

Integrating Activities for Advanced Communities



D2.2- 1st CAWI survey report

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PP	Restricted to other programme participants (including the Commission Services)	
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1. Publishable Executive Summary

This report is a summary of the 1st CAWI (Computer-Assisted Web Interviewing) survey carried out within the INTERACT Project (“International Network for Terrestrial Research and Monitoring in the Arctic”). It is a part of Work Package No. 2 (“Scientific coordination, mentoring and education”), task 2.2. (“Promote Arctic and climate change issues in education”), sub-task 2.2d. (“Feedback on INTERACT educational resources”). This survey starts a series of evaluation questionnaires for teachers which are intended to evaluate the usefulness of resources for education on Arctic and northern issues.

The aim of this study was to recognize science teachers and polar educators’ needs and expectations in relation to new educational materials about the Arctic. The survey was anonymous, and was disseminated using various communication channels. The total number of replies was 113, from 25 different countries. The results of the report allow INTERACT to assess various priorities for producing educational materials, and to understand at what levels and how they will be used.

The most important conclusions are:

- Science teachers have on average a very limited time to introduce polar issues to their students;
- Science teachers and polar educators have on average many groups of students with which they can conduct lessons about the Arctic;
- The new educational materials would be used mainly on geography, nature, and biology lessons;
- Among the suggested topics, the most interesting one for teachers was “Climate change – causes and consequences”;
- Many teachers and educators are willing to use English, even if it’s not their mother tongue;
- The most desirable types of new educational materials were “Multimedia presentations – PowerPoint”, “Movies”, and “Graphics and schemes”;
- Respondents found “Websites/ web portals” as the most useful way of communication between educational projects and teachers;
- Almost 9 in 10 participants were interested in receiving future news and information from the INTERACT.

2. Introduction

This report is a summary of a computer-assisted web interviewing (CAWI) survey conducted among science teachers and polar educators. The survey was conducted as part of the INTERACT Project in May and June 2017. It is the first of 3 surveys designed to collect feedback from teachers and support the development of new educational resources, which will be created within the Project. The aim of the 1st CAWI survey was to recognize teachers and educators' needs and expectations in relation to new educational materials about the Arctic.

The 2nd CAWI survey will be conducted in 2018 and will evaluate the usefulness of materials created, while the 3rd CAWI survey will be conducted in 2019 and will focus on recommendations for future development of educational resources.

3. Methodological note

The survey was conducted using the computer-assisted web interviewing (CAWI) technique, provided by Google Forms. It was published on-line (under this link: https://docs.google.com/forms/d/e/1FAIpQLSd9bpv_iV3Vixbm5NIEurPN5mQstI7Hvx_a1StNzH6_cBG2yg/closedform). The survey was opened and announced on Friday, 5th of May 2017, and was closed four weeks later, on Friday 2nd of June 2017. It was anonymous.

Prior to on-line collection of answers, a paper version of the survey was distributed among participants of two workshops:

- PEI 2017 Italy „Education meets science – bringing polar research into the classrooms”; Rovereto, Italy, 11-14 April 2017 (for polar educators), and
- SCIENTIX Workshops for STEM (Science, Technology, Engineering, and Mathematics) teachers; Warsaw, Poland, 26 April 2017.

These answers were collected on paper and copied into the on-line form.

The survey consisted of 16 questions (open and closed, single and multiple answer) in the paper version, and 17 questions in the on-line version. The only substantial difference between the paper version and the on-line version was question 11a (“What is your preferred language?”), which appeared later, i.e. in the on-line version. To provide methodological consistency, answers to this question are not taken into consideration in this report (not all participants could answer this question).

Participants were also asked whether they want to leave their e-mail address in order to stay in contact and receive occasional e-mail notifications or newsletters about the Project (it wasn't obligatory). Almost 9 in 10 participants gave their e-mail address.

4. Respondents

The target group for this survey was science teachers and polar educators, of all levels of education (which will be the target group for future educational materials created within the Project). There were 113 participants, from 25 countries. Majority of the respondents

have a long learning experience (more than 15 years). For more information about the participants, see sections 7.1 – 7.8.

5. Dissemination of the survey

Respondents were sought and encouraged to participate in the survey using various communication channels: website announcements, e-mail and newsletter notifications, Facebook fan pages and Facebook groups for science and polar teachers and educators, and during two workshops mentioned in section 3 above. A detailed list can be found below. This list is not definitive, as all recipients of the survey were asked to disseminate it further, to whom it may be appropriate. Below are dissemination activities performed by the author of this report, or of which the author has been informed.

5.1. Workshops

Date	Name, place, date of workshop	Comments
11-14 April 2017	PEI 2017 Italy: „Education meets science – bringing polar research into the classrooms”; Rovereto, Italy.	The first version of the survey was ready for the PEI workshop. 17 surveys were collected (answers were later copied into on-line forms).
26 April 2017	SCIENTIX Workshops for STEM teachers; Warsaw, Poland.	12 surveys were collected (answers were later copied into on-line forms).

5.2. Websites

Date	Institution/organisation	URL Address
5 May 2017	INTERACT	http://www.eu-interact.org/outreach2/
30 May 2017	Polish Polar Consortium	http://www.pkpolar.pl/konsorcjum/zaproszenie-ankieta-projektu-interact-nowe-materialy-edukacyjne-o-tematyce-polarnej/

5.3. E-mail / newsletter

Date	Details	Comments
9 May 2017	E-mail to all members of INTERACT consortium (92 recipients)	All recipients were asked to share the link wherever appropriate
15 May 2017	Wicked Weather Watch Spring newsletter	
19 May 2017	SIOS (Svalbard Integrated Arctic Earth Observing System) newsletter	
30 May 2017	Newsletter to members of the Polish Polar Consortium (266 members)	The Polish Polar Consortium is a group of scientists and educators from all Polish scientific institutions which deal with polar issues
31 May 2017	E-mail to INTERACT’s Transnational Access User Group leaders (58 recipients)	

5.4. Facebook fan pages

Date and time (CEST)	Name of Facebook fan page	URL Address	Followers of the fan page
5 May 2017 09:45	INTERACT	https://www.facebook.com/InteractArctic/?fref=ts	364
10 May 2017 10:48	Polar Educators International	https://www.facebook.com/polareducators/	215
12 May 2017 11:17	Wicked Weather Watch	https://www.facebook.com/wickedweatherwatch/	143

5.5. Facebook groups

Date and time (CEST)	Name of Facebook group	URL Address	Number of members
12 May 15:46	"Science Teachers in Europe"	https://www.facebook.com/groups/ScienceTeachersEurope/	8200
22 May 11:31	„INTERACT TA Users”	https://www.facebook.com/groups/431214540570805/	52
23 May 16:18	„Polar Educators International”	https://www.facebook.com/groups/247660677828/	1450
24 May 14:05 (as a reminder)	"Science Teachers in Europe"	https://www.facebook.com/groups/ScienceTeachersEurope/	8200
2 June 13:40 („final call”)	„Polar Educators International”	https://www.facebook.com/groups/247660677828/	1450
2 June 14:31 („final call”)	"Science Teachers in Europe"	https://www.facebook.com/groups/ScienceTeachersEurope/	8200

6. Number of replies

The total number of received replies was 113. Of this number, 84 were obtained from participants who completed the survey on-line, and the rest (29) was obtained from participants of 2 workshops (17 from Italy and 12 from Poland), mentioned in section 5.1.

