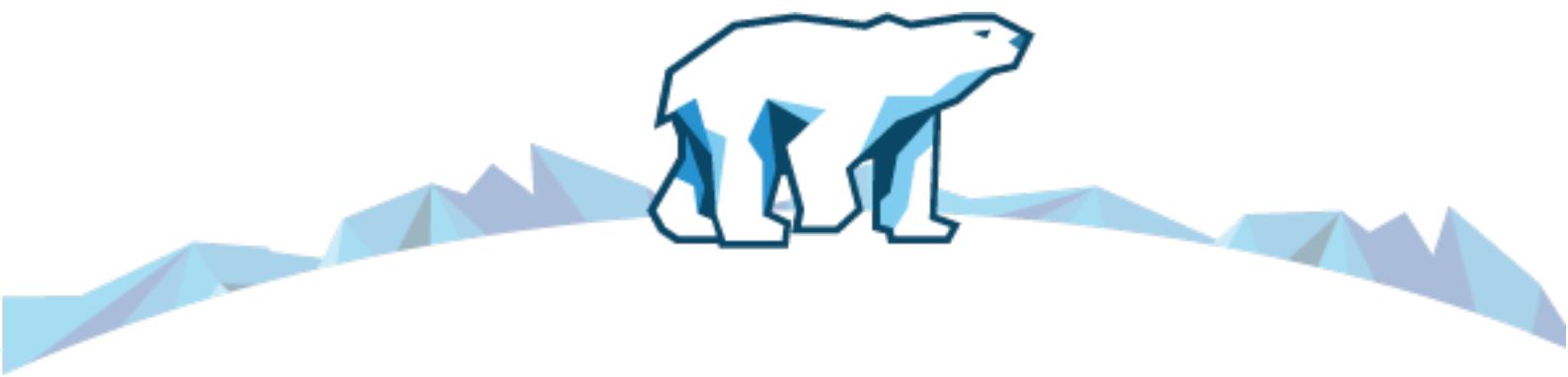
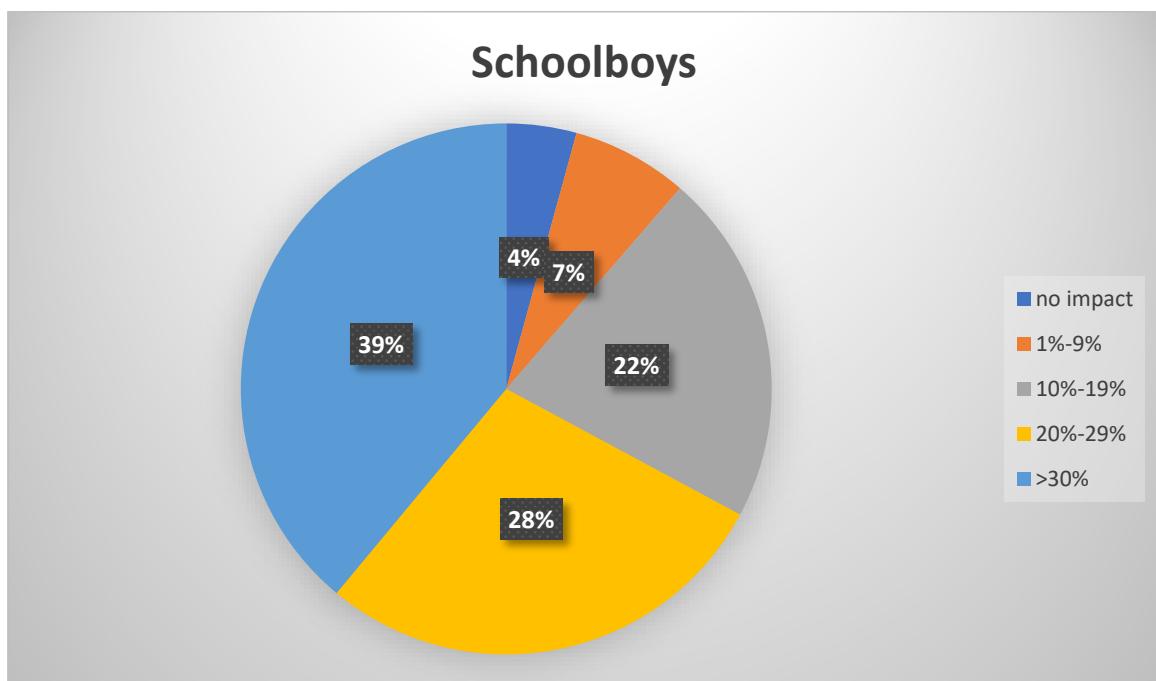
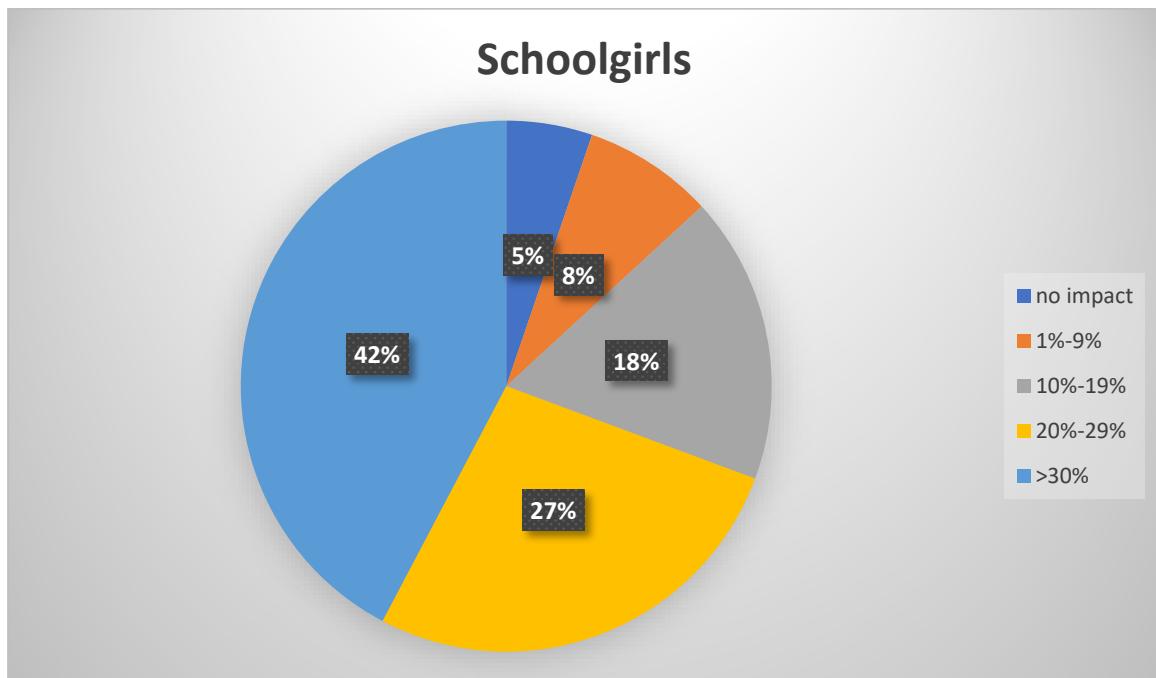
Question 5: To what extent does the project contribute to improve the level of understanding of the world of science and scientific language?

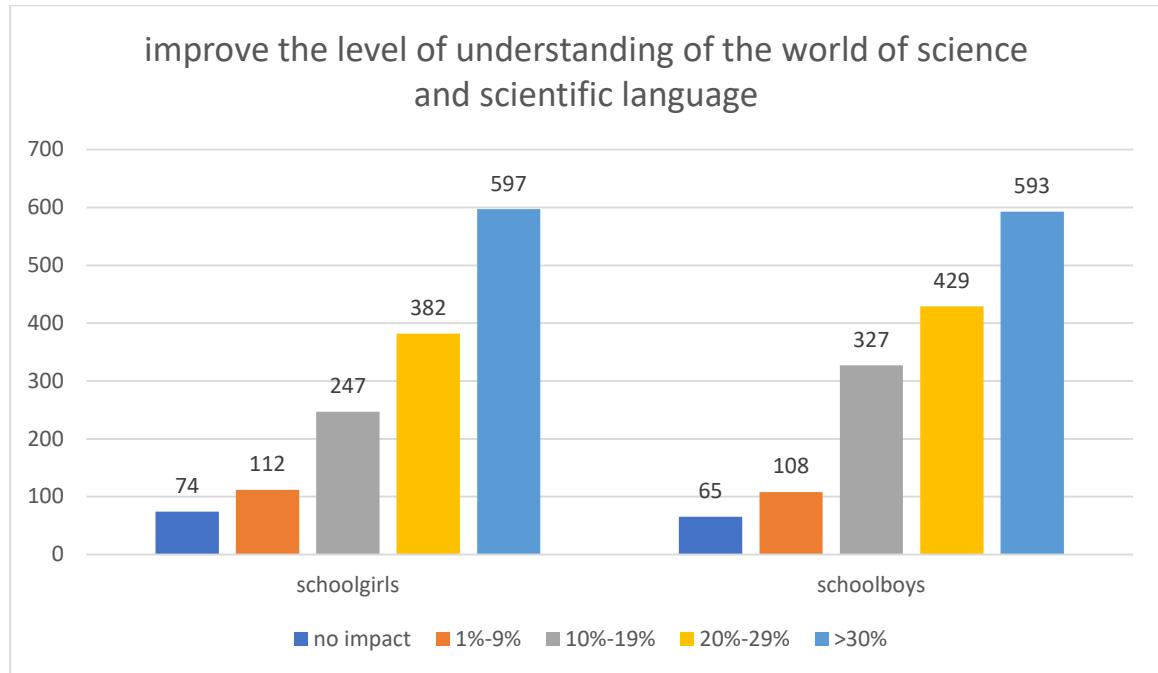
Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.	74	65
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 1% to 9%.	112	108
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 10% to 19%.	247	327
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 20% to 29%.	382	429
The level of knowledge increased compared to the	597	593



prior state before the EDUARCTIC project by 30% and more.		
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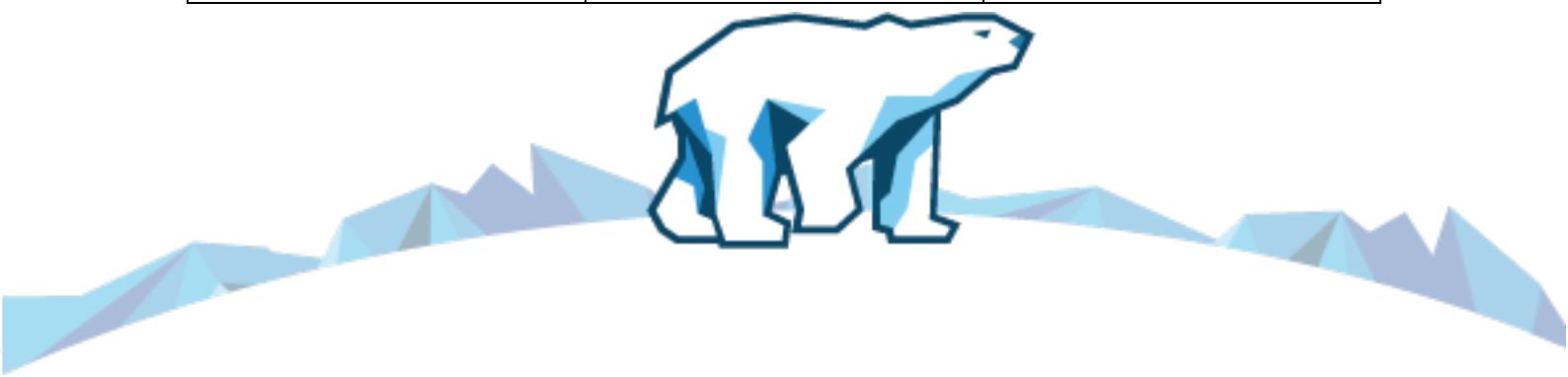