7. Answers

The first part of the survey (questions 1-8) referred to teachers and educators' professional background, experience, and country of origin. The second part of the survey (questions 9-16) was about teachers' needs, expectations, and preferences in relation to new polar educational materials. Below are detailed descriptions of answers collected for each question.

7.1. Question No. 1: “Please select the type of school in which you teach”

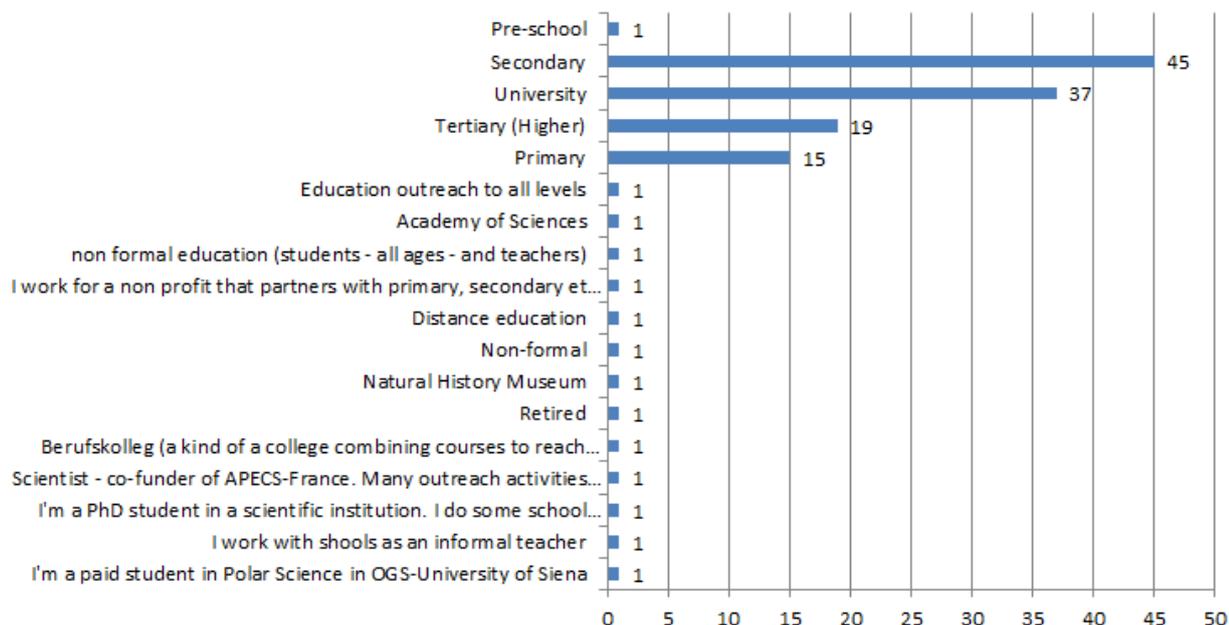


Fig. 1. Answers to Question No. 1

The first question examined the type of school in which the respondents teach. The teachers could indicate more than one type of school. The most common answer was “Secondary” – this type of school was indicated 45 times. Another type of school which was highly represented was “University” - 37 participants work at universities. Both Tertiary (19) and Primary (15) school teachers were significantly less represented in this survey. This question also allowed “other” answers, and the range of responses here was quite big – there were 13 different “other” answers, such as non-formal or distance education.

7.2. Question No. 2: “What is your work experience?”

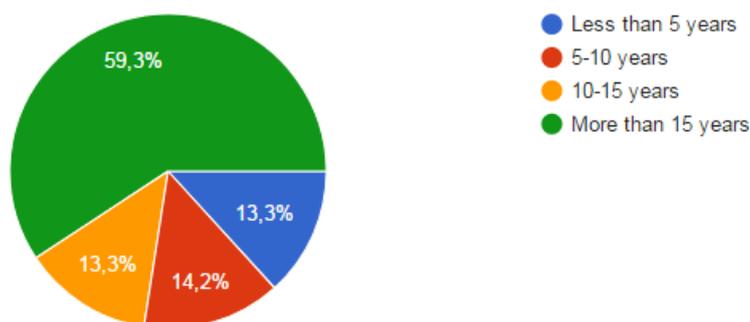


Fig. 2. Answers to Question No. 2

Question number 2 referred to teachers’ work experience. Almost 2/3 of them (59,3%) claimed a long work experience (more than 15 years). The 3 categories: “10-15 years”, “5-10 years”, and “less than 5 years”, count for the other 40%, and are represented in roughly the same way (13,3 – 14,2%).