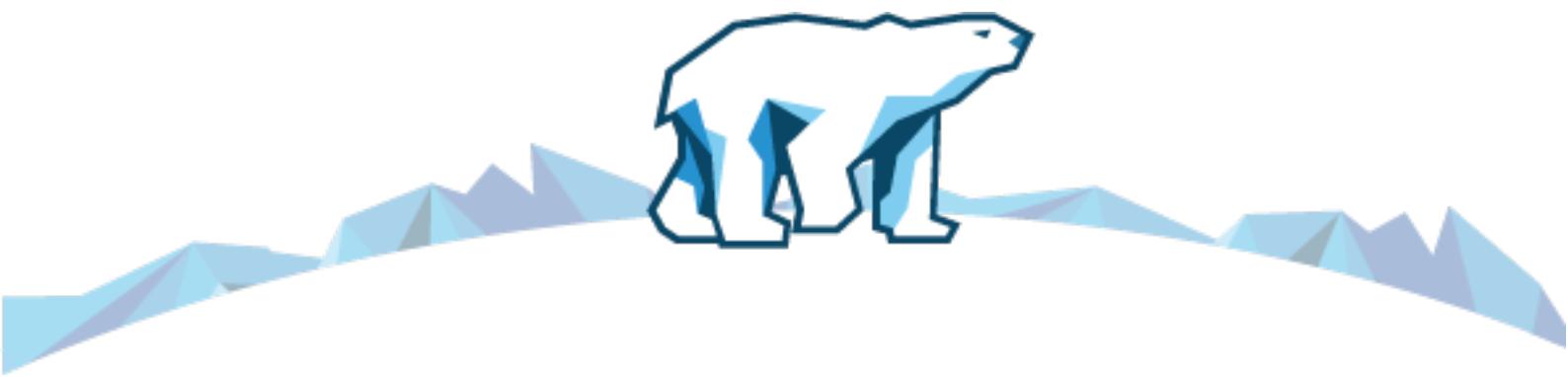
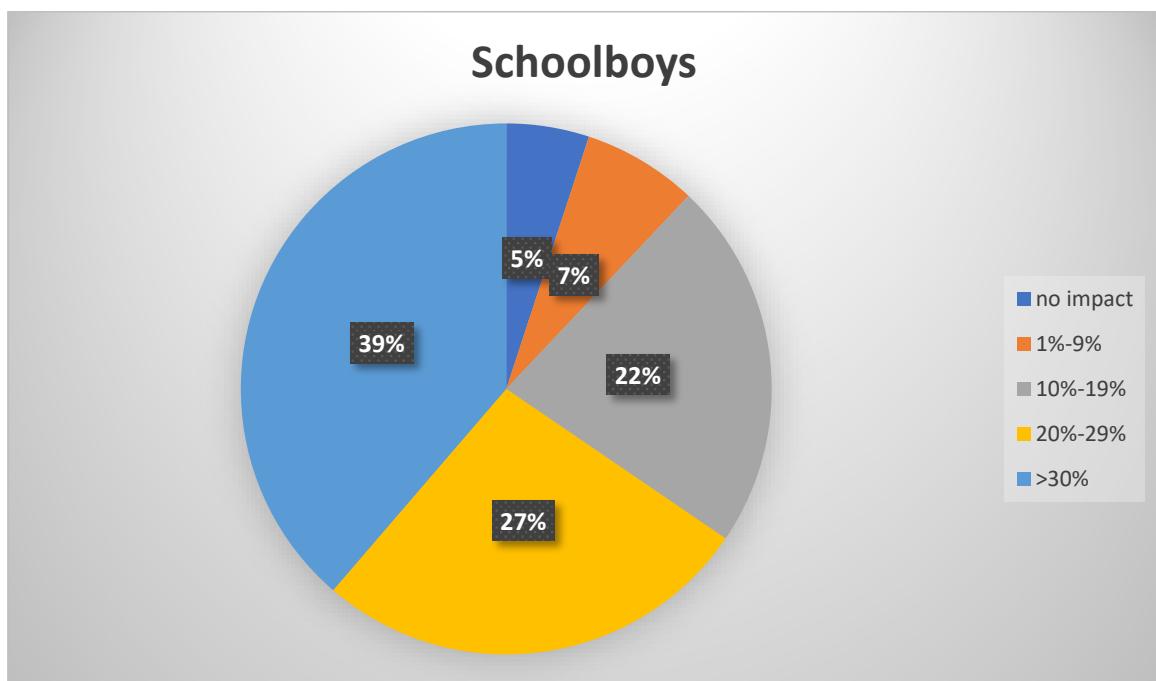
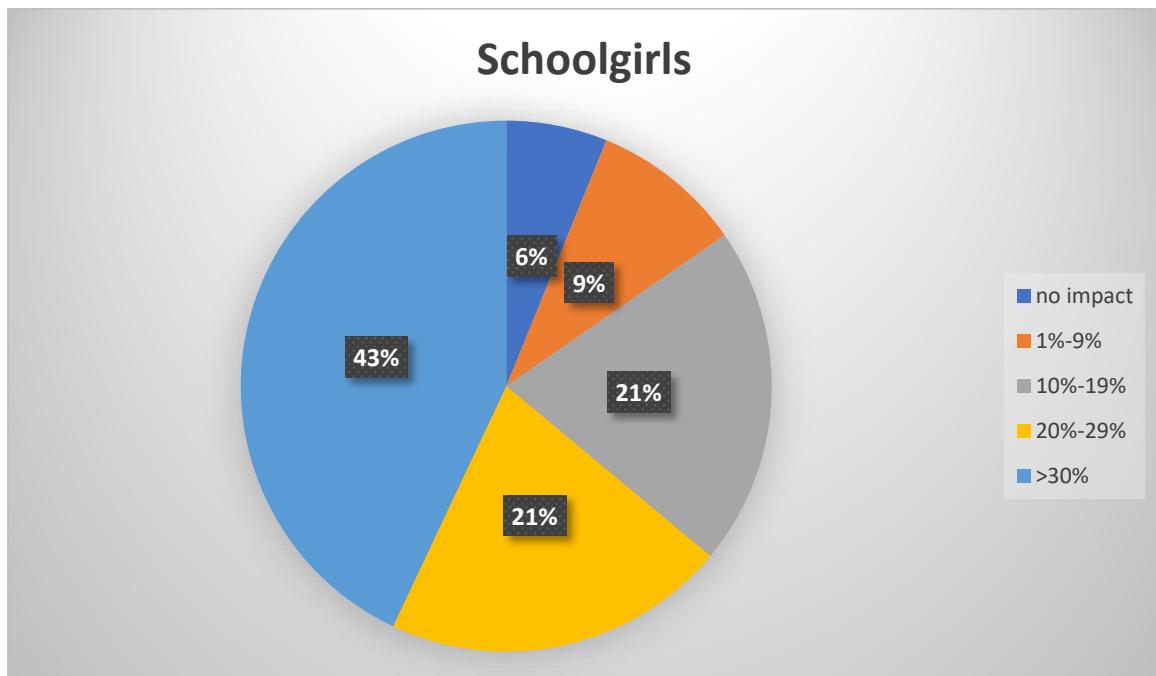
Question 6. To what extent does the project contribute to the increase of interest in STEM and scientific careers among your pupils?

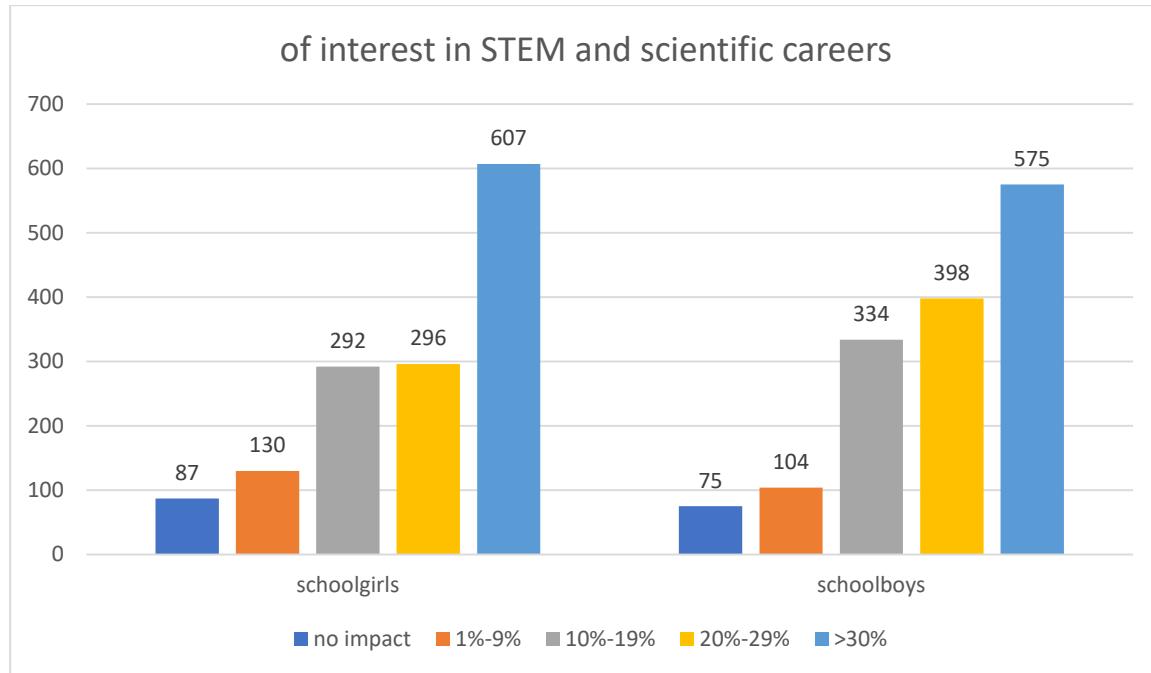
Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.	87	75
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 1% to 9%.	130	104
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 10% to 19%.	292	334
The level of knowledge increased compared to the prior state before the EDUARCTIC project from 20% to 29%.	296	398
The level of knowledge increased compared to the	607	575



prior state before the EDUARCTIC project by 30% and more.		
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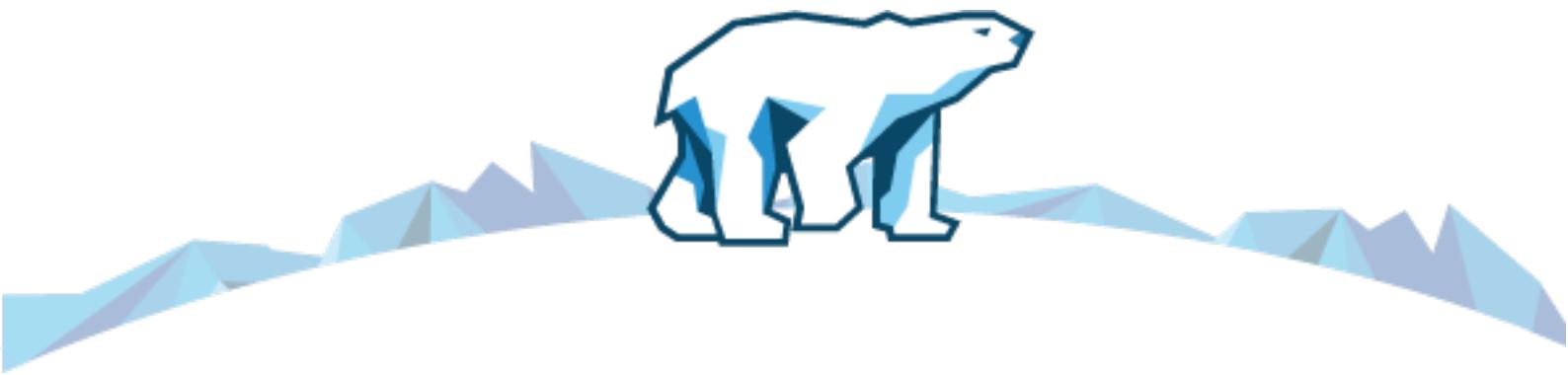
10. Evaluation question by question - description