7.3. Question No. 3: “What is your country of origin?”

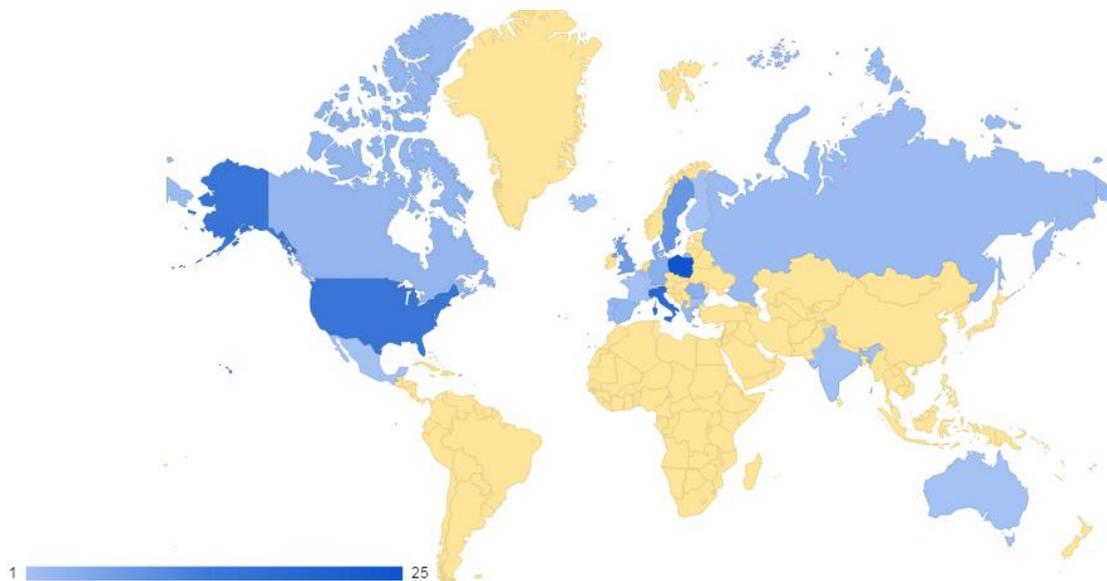


Fig. 3a – Answers to question No. 3 – enumerated geographically

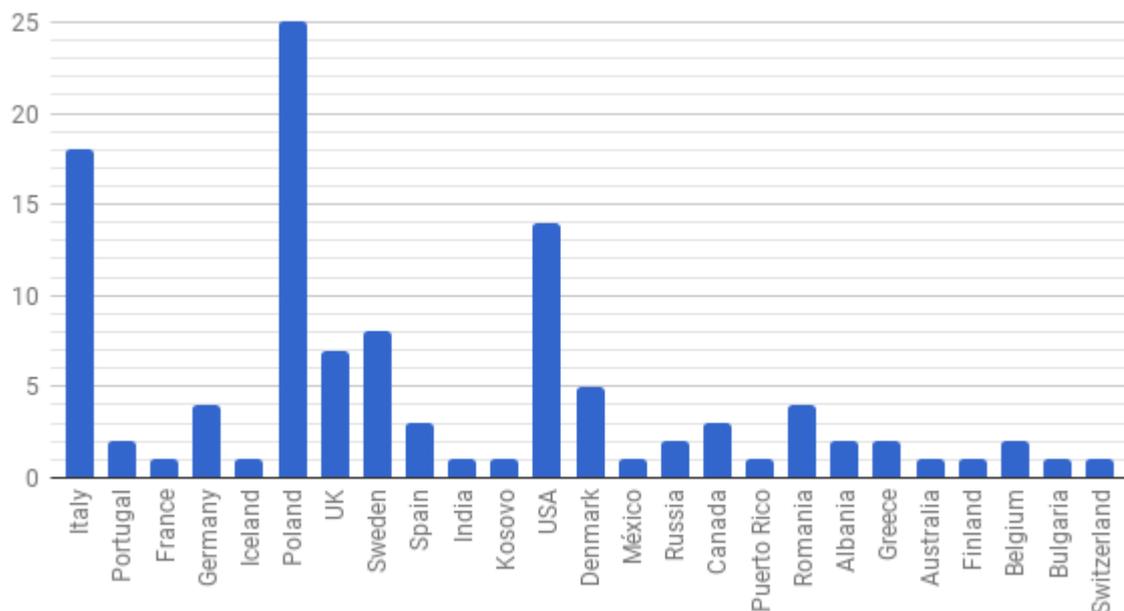


Fig. 3b – Answers to question No. 3 – in numerical terms

The completed questionnaires were received from 25 different countries, from 4 different continents (North America, Europe, Asia, and Australia). The geographical distribution of respondents is shown in Figure 3a. The more intense the blue colour, the higher the number of questionnaires received from a given country. The highest number of surveys was obtained from Poland (25), Italy (18), and USA (14). Also, a significant number of questionnaires was obtained from Sweden (8), the United Kingdom (7), Denmark (5), Germany (4), and Romania (4). A detailed list of all countries (with numbers of received questionnaires) is shown in Fig. 3b.

7.4. Question No. 4: “Are you interested in new educational materials about the Arctic?”

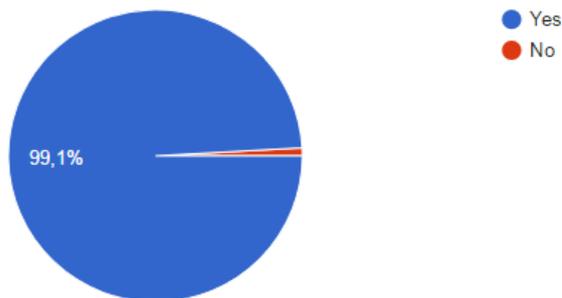


Fig. 4 – Answers to question No. 4

Almost all respondents were interested in new educational materials about the Arctic – 99,1% replied “yes” to this question. Only one person in 113 replied “no”. This score is a confirmation that creation of such materials will be useful.

7.5. Question No. 5: “When would you use those new educational materials?”

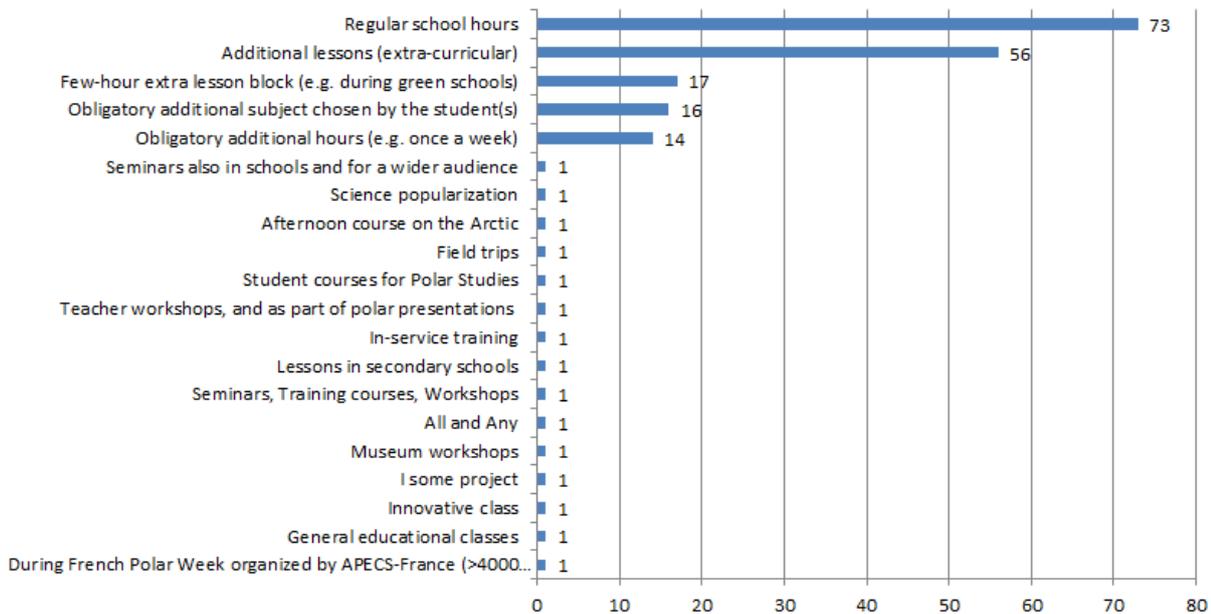


Fig. 5 – Answers to question No. 5

Answers to this question give an insight into the types of classes during which those new resources would be used. 2/3 of respondents (73 answers – 66,4% of participants) would use them during regular school hours. Another frequent occasion would be “Additional lessons”, indicated by half of the respondents (56 answers – 50,9%). The other three suggested answers (“Obligatory additional hours”, “Obligatory additional subject chosen by the student(s)”, and “Few-hour extra lesson block”) were less common, however they received a similar number of votes (14-17 answers, 12,7-15,5%). In this question the participants could also add their own answers, and what is interesting is the diversity of the “other” answers. Just to mention a few: “Student courses for polar studies”, “Teacher workshops”, “Afternoon course on the Arctic”, “Museum workshops”, and “Field trips”.

7.6. Question No. 6: “How many hours during a school year can you devote to lessons on the Arctic (with one group of students)?”

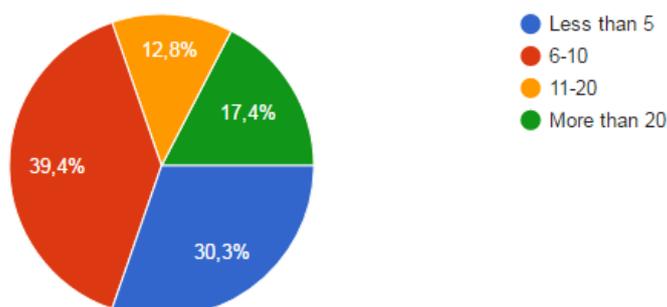


Fig. 6 – Answers to question No. 6

Question no. 6 was intended to give an idea of how many hours the teachers can devote to lessons on Arctic issues. The most frequent answer was “6-10” (39.4%), and the second most frequent answer was “less than 5” (30,3%). The other two possibilities were indicated significantly less often (“11-20” – 12,8%, and “more than 20” – 17,4%). These answers suggest that more than 2/3 of science teachers can devote little or very little time to introduce polar topics to their students. Only a small part of them (less than 1/3) have the comfort of spending more time (more than 11 hours a year) on polar issues. This picture shows that science teachers on average have a very limited time to conduct classes on polar issues. This is also important information from the perspective of creation of new educational materials about the Arctic. Basing on this assumption, the following recommendations can be made:

- new materials need to be very efficient in presenting relevant material quickly;
- a particular attention should be paid to the attractiveness of materials;
- part of the materials need to be related to STEM subjects in general, but with a connection to polar issues (e.g. a material on tectonics with examples from Iceland, or a material on magnetism with a mention of northern lights);
- part of the materials should be designed for use during school activities other than regular lessons, e.g. topics for discussion (related to polar issues) for parenting hours or Oxford-style debates.