(1) TECHNOLOGY

Question 1. Utility of (1) online lessons, (2) Polarpedia and (3) monitoring system in conducting various activities within the EDU-ARCTIC project

(4) online lessons: 56% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 6 points, 35% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 5 points, 6% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 4 points, 1% of interviewed teachers assess the utility of online lessons in conducting various activities with the project on the scale 1-6 with 2 and 3 points, nobody assess the utility of online lessons with 1 point

(5) Polarpedia: 53% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 6 points, 36% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 5 points, 8% of interviewed teachers assess the utility of



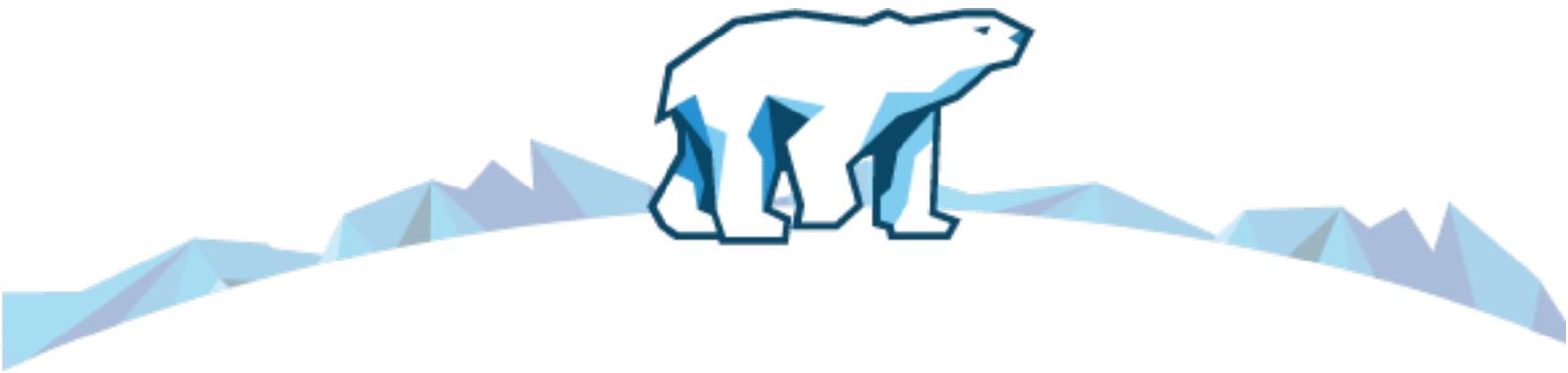
Polarpedia in conducting various activities with the project on the scale 1-6 with 4 points, 2% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 3 points, no interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 2 points, 1% of interviewed teachers assess the utility of Polarpedia in conducting various activities with the project on the scale 1-6 with 1 point

(6) monitoring system: 45% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 6 points, 43% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 5 points, 9% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 4 points, 2% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 3 points, 1% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 2 points, 6% of interviewed teachers assess the utility of monitoring system in conducting various activities with the project on the scale 1-6 with 1 point

Question 2: visual attractiveness of (1) online lessons, (2) Polarpedia and (3) monitoring system

(4) online lessons: 68% of interviewed teachers assess visual attractiveness of online lessons on the scale 1-6 with 6 points, 30% of interviewed teachers assess visual attractiveness of online lessons on the scale 1-6 with 5 points, 2% of interviewed teachers assess visual attractiveness of online lessons on the scale 1-6 with 4 points, no interviewed teachers assess the visual attractiveness of online lessons on the scale 1-6 with 1, 2 and 3 points

(5) Polarpedia: 58% of interviewed teachers assess visual attractiveness of Polarpedia on the scale 1-6 with 6 points, 36% of interviewed teachers assess visual attractiveness of Polarpedia on the scale 1-6 with 5 points, 6% of interviewed teachers assess visual



attractiveness of Polarpedia on the scale 1-6 with 4 points, no of interviewed teachers assess the visual attractiveness of Polarpedia on the scale 1-6 with 1,2 and 3 points

(6) monitoring system: 49% of interviewed teachers assess visual attractiveness of monitoring system on the scale 1-6 with 6 points, 42% of interviewed teachers assess visual attractiveness of monitoring system on the scale 1-6 with 5 points, 9% of interviewed teachers assess visual attractiveness of monitoring system on the scale 1-6 with 4 points, no of interviewed teachers assess the visual attractiveness of monitoring system on the scale 1-6 with 1, 2 and 3 points

Question 3: Frequency of using of (1) online lessons, (2) Polarpedia and (3) monitoring system

(4) online lessons: 29% of interviewed teachers use online lessons on average once a month, 21% of interviewed teachers use online lessons less than twice every month, 25% of interviewed teachers use online lessons a few times a month, 25% of interviewed teachers give an answer marked with the number 4 rarely

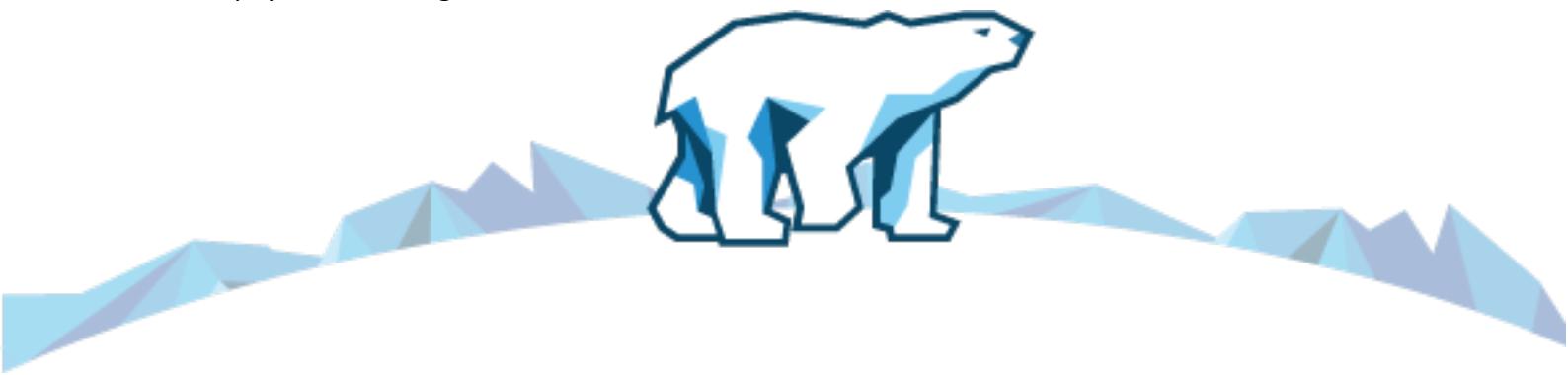
(5) Polarpedia: 36% of interviewed teachers use Polarpedia on average once a month, 23% of interviewed teachers use Polarpedia less than twice every month, 21% of interviewed teachers use Polarpedia a few times a month, 20% of interviewed teachers give an answer marked with the number 4 rarely

(6) monitoring system: 42% of interviewed teachers use monitoring system on average once a month, 21% of interviewed teachers use monitoring system less than twice every month, 11% of interviewed teachers use monitoring system a few times a month, 26% of interviewed teachers give an answer marked with the number 4 rarely

(2) FACTUAL

Question 1: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on pupils' knowledge about issues related to the Arctic

(4) online lessons: 4% of interviewed teachers assess, that online lessons have no impact on pupils' knowledge about issues related to the Arctic, 4% of interviewed teachers assess, that online lessons have little impact on pupils' knowledge about issues related to the Arctic, 47% of interviewed teachers assess, that online lessons have significant impact on pupils' knowledge about issues related to the Arctic, 45% of interviewed teachers assess,

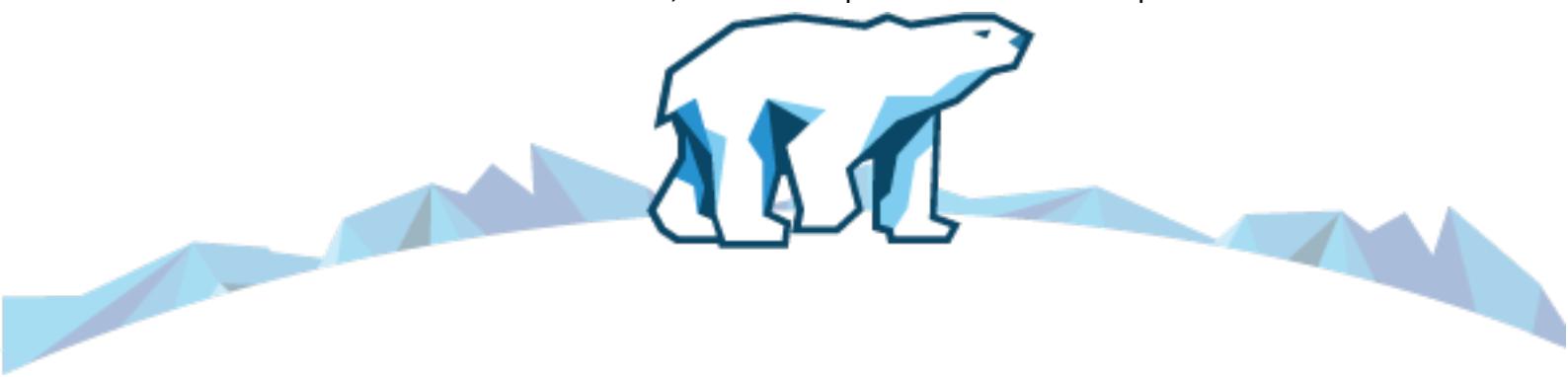


that online lessons have a very strong impact on pupils' knowledge about issues related to the Arctic

- (5) Polarpedia: 5% of interviewed teachers assess, that Polarpedia have no impact on pupils' knowledge about issues related to the Arctic, 26% of interviewed teachers assess, that Polarpedia have little impact on pupils' knowledge about issues related to the Arctic, 54% of interviewed teachers assess, that Polarpedia have significant impact on pupils' knowledge about issues related to the Arctic, 15% of interviewed teachers assess, that Polarpedia have a very strong impact on pupils' knowledge about issues related to the Arctic
- (6) monitoring system: 4% of interviewed teachers assess, that monitoring system have no impact on pupils' knowledge about issues related to the Arctic, 20% of interviewed teachers assess, that monitoring system have little impact on pupils' knowledge about issues related to the Arctic, 51% of interviewed teachers assess, that monitoring system have significant impact on pupils' knowledge about issues related to the Arctic, 23% of interviewed teachers assess, that monitoring system have a very strong impact on pupils' knowledge about issues related to the Arctic