7.7. Question No. 7: “In how many groups (classes, extra-curriculum groups, etc.) can you conduct lessons about the Arctic?”

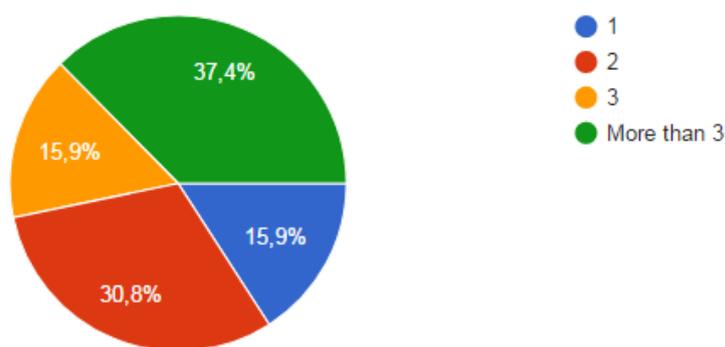


Fig. 7 – Answers to question No. 7

The most common answer to this question was “more than 3” (37,4% of respondents indicated this option). The second most common answer was “2” (30,8%). The other two options (“1” and “3”) received relatively less answers (both 15,9%). This distribution suggests that science teachers and polar educators on average have many groups of students with which they can conduct lessons about the Arctic. This is good news for the project, because it implies the opportunity of reaching more students (as end

users). If the teachers find the materials attractive and useful, they would usually use them with more than one group of students.

7.8. Question No. 8: “In scope of which subject will you be able to use INTERACT educational materials?”

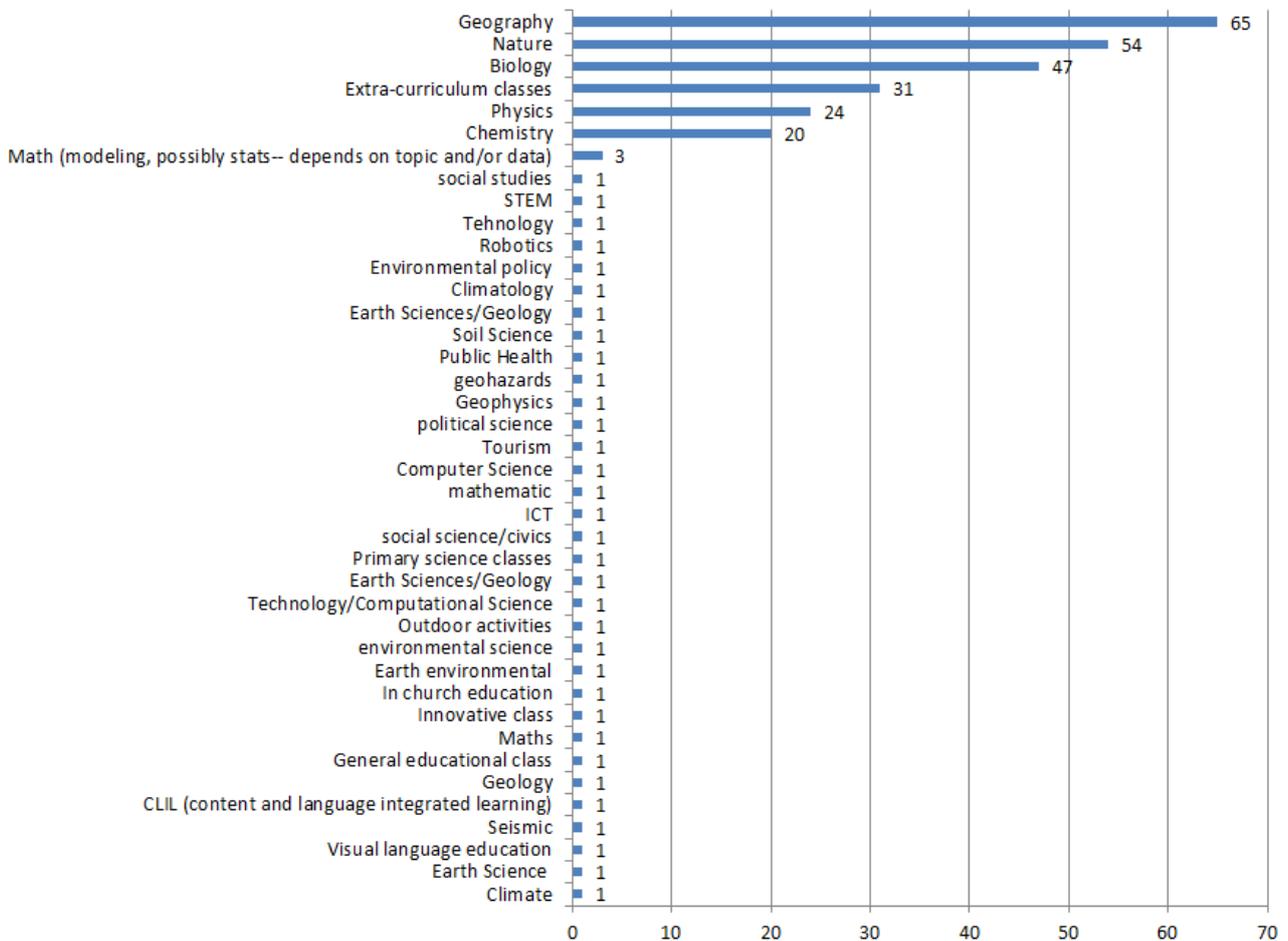


Fig. 8 – Answers to question No. 8

In this question the respondents were asked to indicate all subjects in scope of which they will be able to use new educational materials. Also, they could give examples of other subjects, not mentioned in the question. The answers show a significant difference in the number of votes between traditional science subjects. Geography received the highest number of votes (65 votes (58,6% of respondents)), while Chemistry only 20 (18%). The other subjects were placed in between: Nature – 54 (48,6%), Biology – 47 (42,3%), and Physics – 24 (21,6%). Teachers could also name any other subject, and the range of answers was surprisingly big. Among the answers were: “Visual language education”, “Innovative class”, “Church education”, “Outdoor activities”, “Technology/ computer science”, “Social science”,

“Political science”, and many more. The variety of subjects may also result from different curriculums in respondents’ countries. These are often difficult to compare, but the predominance of geography, biology, and nature, is undisputed. This needs to be taken into consideration when creating new educational resources.

7.9. Question No. 9: “When you think about new educational materials – which topics would be most interesting for you and your students?”

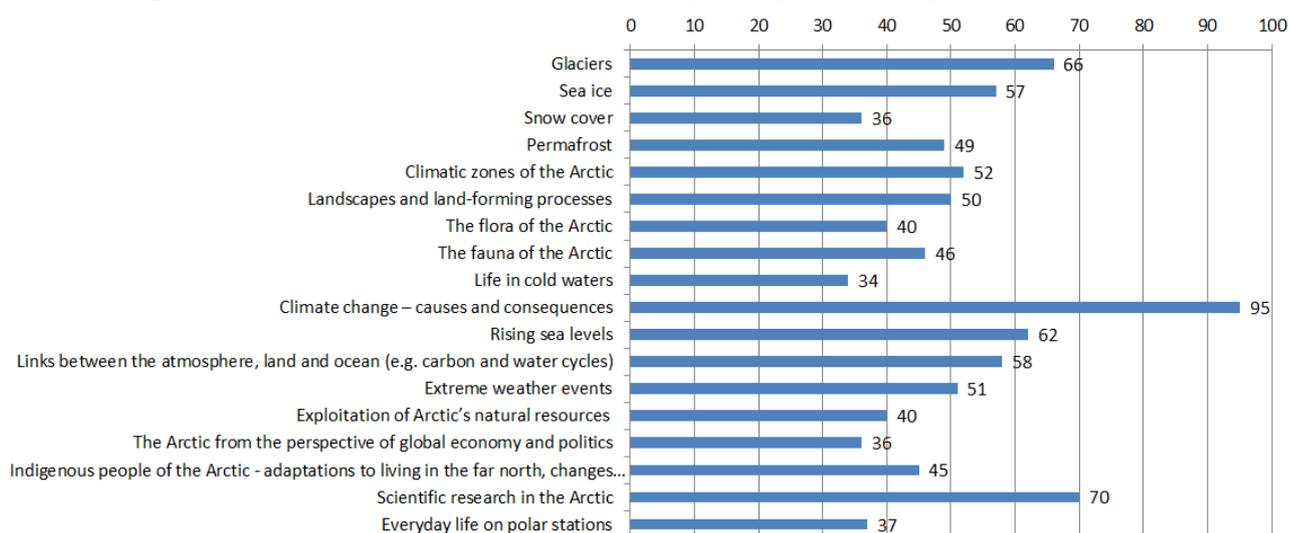


Fig. 9 – Answers to question No. 9

This question can be considered as the opening of the second part of the survey (questions 9-16), which generally referred to teachers’ needs, expectations, and preferences in relation to new polar educational materials. Here the teachers were asked about topics which they find most interesting and relevant, and were given a wide range of possible answers. Among the 18 answers were topics related to natural, social, scientific and economic aspects of the Arctic.

Definitely the most interesting issue for teachers was “Climate change – causes and consequences”, which received a record number of 95 votes (84,8% of participants indicated this answer). This score confirms that the topic of climate change is a subject of a highest concern among people who deal with Arctic issues. The second most interesting topic was “Scientific research in the Arctic” with 70 votes (62,5%). Such a high score of this topic is a slightly surprising result. However it probably indicates the demand for information not only about climate change and corresponding issues, but also about the scientific research which leads to such discoveries and conclusions. The third most interesting topic was “Glaciers”, which received 66 votes (58,9%), and the fourth – “Rising sea levels” – 62 votes (55,4%), which comes as no surprise, considering the growing awareness of possible global consequences of climate change. Other often indicated

answers were “Links between the atmosphere, land and ocean” (58 votes/ 51,8%) and “Sea ice” (57 votes/ 50,9%). That corresponds with the above mentioned concerns.

Another group of answers (with a similar number of votes – from 52 to 49) continues the trend of interest in the characteristics of changes in natural processes in the Arctic: “Climatic zones of the Arctic” (52 votes), “Extreme weather events” (51 votes), “Landscapes and land-forming processes” (50 votes), and “Permafrost” (49 votes). When asked about the Arctic flora and fauna separately, the respondents indicated “fauna” more often (46 as opposed to 40 votes).

Answers related to social and economic issues of living in the Arctic received a slightly disappointing number of votes (“Indigenous people of the Arctic - adaptations to living in the far north, changes and challenges related to climate change, global economy, and global politics” – 45 votes, “Exploitation of Arctic’s natural resources” – 40 votes, and “The Arctic from the perspective of global economy and politics” – 36 votes), probably because these topics are not the main interest of science teachers. Another explanation might be related to the conclusions of question no. 6 – “How many hours during a school year can you devote to lessons on the Arctic (with one group of students)?”, which suggest that many teachers struggle with insufficient numbers of hours that teachers can devote to polar issues (see section 7.6). Finally, “Everyday life on polar stations” received a rather low number of votes (37), probably because of a high percentage of university teachers participating in this survey (see section 7.1), and this is a subject of interest primarily on the first levels of education.

The list of requirements for new educational resources will be very helpful to INTERACT experts who will design new educational materials.

7.10. Question No. 10: “Please give examples of other topics related to the Arctic (not mentioned above), which might interest you and your students”

In addition to question no. 9, respondents could give their own answers as suggestions for new education materials. 38 answers were collected, many of which contained interesting ideas and perspectives, for example: “History of discovering the Arctic”; “Research on prehistoric ice”; “Consequences to non-polar countries resulting from Arctic changes”; “Research vessels”; “Properties of substances at low temperatures”; “Threats to biodiversity”; “Farming without ploughing”; “Arctic food web”; “Pollution in the Arctic”; “Preservation”; “Comparison of Arctic to Antarctic”; “Art and changing cultures of indigenous populations”; “Use of drone technology and other imaging techniques to acquire data”; “Arctic tourism”; “Life in polar cities”; “New technologies in polar regions”;

“Polar regions as extra-terrestrial conditions”; “Frost flowers and melt ponds”; “Topo-climatology and Arctic ecosystems”; “Cooperation projects with people living in the Arctic”.

The full list of answers to this question can be found in Appendix 3.

7.11. Question No. 11: “To what extent can you and your students use educational materials in English?”

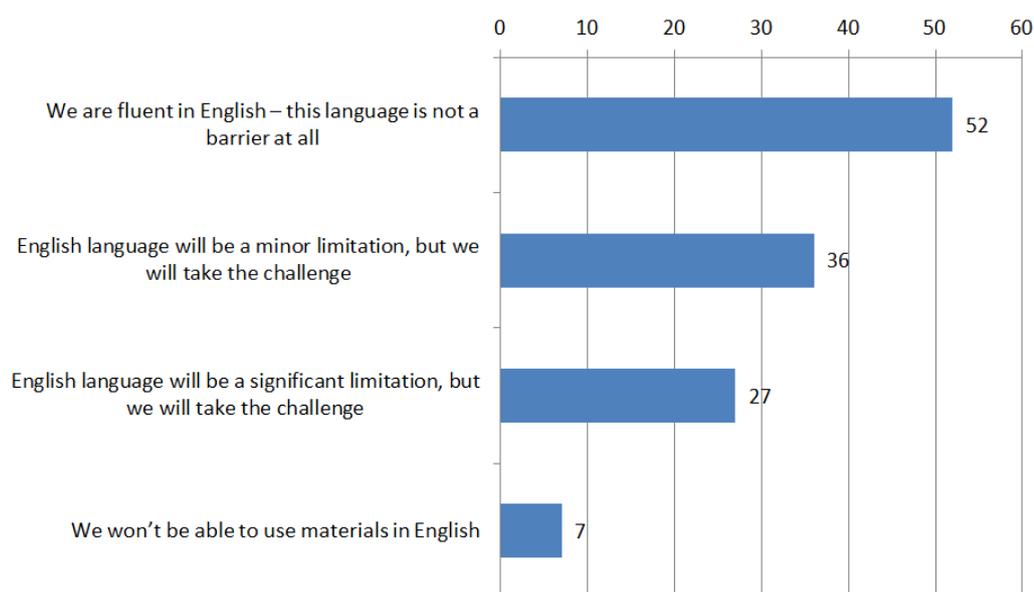


Fig. 10 – Answers to question No. 11

This question was supposed to examine the usefulness of educational materials created in English. Respondents could indicate more than one answer. Less than half (52 – 46,4% of participants) declared that they are fluent in English and that this language would not be a barrier at all. Almost 1/3 (36 – 32,1%) of the respondents indicated that English language would be a minor limitation, but they would take the challenge. Those two answers collected 88 replies, which counts for more than 2/3 of all replies (72,1%), and can be acknowledged as a good result. Moreover, those for who “English language would be a significant limitation, but they would take the challenge” (27 answers) can also be counted into the group of who would be able to use materials in English – and this group accounts for 94,3% of all respondents (115 answers). On the other hand, 7 participants admitted that they would not be able to use materials in this language. This is a reminder that there are places where the English language can be an impassable barrier for teachers and their students.