Question 2: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on level of understanding of scientific issues and scientific language among pupils

- (4) online lessons: 1% of interviewed teachers assess, that online lessons have no impact on level of understanding of scientific issues and scientific language among pupils, 3% of interviewed teachers assess, that online lessons have little impact on level of understanding of scientific issues and scientific language among pupils, 50% of interviewed teachers assess, that online lessons have significant impact on level of understanding of scientific issues and scientific language among pupils, 46% of interviewed teachers assess, that online lessons have a very strong impact on level of understanding of scientific issues and scientific language among pupils
- (5) Polarpedia: 4% of interviewed teachers assess, that Polarpedia have no impact on level of understanding of scientific issues and scientific language among pupils, 10% of interviewed teachers assess, that Polarpedia have little impact on level of



understanding of scientific issues and scientific language among pupils, 52% of interviewed teachers assess, that Polarpedia have significant impact on level of understanding of scientific issues and scientific language among pupils, 34% of interviewed teachers assess, that Polarpedia have a very strong impact on level of understanding of scientific issues and scientific language among pupils

- (6) monitoring system: 7% of interviewed teachers assess, that monitoring system have no impact on level of understanding of scientific issues and scientific language among pupils, 14% of interviewed teachers assess, that monitoring system have little impact on level of understanding of scientific issues and scientific language among pupils, 42% of interviewed teachers assess, that monitoring system have significant impact on level of understanding of scientific issues and scientific language among pupils, 37% of interviewed teachers assess, that monitoring system have a very strong impact on level of understanding of scientific issues and scientific language among pupils

Question 3: impact of (1) online lessons, (2) Polarpedia and (3) monitoring system on level of interest in STEM and scientific careers among pupils

- (4) online lessons: 2% of interviewed teachers assess, that online lessons have no impact on level of interest in STEM and scientific careers among pupils, 6% of interviewed teachers assess, that online lessons have little impact on level of interest in STEM and scientific careers among pupils, 43% of interviewed teachers assess, that online lessons have significant impact on level of interest in STEM and scientific careers among pupils, 49% of interviewed teachers assess, that online lessons have a very strong impact on level of interest in STEM and scientific careers among pupils

- (5) Polarpedia: 5% of interviewed teachers assess, that Polarpedia have no impact on level of interest in STEM and scientific careers among pupils, 19% of interviewed teachers assess, that Polarpedia have little impact on level of interest in STEM and scientific careers among pupils, 44% of interviewed teachers assess, that Polarpedia have significant impact on level of interest in STEM and scientific careers among pupils, 32% of interviewed teachers assess, that Polarpedia have a very impact on level of interest in STEM and scientific careers among pupils



(6) monitoring system: 8% of interviewed teachers assess, that monitoring system have no impact on level of interest in STEM and scientific careers among pupils, 20% of interviewed teachers assess, that monitoring system have little impact on level of interest in STEM and scientific careers among pupils, 41% of interviewed teachers assess, that online lessons have significant impact on level of interest in STEM and scientific careers among pupils, 31% of interviewed teachers assess, that online lessons have a very strong impact on level of interest in STEM and scientific careers among pupils

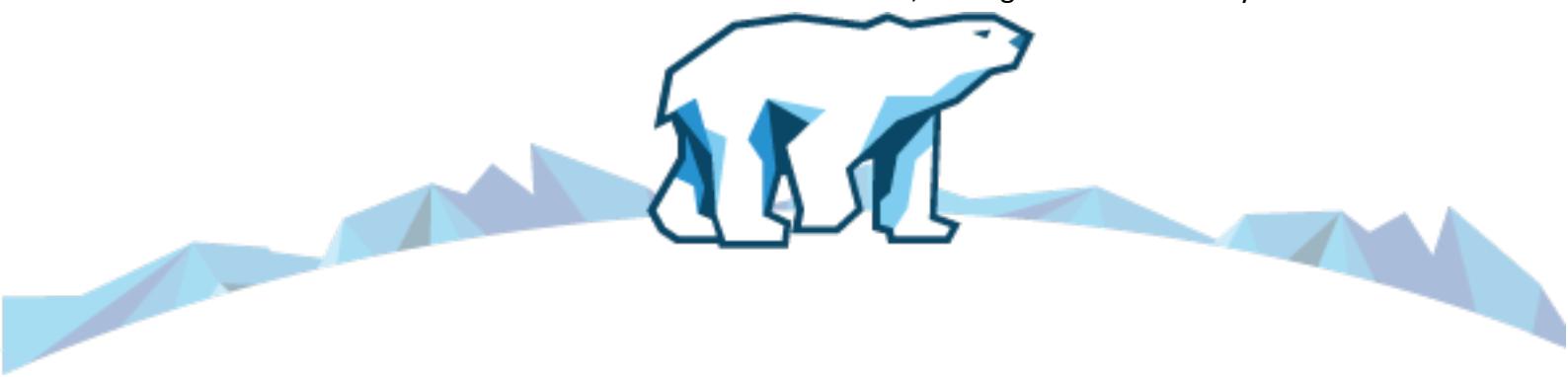
Question 4: Differences between schoolgirls and schoolboys in extension of increasing knowledge on issues related to the Arctic after the participation in EDU-ARCTIC project

schoolgirls

3. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 5% of schoolgirls
4. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 95% of schoolgirls:
among 12 % of schoolgirl the level of knowledge on issues related to the Arctic increased from 1%-9%; among 21 % of schoolgirl the level of knowledge on issues related to the Arctic increased from 10%-19%; among 29 % of schoolgirl the level of knowledge on issues related to the Arctic increased from 20%-29%; among 33 % of schoolgirl the level of knowledge on issues related to the Arctic increased from more than 30%

schoolboys

3. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 5% of schoolboys
4. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of knowledge on issues related to the Arctic among 95% of schoolboys:
among 12 % of schoolboys the level of knowledge on issues related to the Arctic increased from 1%-9%; among 25 % of schoolboys the level of knowledge on issues related to the Arctic increased from 10%-19%; among 27 % of schoolboys the level



of knowledge on issues related to the Arctic increased from 20%-29%; among 31 % of schoolboys the level of knowledge on issues related to the Arctic increased from more than 30%

Question 5: Differences between schoolgirls and schoolboys in understanding of the world of science and scientific language after taking part in the EDU-ARCTIC project

schoolgirls

3. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 5% of schoolgirls

4. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 95% of schoolgirls:

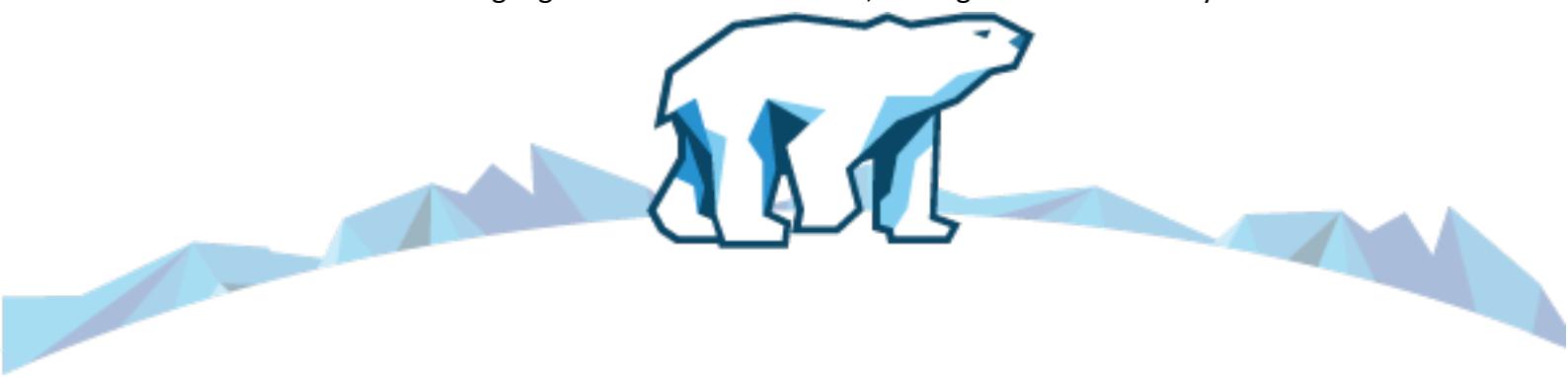
among 8 % of schoolgirl the level of understanding of the world of science and scientific language increased from 1%-9%; among 18 % of schoolgirl the level of understanding of the world of science and scientific language increased from 10%-19%; among 27 % of schoolgirl the level of understanding of the world of science and scientific language increased from 20%-29%; among 42 % of schoolgirl the level of understanding of the world of science and scientific language increased from more than 30%

schoolboys

3. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 4% of schoolboys

4. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of understanding of the world of science and scientific language among 96% of schoolboys:

among 7 % of schoolboys the level of understanding of the world of science and scientific language increased from 1%-9%; among 22 % of schoolboys the level of



understanding of the world of science and scientific language increased from 10%-19%; among 28 % of schoolboys the level of understanding of the world of science and scientific language increased from 20%-29%; among 39 % of schoolboys the level of understanding of the world of science and scientific language increased from more than 30%

Question 6: Differences between schoolgirls and schoolboys in increase of interest in STEM and scientific careers after taking part in the EDU-ARCTIC project

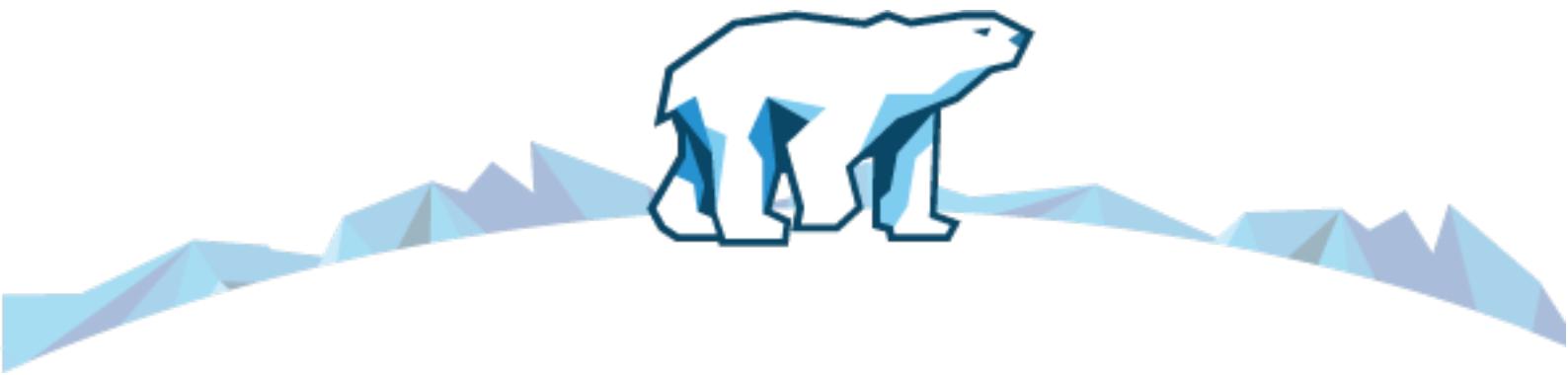
schoolgirls

3. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 6% of schoolgirls
4. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 94% of schoolgirls:
among 9 % of schoolgirl the level of interest in STEM and scientific careers increased from 1%-9%; among 21 % of schoolgirl the level of interest in STEM and scientific careers increased from 10%-19%; among 21 % of schoolgirl the level of interest in STEM and scientific careers increased from 20%-29%; among 43 % of schoolgirl the level of interest in STEM and scientific careers increased from more than 30%

schoolboys

3. The interviewed teachers assess, that there is no impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 5% of schoolboys
4. The interviewed teachers assess, that there is an impact of EDU-ARCTIC project on increasing of interest in STEM and scientific careers among 95% of schoolboys:
among 7 % of schoolboys the level of interest in STEM and scientific careers increased from 1%-9%; among 22 % of schoolboys the level of interest in STEM and scientific careers increased from 10%-19%; among 27 % of schoolboys the level of interest in STEM and scientific careers increased from 20%-29%; among 35 % of schoolboys the level of interest in STEM and scientific careers increased from more than 30%

11. Case studies



- **Case study No. 1: comparing the answers of three teachers chosen at random from Greece, three from Poland and three from Romania to see if there are any notable differences in terms of European countries:** survey question “What is the impact of each of the EDU-ARCTIC modules on your pupils' knowledge about issues related to the Arctic (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?” (1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

Greece: 1-1-2

Poland: 1-2-2

Romania: 2-4-1

- **Case study No. 2: comparing the answers of the same three teachers chosen at random from Greece, three from Poland and three from Romania to see if there are any notable differences in terms of European countries:** survey question “What is the impact of each EDU-ARCTIC module on the level of interest in STEM and scientific careers among your pupils?” (1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

Greece: 1-1-1

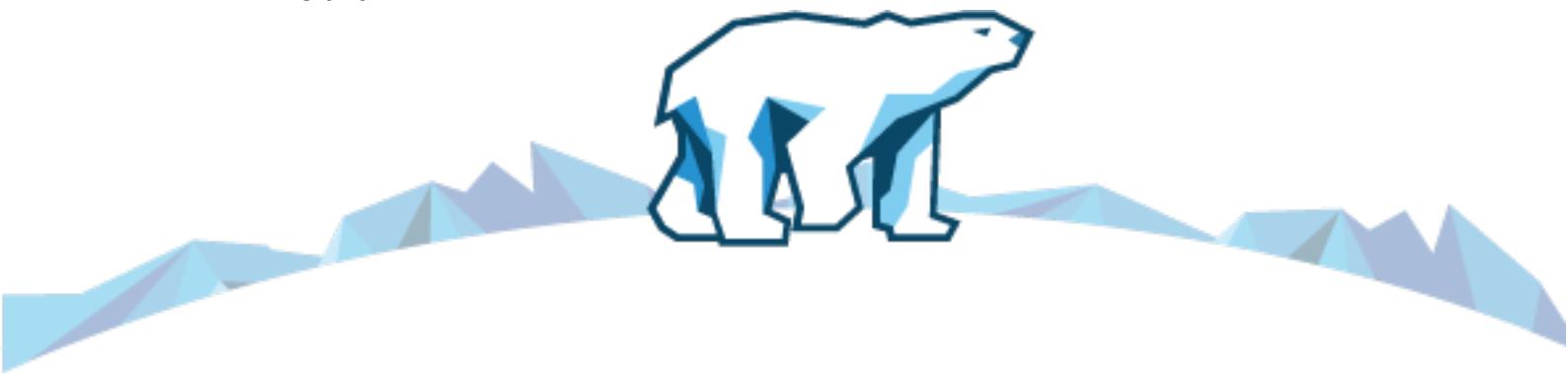
Poland: 2-2-2

Romania: 2-3-1

- **Case study No. 3: comparing the answers of the same three teachers chosen at random from Greece, three from Poland and three from Romania to see if there are any notable differences in terms of European countries:** survey question “What is the impact of each EDU-ARCTIC module on the level of understanding of scientific issues and scientific language among your pupils?” (1-very strong impact, 2-significant impact, 3-little impact, 4-no impact) [choose from the scroll-down list].

Greece: 1-1-2

Poland: 1-2-2



Romania: 2-4-1

These samples indicate that the highest scores tend to be given by the Greek teachers, followed by their Polish colleagues and the Romanians. The scores may vary quite significantly among teachers from one country, especially the Romanian teachers (from 1 to 4) which may be due to the location of the school, the age groups taught, English-language skills and frequency of use of project modules.

- **Case study No. 4: comparing the answers of the teachers with high, medium and low-level EDU-GAME scores to the three questions analysed above:**

high (14400 points, Poland, female, 15 girls + 5 boys): 1 - 1 - 1

medium (4920, Serbia, male, 52 girls + 49 boys): 2 - 2 - 1

lowest (200, Albania, female, 5 girls + 8 boys): 2 - 1 - 1

These samples show that there are no significant variations between these teachers who did not engage in the project in the same manner of frequency.

- **Case study No. 5: comparing the three top EDU-Games scorers' answers as to how often they used the modules** (3 a few times a month, 2 less than twice every month, 1 on average once a month; the answer "rarely" = no answer given):

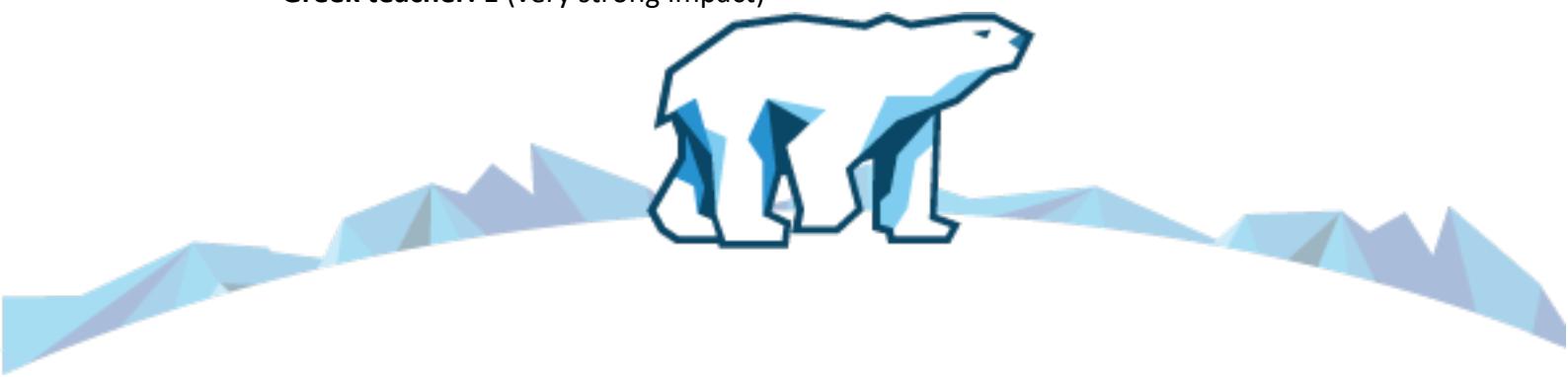
Greek teacher (19020 points, male, 24 girls and 19 boys aged 16): Online lessons - 1, Polarpedia - 1, Monitoring system - 1

Albanian teacher (22893, female, 12 girls and 8 boys, aged 20): Online lessons - 1, Polarpedia - 1, Monitoring system - 1

Albanian teacher (24078, female, 14 girls and 13 boys, aged 13): Online lessons - 1, Polarpedia - 1, Monitoring system - 1

- All three modules very used by the three teachers frequently, no matter how old the pupils were.
- **Case study No. 6: comparing the three top EDU-Games scorers' answers on the impact of each EDU-ARCTIC module on the level of interest in STEM and scientific careers among their pupils:**

Greek teacher: 1 (very strong impact)



Albanian teacher: 1 (very strong impact)

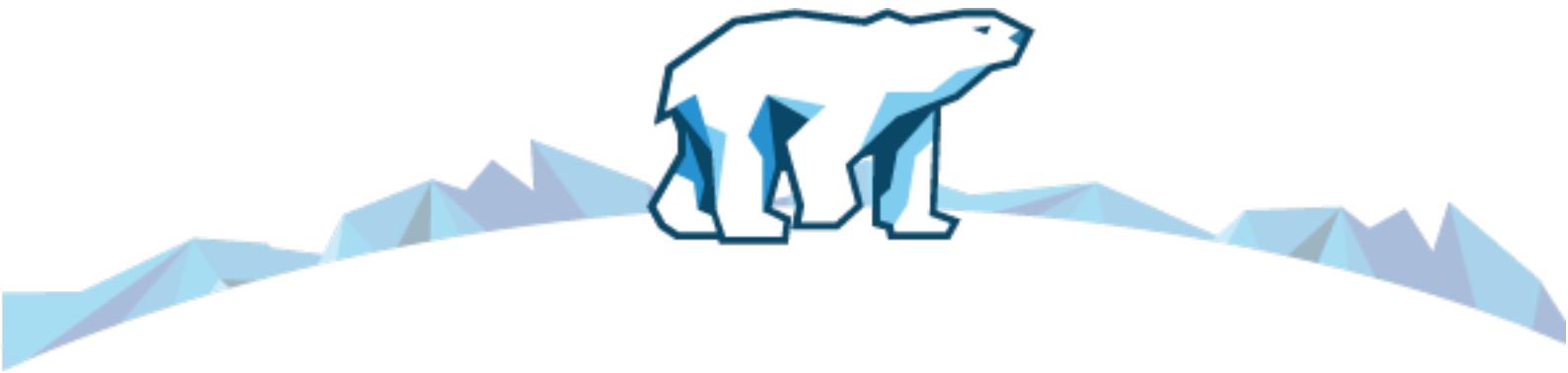
Albanian teacher: 1 (very strong impact)

The answers show that a frequent use of the EDU-ARTIC modules impacts very strongly the interest of pupils in STEM and scientific careers, no matter if they belong to the age group 13, 16 or 20. The project's objectives in this respect have thus clearly been attained.

12. General evaluation of the “After EDU-ARCTIC” survey

The survey permits remarks about factual aspects of the EDU-ARCTC project like utility, visual attractiveness and frequency of using on-line lessons, Polarpedia and monitoring system and technical aspects of the EDU-ARCTIC project like opinion of interviewed teachers about the impact of online lessons, Polarpedia and the monitoring system on pupils' knowledge about issues related to the Arctic, on the level of understanding of scientific issues and scientific language among pupils and the level of interest in STEM and scientific careers among pupils having taken part in the EDU-ARCTIC project. The survey also allows to trace the differences between schoolgirls and schoolboys in extension of increasing knowledge on issues related to the Arctic, in their understanding of the world of science and scientific language and increase of interest in STEM and scientific careers after taking part in the EDU-ARCTIC project. The survey was filled in by teachers who participated in the programme for more than one year. However, it does not provide information on how intensively the pupils of the interviewed teachers participated in the EDU-ARCTIC project – nor for how long the teachers and their pupils took part in the project, how many on-line lessons they joined, how many projects they prepared for the competition, how long and how many pupils were engaged in the monitoring activities. It is thus not possible to make any detailed remarks relevant for a group of pupils identified by the number of participants, their age and time being involved in the project. The results consist therefore only of general remarks.