7.12. Question No. 11a: “What is your preferred language?”

This question appeared only in the on-line version of the survey, so the results here cannot be treated as conclusive. However they give an interesting insight into the subject,

and therefore have an additional value. Unsurprisingly, the respondents usually indicated their mother tongue as the preferred language. However it was also observed that many participants declared also English, in addition to their native language. Such a tendency suggests that many teachers and educators are willing to use English, even if it's not their mother tongue.

7.13. Question No. 12: “What are the preferred types of educational materials?”

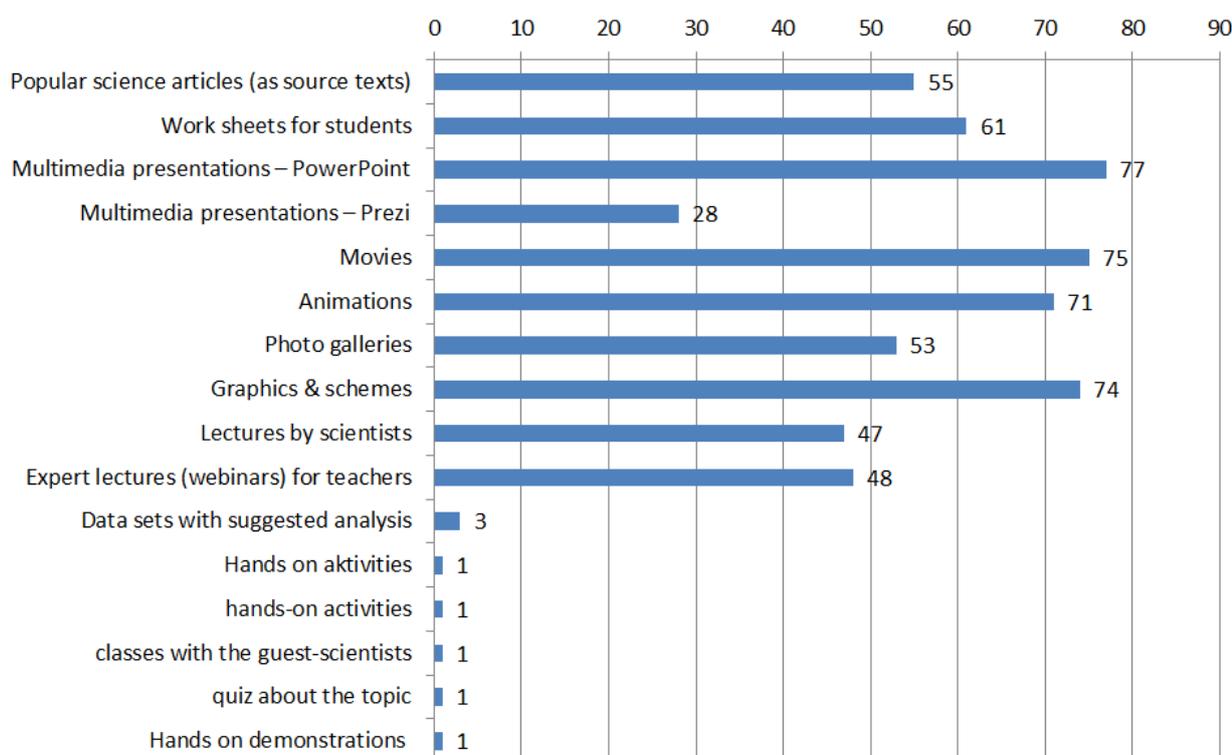


Fig. 11 – Answers to question No. 12

Question No. 12 was one of the most important questions in this survey. The participants could indicate more than one answer, and also add their own suggested methods of presenting educational materials. The answers collected gave a very interesting picture of teachers’ preferences in this regard.

The most popular type of educational material was “Multimedia presentation – PowerPoint”, which collected 77 answers – so more than 2/3 (68,8%) of all respondents prefer this format. Surprisingly, the other option of multimedia presentation, which is Prezi, received the lowest number of votes – only 28 (only 25% of participants found this format useful). Such a result clearly indicates that the format is crucial in case of a multimedia presentation. The second most popular type of material was “Movies”, which collected 75 answers (67% participants). The third most popular type of material was “Graphics and schemes” (74 – just one vote less than “Movies”). Such a high score of this type can be surprising, especially given the fact that “Animations” received a slightly lower number

of votes – 71 (63,4%), and ended up on the fourth position. Another popular type of educational material was “Work sheets for students”, which received 61 votes (54,5% – more than half of the respondents). This result indicates that materials which engage students in individual work are also considered to be useful. Also important seem to be “Popular science articles (as source texts)”, which collected 55 votes (49,1%). Although this type of material is sometimes perceived as too traditional, this relatively high score might suggest a universal demand for comprehensive sources of knowledge. Another type of material were “Photo galleries”, which received 53 votes (47,3%), “Expert lectures (webinars) for teachers”, with 48 votes (42,9%), and “Lectures by scientists” (47 votes/ 42%).

The type of material of the lowest popularity was – already mentioned – multimedia presentation in Prezi format (28 votes/ 25%). What stands behind such a low result of Prezi format is probably either the fact that it is a relatively new type of media, or that Prezi presentations cannot be as easily modified as PowerPoint presentations.

Apart from the answers mentioned above, participants could give their own individual suggestions. There weren't many of them here, but the ones that appeared seem very inspiring: “Data sets with suggested analysis”, “Hands-on activities”, “Classes with guest-scientists”, “Quiz about the topic”, and “Hands on demonstrations”.

7.14. Question No. 13: “What existing sources of free educational materials (especially on polar issues) do you find most useful, and can recommend to others? Please give examples (names of projects, web portals etc.)”

This was an open question – the participants were asked to recommend the sources of free educational materials which they find useful and worth sharing. The total number of relevant replies was 54, so almost half of all of the participants shared their recommendations. Thanks to their contribution, the creators of INTERACT materials will be able to become acquainted with all the already existing sources of educational materials which our respondents find interesting and useful. The full list of replies can be found in Appendix 2 (the list hasn't been verified yet or checked for spelling).