The survey allows to make comments on the above-mentioned aspects of the project for Central and Eastern Europe mainly because the largest group of teachers who filled in the survey comes from this part of Europe. There are no representative results for the

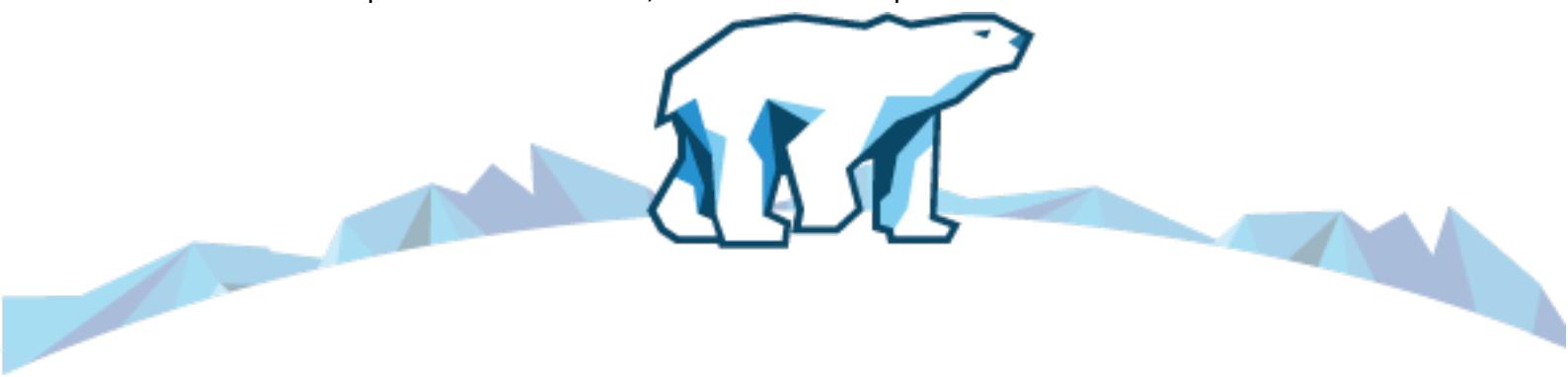


implementation of the EDU-ARCTIC project and the growth of pupils' knowledge about the Arctic and the impact of the projects' modules across the whole of Europe because of a lack of representative quantities of filled-in surveys from Western and Northern Europe.

A clear majority of interviewed teachers esteem that all modules of the project are useful in conducting various activities within the project. The most useful module are the online lessons (56%). 49% of interviewed teachers esteem that the monitoring system and 53% that Polarpedia are useful in conducting various activities within the project. The reasons for assessing the modules as not so useful are determined by working conditions of teachers in a number of schools: problems with fitting the online lesson into the time schedule and national curricula; the difficulty to create the habit of visiting the Polarpedia pages, lack of interest among pupils, monitoring system considered too difficult; problems concerning the realization of project activities: technical problems, recorded lessons considered difficult to locate online.

The clear majority of interviewed teachers esteems that the most attractive modules regarding visual presentation are the online lessons (68%) and Polarpedia (58%). 49% of interviewed teachers assess the monitoring system as the most visual attractive module. There are no evaluable replies explaining reasons for other assessments. The module which is most used by interviewed teachers is the monitoring system (42%). Most of interviewed teachers esteem that they use the online lessons (29%), Polarpedia (36%) and monitoring system (42%) on average once a month. The reasons for using the projects' modules rarely are determined by working conditions of teachers in a number of schools teachers are involved in other projects and school activities, their lack time, have problems with fitting the online lessons into the syllabus, transmission time, missing internet connexion; problems that pupils have can also be a notable factor: not enough interested and motivated pupils, the monitoring system considered too difficult; problems concerning the realization of project activities: technical problems.

Most interviewed teachers assess that online lessons (45%), Polarpedia (54%) and the monitoring system have (51%) a significant impact on pupils' knowledge about issues related to the Arctic. Concerning the question of no impact, 4% of interviewed teachers assess that there is no impact of online lessons, 5% as far as Polarpedia is concerned and 6% in relation

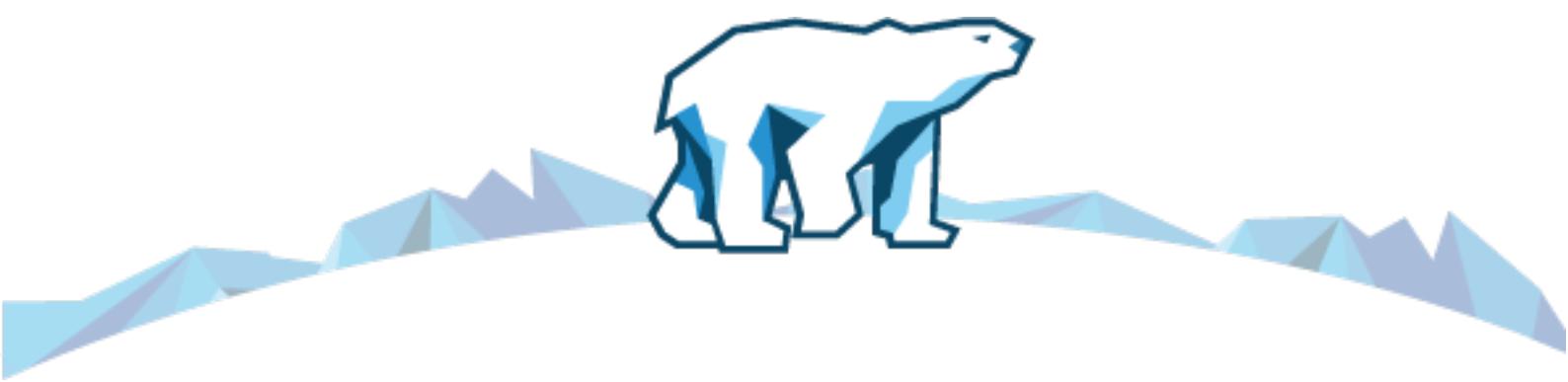


to the monitoring system. Regarding pupils' knowledge about issues related to the Arctic, the largest percentages concerning the answer that the impact is little are 4%, 26% and 20% respectively. As to the level of understanding of scientific issues and scientific language among pupils, the largest numbers of teachers considering that the impact is only little are: 6% regarding online lessons, 19% Polarpedia and 20% concerning the monitoring system. Just a few teachers assess that all modules have no impact on the level of understanding of scientific issues and scientific language among pupils (2%, 5%, 8%).

Concerning the increase of the level of knowledge on issues related to the Arctic, teachers esteem that there was no increase at all among 5% of schoolgirls and schoolboys, an increase of 1 to 9% concerns 12% of all boys and all girls, an increase of 10 to 19% concerns 25% of all boys and 21% of all girls (i.e. 4% more among boys than girls); in the category 20 to 29% increase, 27% of all boys and 29% of all girls (i.e. 2% more among girls than boys); in the category 30% and above, 31% of all boys and 33% of all girls (i.e. 2% more among girls than boys).

As to the project's impact on the level of understanding of the world of science and scientific language, the interviewed teachers esteem that it had no impact whatsoever on 5% of all boys and 4% of all girls; an increase of 1 to 9% concerns 7% of all boys and 8% of all girls (i.e. 1% more among girls than boys); an increase of 10 to 19% concerns 22% of all boys and 17% of all girls (i.e. 5% more among boys than girls); in the category 20 to 29% increase, 28% of all boys and 27% of all girls (i.e. 1% more among boys than girls); in the category 30% and above, 39% of all boys and 41% of all girls (i.e. 2% more among girls than boys).

Concerning increased interest in STEM and scientific careers, teachers esteem that the interest has not been raised at all among 5% of all boys and 6% of all girls (i.e. 1% more among girls than boys); an increase of 1 to 9% concerns 7% of all boys and 9% of all girls (i.e. 2% more among girls than boys); an increase of 10 to 19% concerns 22% of all boys and 21% of all girls (i.e. 1% more among boys than girls); in the category 20 to 29% increase, 17% of all boys and 21% of all girls (i.e. 4% more among girls than boys); in the category 30% and above, 39% of all boys and 43% of all girls (i.e. 4% more among girls than boys).



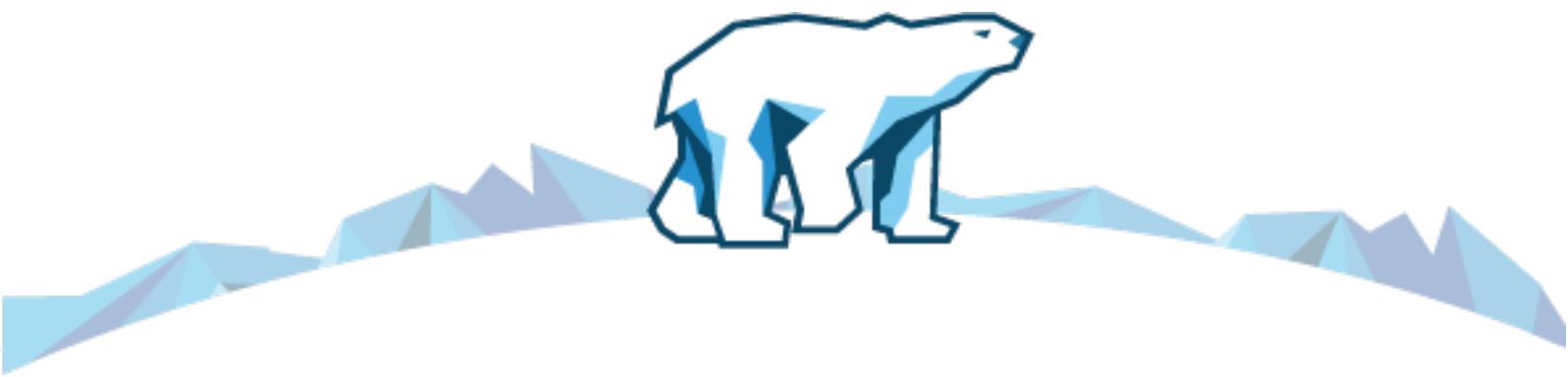
13. Evaluation in relation to the objectives of the “During EDU-ARCTIC” survey and “After EDU-ARCTIC” survey

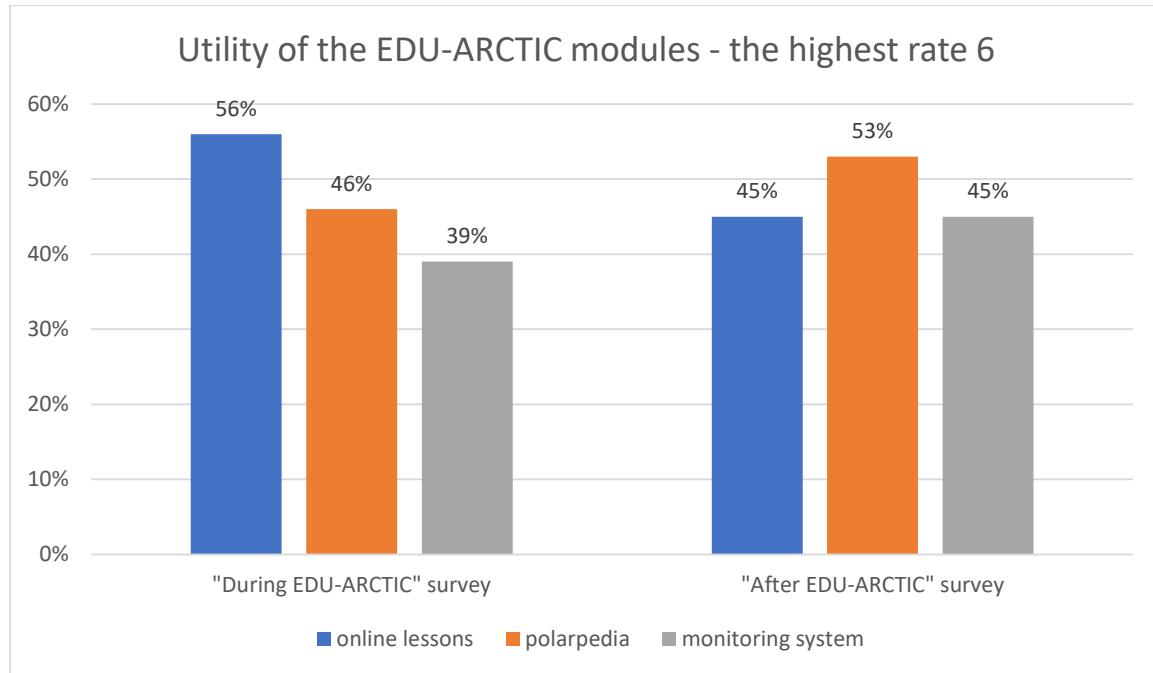
Quality of the educational program

The quality of the educational program has to be measured by the utility, visual attractiveness and frequency of using of projects' modules. All modules are useful in conducting various activities within the project. The most useful, visually attractive and most commonly used module are the online lessons.

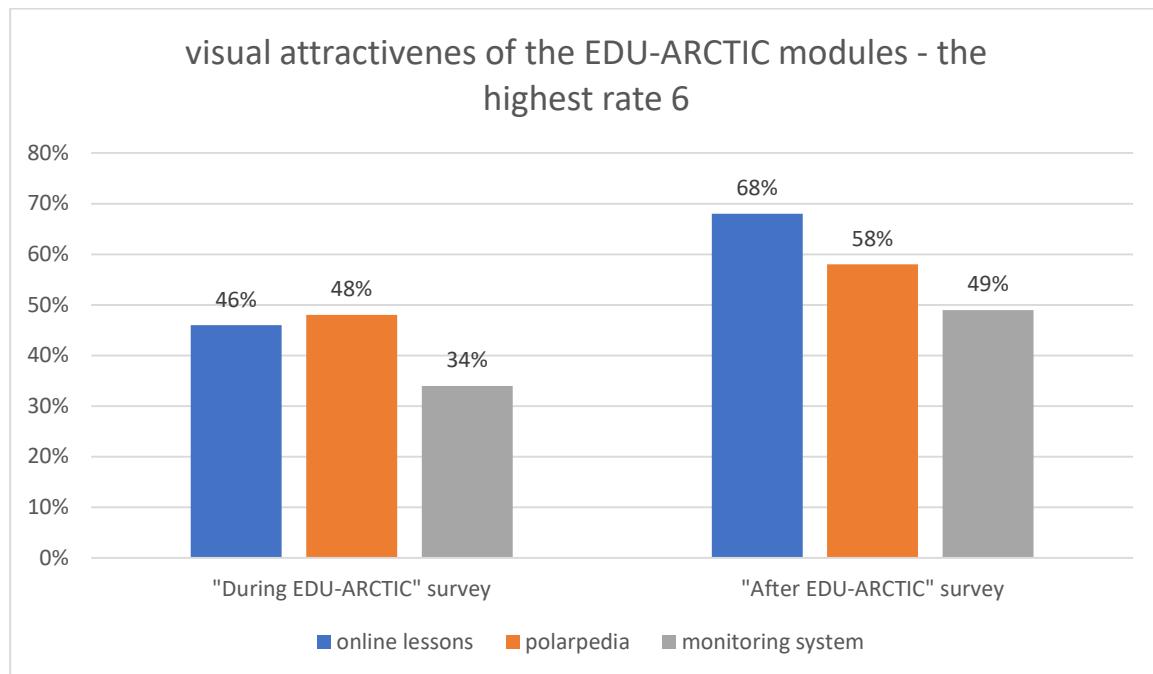
14. Comparison

The “During EDU-ARCTIC” survey was filled in by 130 teachers from 27 countries, the “After EDU-ARCTIC” survey by 80 teachers from 19 countries. The vast majority teachers who took part in the evaluation come from Central and Eastern Europe: 74% for the “During EDU-ARCTIC” survey and 80% for the “After EDU-ARCTIC survey”; from Western Europe 17% for the “During EDU-ARCTIC” survey and 16% for the “After EDU-ARCTIC” survey as well as 5% from Northern Europe for the “During EDU-ARCTIC” survey and just one teacher in the “After EDU-ARCTIC” survey. The largest group that participated in the EDU-ARCTIC project according to the interviewed teachers in the “During EDU-ARCTIC” and “After EDU-ARCTIC” surveys were 13-year-old pupils.

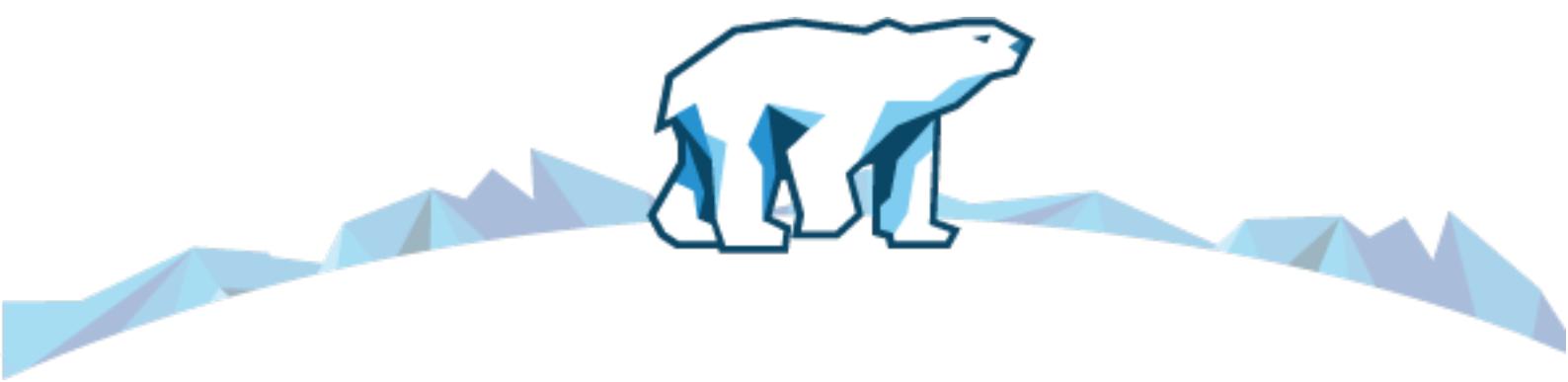


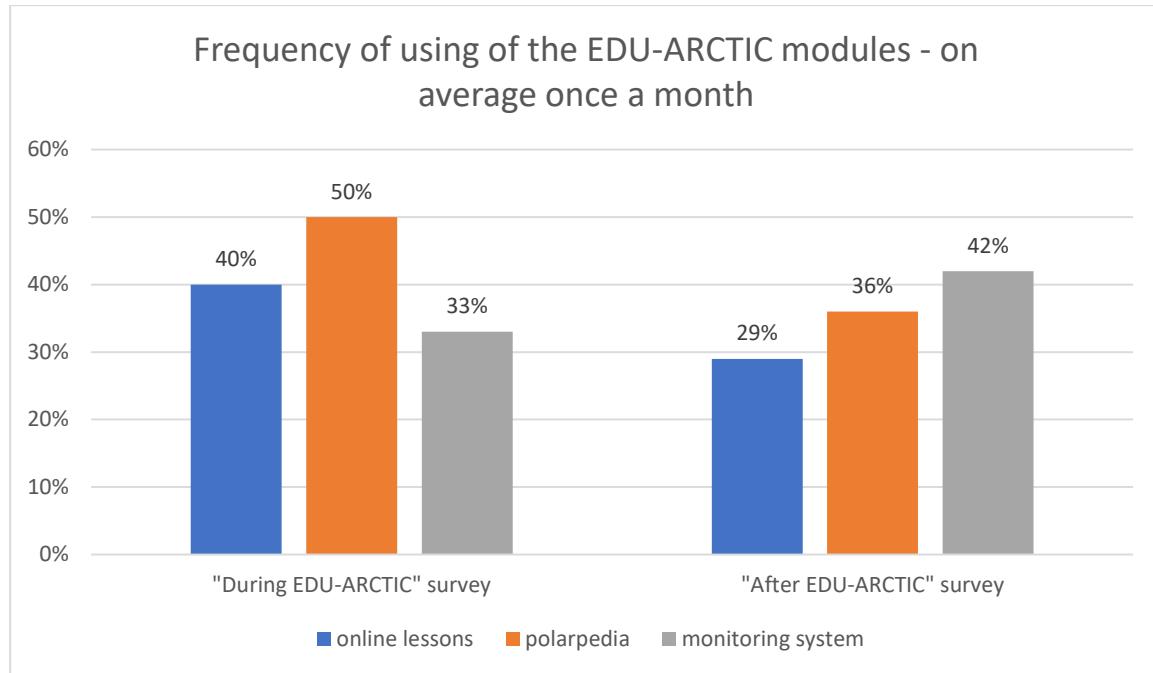


The utility of online lessons was considered to be in decline towards the end of the project: 11%, the utility of Polarpedia and the monitoring system increased by 7%.



The visual attractiveness of the EDU-ARCTIC modules increased towards the end of the project: online lessons by 18%, Polarpedia by 10% and the monitoring system by 15%.