7.15. Question No. 14: “Which way of communication between educational projects and teachers you find most useful?”

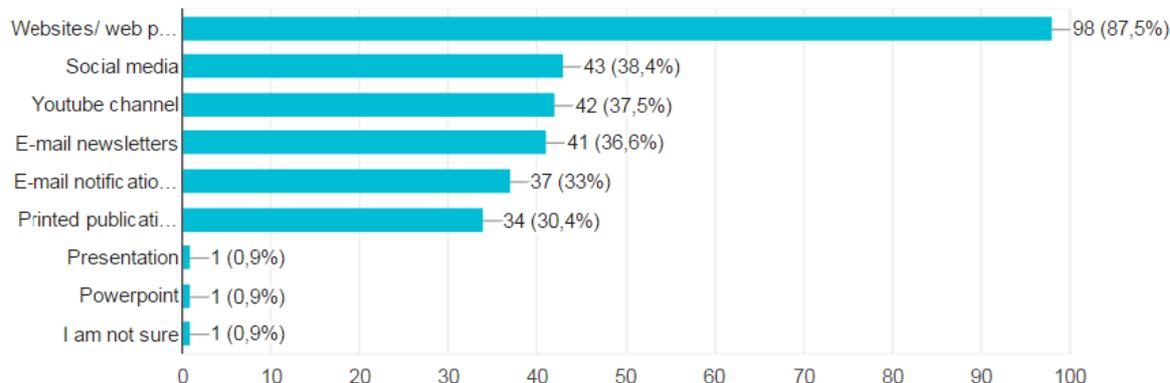


Fig. 12 – Answers to question No. 14 (see the Appendix 1 for the full labels on the vertical axis)

In this question the teachers and educators were asked about their preferred ways of receiving information from educational projects (more than one answer was possible). The undisputed leader of this category is “Websites/ web portals”, with 98 votes – almost 9 in 10 teachers (87,5%) find this way most useful. The other suggested ways of communication are far behind the websites and web portals, but they seem to share a similar degree of appreciation – all the answers here range from 43 to 34 votes (38,4 to 30,4%). Social media, YouTube channel and e-mail newsletters received a very close score (43, 42, and 41 respectively). E-mail notifications seem to be slightly less popular than e-mail newsletters, with the appreciation of only 1/3 of respondents (37 votes).

Printed publications received only 34 votes (30,4%), however this way of communication belongs to a completely different kind – it is the only medium here which isn’t based on the Internet, and given the fact that therefore it is associated with various restrictions, e.g. printing, physical distribution, and storage, such a score can be perceived as relatively good. Also, it shows a constant demand for this medium of communication.

7.16. Question No. 15: “Would you like to be updated with information for teachers from INTERACT?”

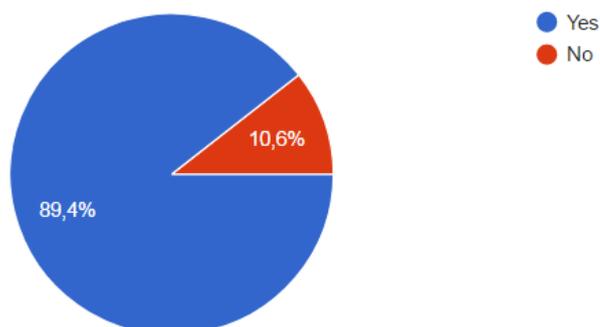


Fig. 13 – Answers to question No. 15

Staying in touch with teachers and educators is an important part of the project. This question was intended to investigate the willingness of participants to receive updates about INTERACT. Almost 9 in 10 of them were interested in this option. Of 113 replies, 101 voted “Yes”, and only 12 voted “No”. This is a very good result, considering the general perception of e-mail newsletters and notifications as useful ways of communication (see section 7.15 for details). Also, it suggests that there is a considerable demand for updates and information about the project.

7.17. Question No. 16: “If you are interested in receiving e-mail newsletters from INTERACT on new educational materials, and other occasional e-mail notifications on INTERACT news and events (e.g. workshops for teachers), please give us your e-mail – we promise not to spam you”

In addition to question No. 15, this question was offering the possibility of leaving an e-mail address for those participants who were willing to stay in touch. As a result, 93 individual e-mail addresses were collected. This collection will help to create a database of e-mail addresses for future distribution of news, notifications and other important information about the INTERACT project.

8. Conclusions and recommendations

The results of the report allow INTERACT to assess various priorities for producing educational materials and to understand at what levels and how they will be used.

The respondents' answers suggest a top priority topic is: "Climate change – causes and consequences" (Question No. 9), in English language (Q. No. 11), in multimedia/power point presentation format (Q. No. 13), available on a website (Q. No. 14). This material will be used mainly in secondary education (Q. No. 1), during regular school classes (Q. No. 5) of geography (Q. No. 8), in more than 3 groups/classes (Q. No. 7).

In general, the most important conclusions are:

- Science teachers have on average a very limited time to introduce polar issues to their students (Question No. 6);
- Science teachers and polar educators have on average many groups of students with which they can conduct lessons about the Arctic (Q. No. 7);
- The new educational materials would be used mainly on geography, nature, and biology lessons (Q. No. 8);
- Among the suggested topics, the most interesting one for teachers was "Climate change – causes and consequences" (Q. No. 9);
- Many teachers and educators are willing to use English, even if it's not their mother tongue (Q. No. 11);
- The most desirable types of new educational materials were "Multimedia presentations – PowerPoint", "Movies", and "Graphics and schemes" (Q. No. 12);
- Respondents found "Websites/ web portals" as the most useful way of communication between educational projects and teachers (Q. No. 14);
- Almost 9 in 10 participants were interested in receiving future news and information from the INTERACT (Q. No. 15).

Apart from the mentioned above conclusions, below are recommendations for creators of new educational materials about the Arctic, which appeared in the report:

- New materials need to be very efficient in presenting relevant material quickly;
- A particular attention should be paid to the attractiveness of materials;
- Part of the materials need to be related to STEM subjects in general, but with a connection to polar issues (e.g. a material on tectonics with examples from Iceland, or a material on magnetism with a mention of northern lights);
- Part of the materials should be designed for use during school activities other than regular lessons, for example parenting hours or Oxford-style debates (e.g. topics for discussion – related to polar issues).

9. Appendix 1 – The questionnaire

Dear Teachers and Educators!

The Arctic is rapidly changing and the changes there have global implications. This is being recognised in research and in education.

The INTERACT project (www.eu-interact.org) is a circumpolar network of 79 Arctic polar stations and northern alpine areas of Europe, Asia and North America, and an international consortium of 47 scientific institutions devoted to polar research. We are building a capacity for identifying, understanding, predicting and responding to diverse environmental changes throughout the wide environmental and land-use envelopes of the Arctic.

One of our aims is to facilitate the education and recruitment of the next generation of researchers. In order to make it happen, we will create a collection of free educational materials about the Arctic, for all levels of education. By creating and sharing these materials, we aim to raise awareness of the Arctic, and to strengthen the teaching of science based on the results of research and observations carried out in polar stations and observatories.

The collection of free educational materials will include:

- Various educational materials for teachers and educators;
- Up-dated on-line course “The Changing Arctic”;
- Glossary;
- Picture gallery.

We want these materials to be as useful as possible, and we have the ability to make some requested video clips and animations. Therefore we kindly ask you for your support. You can do it by answering the following questions. It takes only a few minutes, and each answer will help us to give educators the most relevant and helpful resources.

The survey is anonymous and closes on 2nd June 2017.

Thank you very much for participating!

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730938.