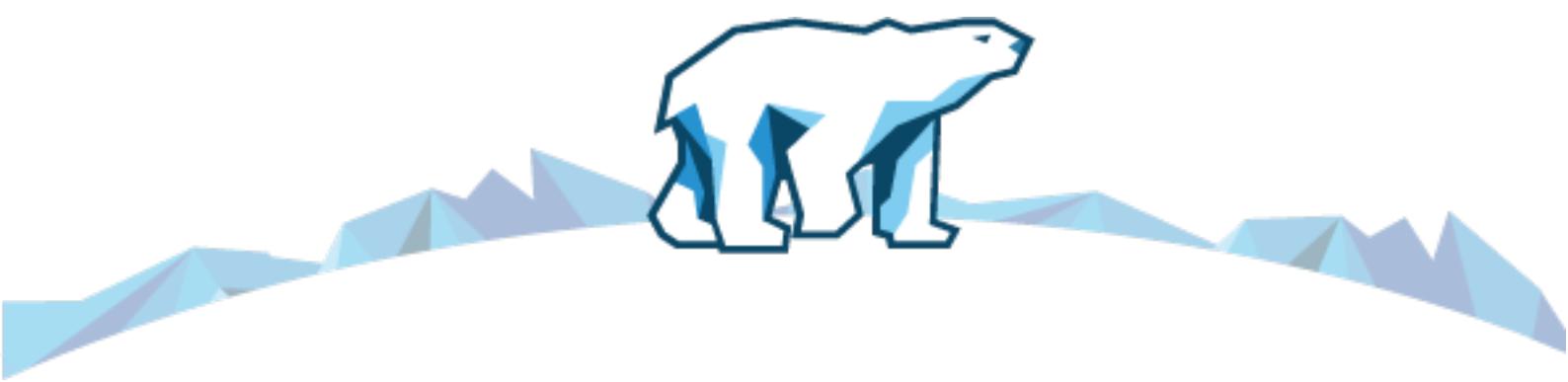
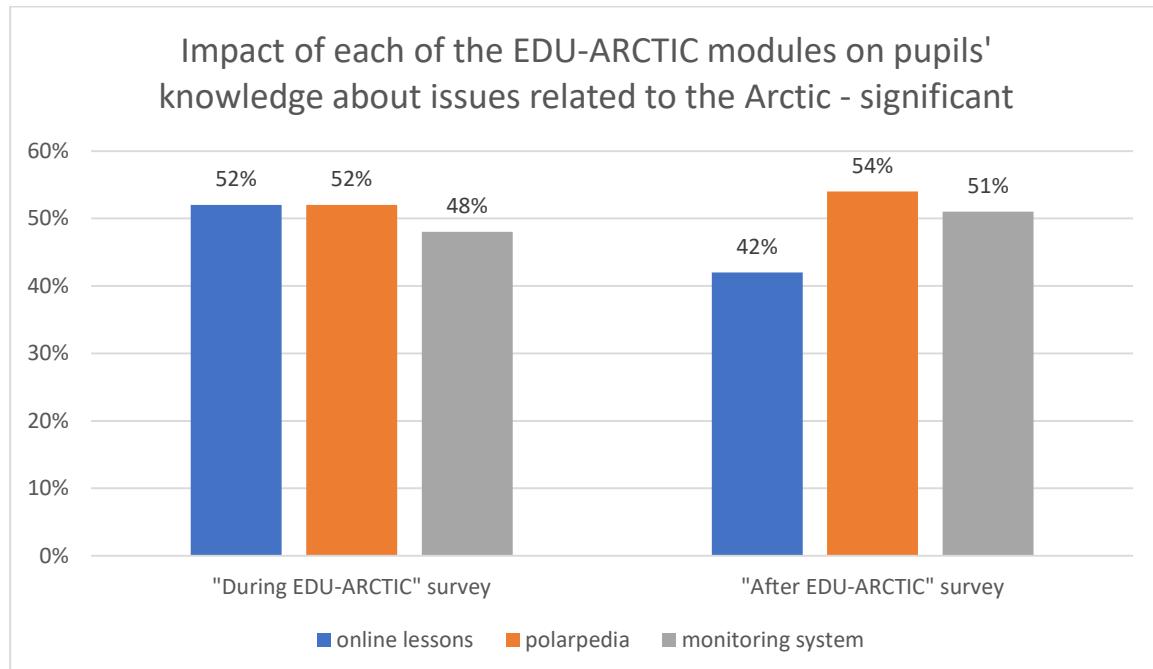




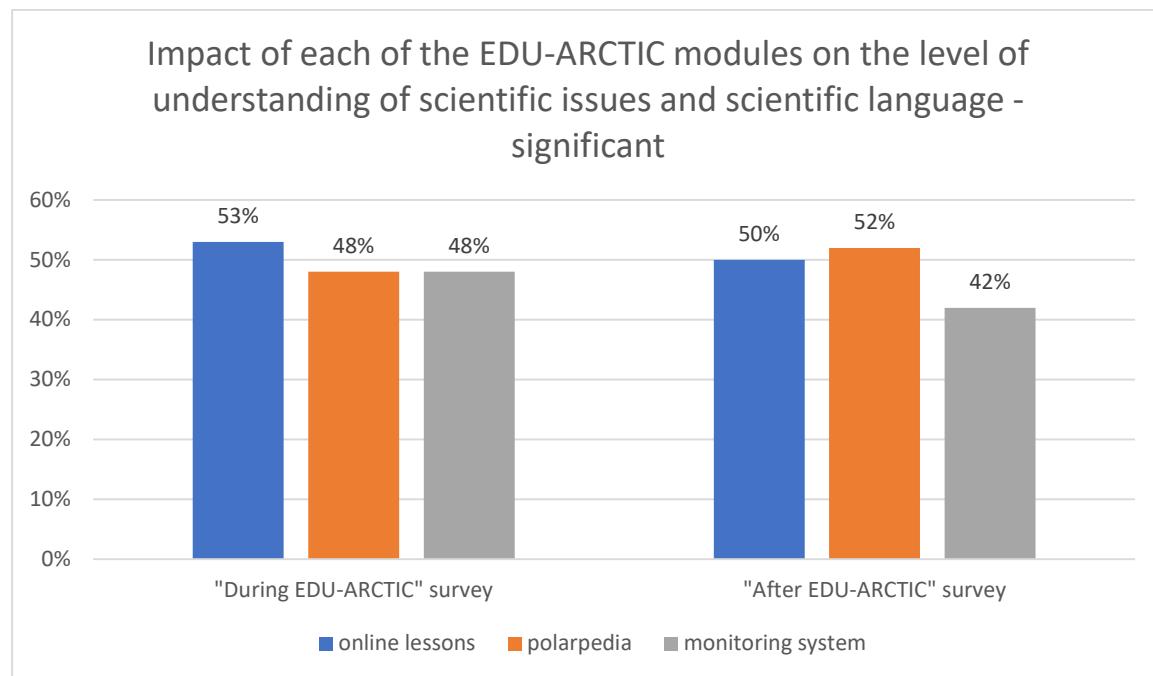
In the category using the modules on average once a month the frequency decreased: online lesseons by 19%, Polarpedia 14% and the monitoring system 9%.

IMPACT OF EACH EDU-ARCTIC MODULE

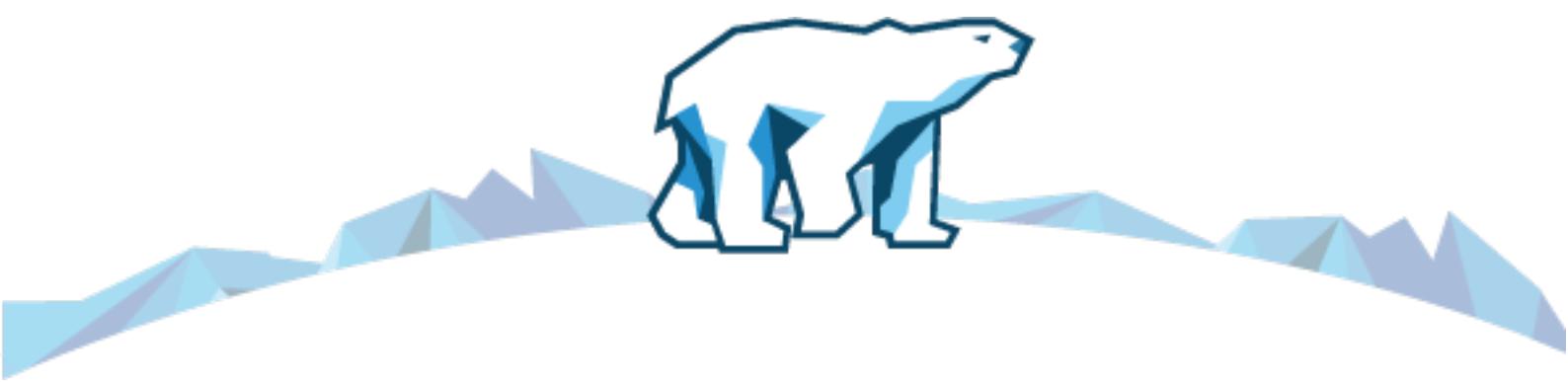
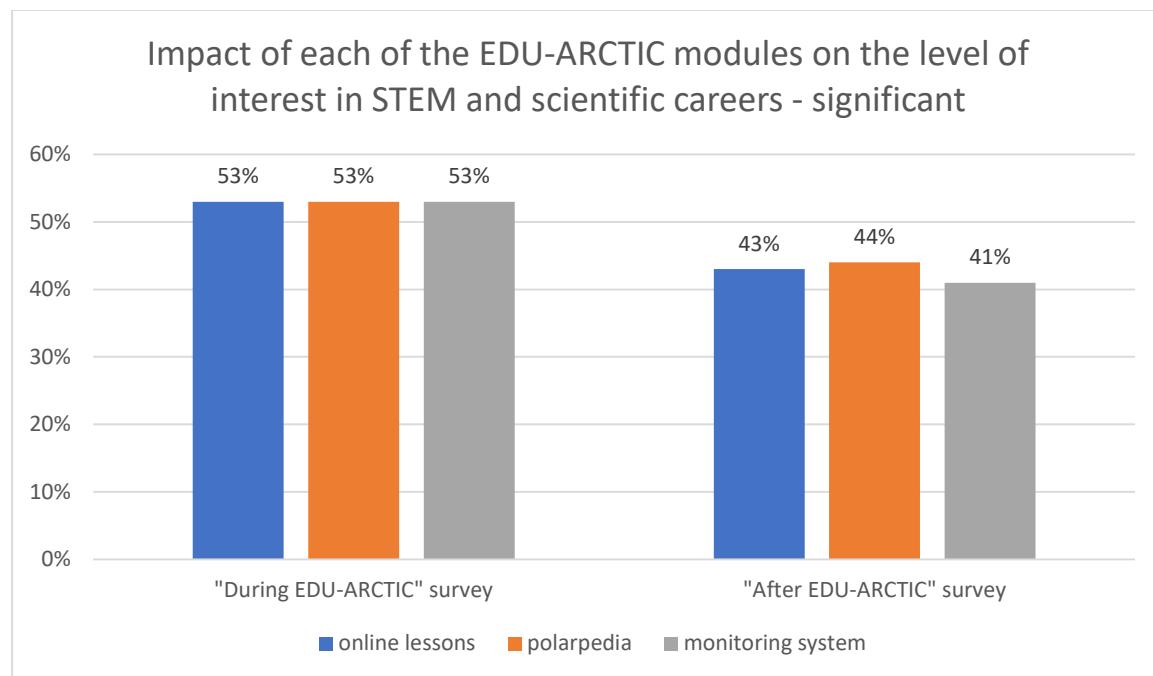
Most interviewed teachers esteem that the impact of each EDU-ARCTIC module on their pupils' knowledge about issues related to the Arctic is significant.



The impact of online lessons in the category “significant” decreased by 10% towards the end of the project. The impact of Polarpedia rose by 2%, the impact of monitoring system by 3 %.



The impact of online lessons decreased by 3% towards the end of the project, Polarpedia rose by 4% and the monitoring system decreased by 6%.



The impact of online lessons decreased by 10% towards the end of the project, Polarpedia by 9% and the monitoring system by 12%. In the „After EDU-ARCTIC“ survey the percentage for Polarpedia in the category “very strong” was the highest at 49%.

As to knowledge on issues related to the Arctic, the level of understanding of the world of science and scientific language as well as interest in STEM and scientific careers, the rates of increase are more important for boys than they are for the girls.

15. Conclusion

The final results of the project will be reported in D.5.4 (M39). As to the Final evaluation report with case studies of EDU-ARCTIC, it can be observed that the impact of the EDU-ARCTIC modules has been generally speaking very strong, with a higher percentage among girls than boys, though the difference is not major. The modules have also contributed in a significant way to the enhancement of the pupils' knowledge about the polar regions and the scientific subjects dealt with in the project. The online lessons, Polarpedia and Monitoring system received the highest score in terms of utility. This clearly indicates that proactive and innovative measures to raise interest among pupils in STEM can lead to very positive results as they evidently have done in the case of EDU-ARCTIC.