1. Please select the type of school in which you teach:

- Preschool
- Primary
- Secondary
- Tertiary (higher)
- University

Other – please specify:

2. What is your work experience?

- Less than 5 years
- 5-10 years
- 10-15 years
- More than 15 years

3. What is your country of origin?

4. Are you interested in new educational materials about the Arctic?

- Yes
- No

5. When would you use those new educational materials?

- Regular school hours
- Obligatory additional hours (e.g. once a week)
- Obligatory additional subject chosen by the student(s)
- Additional lessons (extra-curricular)
- Few-hour extra lesson block (e.g. during green schools)
- Other:

6. How many hours during a school year can you devote to lessons on the Arctic (with one group of students)?

- Less than 5
- 6-10
- 11-20
- More than 20

7. In how many groups (classes, extra-curriculum groups, etc.) can you conduct lessons about the Arctic?

- 1
- 2
- 3
- More than 3

8. In scope of which subject will you be able to use INTERACT educational materials?

- Geography
- Chemistry
- Physics

- Biology
- Nature
- Extra-curriculum classes
- Other:

8. When you think about new educational materials – which topics would be most interesting for you and your students?

- Glaciers
- Sea ice
- Snow cover
- Permafrost
- Climatic zones of the Arctic
- Landscapes and land-forming processes
- The flora of the Arctic
- The fauna of the Arctic
- Life in cold waters
- Climate change – causes and consequences
- Rising sea levels
- Links between the atmosphere, land and ocean (e.g. carbon and water cycles)
- Extreme weather events
- Exploitation of Arctic's natural resources
- The Arctic from the perspective of global economy and politics
- Indigenous people of the Arctic - adaptations to living in the far north, changes and challenges related to climate change, global economy, and global politics
- Scientific research in the Arctic
- Everyday life on polar stations

9. Please give examples of other topics related to the Arctic (not mentioned above), which might interest you and your students:

10. To what extent can you and your students use educational materials in English?

- We are fluent in English – this language is not a barrier at all
- English language will be a minor limitation, but we will take the challenge
- English language will be a significant limitation, but we will take the challenge
- We won't be able to use materials in English

11a. What is your preferred language?

11. What are the preferred types of educational materials?

- Popular science articles (as source texts)
- Work sheets for students

- Multimedia presentations – PowerPoint
- Multimedia presentations – Prezi
- Movies
- Animations
- Photo galleries
- Graphics & schemes
- Lectures by scientists
- Expert lectures (webinars) for teachers
- Other – please specify:

12. What existing sources of free educational materials (especially on polar issues) do you find most useful, and can recommend to others? Please give examples (names of projects, web portals etc.):

13. Which way of communication between educational projects and teachers you find most useful?

- Websites/ web portals
- Social media
- YouTube channel
- E-mail newsletters
- E-mail notifications
- Printed publications
- Other – please specify:

14. Would you like to be updated with information for teachers from INTERACT?

- Yes
- No

15. If you are interested in receiving e-mail newsletters from INTERACT on new educational materials, and other occasional e-mail notifications on INTERACT news and events (e.g. workshops for teachers), please give us your e-mail – we promise not to spam you:

10. Appendix 2 – answers to Question No. 13 “What existing sources of free educational materials (especially on polar issues) do you find most useful, and can recommend to others? Please give examples (names of projects, web portals etc.)”

Below is a list of all 54 answers which indicated sources of educational materials (in alphabetical order), recommended by participants of the survey (the list hasn't been verified or checked for spelling):

- activities from ANDRILL.org/education, or resource book from IPY Oslo;
- AK EnergySmart, village math, NEED project;
- Andrill website;
- APECS website and webinars;
- Center for Science and Environment;
- Edu-Arctic;
- Edu-Arctic;
- Edu-Arctic project, on-line lessons from Antarctica, data from research stations;
- Edu-Arctic, movies on Youtube;
- Educamp Propolar - from Portuguese Polar Program; Polar Resource Book (from IPY);
- educapoles.org;
- Flxhibit tools;
- Grid Arendal, Topo Svalbard;
- <http://www.emu.dk/>;
- <http://www.polarforskningsportalen.se/antarktis>;
- <https://earthobservatory.nasa.gov/>; <http://nsidc.org/>; <http://www.atoptics.co.uk/>;
<https://earth.nullschool.net/>;
- I mainly use figures from text books and some material from www.forskning.no;
- INTERACT;
- Maps NPI, Research in Svalbard, Girls on Ice, Arctic Portal, SCAR, IASC etc.;
- materials developed by Polar Educators International, experiments shown in PEI workshops / GLOBE workshops, ... ;
- Materials of the Alfred-Wegener-Institut;
- Materials of the Alfred-Wegener-Institute;
- NASA data sets and AOOS;
- NASA for kids, TEDs, NOAA Resources;
- Natural G, Geografia w szkole, Hornsund Station's facebook page;

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- NGS, NOAA, NASA;
 - NOAA materials, PolarTREC expeditions and lessons;
 - NSF, NASA, NOAA;
 - NSF, NASA, NOAA;
 - NSF, NASA, NOAA;
 - open-source journals;
 - own data, AMAP webpage;
 - PEI website;
 - PEI Website, IPY Resource Book - but translation needed;
 - Polar Educators International;
 - Polar Educators International, other sources;
 - Polarpedia Edu-arctic;
 - PolarTREC resources, c ice;
 - Reconstructing past climate of the Earth (book);
 - RESEt;
 - scholaris.pl, epodreczniki.pl;
 - Scientix;
 - Scientix Portal;
 - Sea-Ice extent <https://nsidc.org/arcticseaicenews/>;
 - SERC;
 - Serpeta;
 - TED-education Andriill polartrec Our spaces-Antarctica day Arkive Crash course cryosphere NASA PBS learning media Learning A-Z;
 - TV shows;
 - web of science;
 - Websites of natural history museums or education centres in the US and Canada (can't find any specific page at the moment);
 - Wicked Weather Watch, Geographical Association;
 - Wiki + thematic pages of different research institutions;
 - www.andrill.org (Flexhibit materials); my blog site which is www.scienceroadshow.wordpress.com, Polar Educators International (we have hosted wonderful Master Class webinars featuring polar scientists and educators) www.polareducator.org;
 - www.isskolen.dk.

11. Appendix 3 – answers to Question No. 10: “Please give examples of other topics related to the Arctic (not mentioned above), which might interest you and your students”

Below is a list of 38 suggestions of other topics related to the Arctic (as ideas for new educational materials) given by the participants of the survey (in alphabetical order).

- Arctic and Antarctic explorers, New technologies in polar regions, Polar regions as extra-terrestrial conditions proxies;
- Arctic food web;
- arctic tourism;
- art and changing cultures of indigenous populations;
- Climate change and migration;
- Comparison of Arctic to Antarctic (important to know similarities and differences);
- Consequences to non-polar countries resulting from Arctic changes;
- cooperation-projects with people living in the arctic;
- Environmental links in the Arctic: Climate change -> Glaciers -> Rivers and landforms -> Dust transport of nutrients -> Lake ecology -> Flora and fauna ecology -> Fjord processes;
- Evidence for climate change, indigenous knowledge and oral history;
- Farming without ploughing;
- Food chains, threats to biodiversity;
- Frost flowers and melt ponds;
- Genetics;
- global teleconnections;
- Health and Well-Being; Public Health; Indigenous Health; Participatory Research Methods;
- History of Arctic exploration, topo-climatology and Arctic ecosystems;
- History of discovering, Research on prehistoric ice;
- ice classification;
- Landscape communication; Reading and writing;
- Life in polar cities, history of polar exploration;
- Medicine, diving, meteorites;
- Mitigation and Adaption strategies for Climate Change;
- Plastic pollution;
- Pollution in the Arctic;
- Preservation;
- Processes in Arctic and Alpine regions, freeze-up/break-up, ... ;
- Properties of substances at low temperatures; Changes of states of matter;

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- Relations between humans and environment in the Arctic;
 - remote sensing;
 - Research and monitoring methods;
 - Research vessels exposition;
 - Samhällskunskap (civics);
 - Statistics over time and interactive;
 - Sustainability, threats to wildlife, Arctic biome, threats to people, development;
 - The history and evolution of the geosystem;
 - Use of drone technology and other imaging techniques to acquire data;
 - Use of energy types and impact on environment.