

THE BIOPHILIA EDUCATIONAL PROJECT

EVALUATION

Attentus

This evaluation is conducted by Attentus – Human Resource Consultancy for the Ministry of Education, Science and Culture in Iceland. The authors of this report want to thank the Ministry, the project managers in the five Nordic countries Åland Islands, Faroe Islands and Greenland and those who participated in the survey and the focus groups for their contribution which is greatly acknowledged.

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EXECUTIVE SUMMARY

The Biophilia Educational Project is a large-scale pilot project that builds on the participation of academics, scientists, artists, teachers and students at all academic levels. The project was originally developed by Björk Guðmundsdóttir, the City of Reykjavík and the University of Iceland, in connection with the release of Björk's 2011 album Biophilia. The Biophilia Educational Project aims to inspire children to explore their own creativity, while learning about music, nature and science through new technologies. The Icelandic government sought collaboration with the other four Nordic countries, Åland Islands, Faroe Islands and Greenland to further develop the project. Local collaboration networks were set up in all the five Nordic countries, Åland Islands, Faroe Island and Greenland.

The aim of the Biophilia Educational Project Evaluation was to evaluate the implementation and methodology of the Nordic Biophilia Project with the cooperating partners. The evaluation should cover if and how the main objectives of the project were achieved, the main strengths and weaknesses and suggest new projects that could be established in the future. The evaluation should gain information about the effect the project has had on the participants, their work, their workplace as well as the children. The expected outcomes of the Nordic collaboration are to:

1. promote innovation in schools through the development of educational methods which combine natural sciences, creativity, and technology
2. break up traditional teaching practices through a cross-disciplinary approach, across all ages, subjects, and disciplines
3. set up a Nordic collaborative network that will share experiences, ideas and further develop the project based on common Nordic values
4. encourage young people's interest in creativity, natural sciences and technology, and thus progressively increase the competitiveness of the Nordic countries.

The five Nordic countries, Åland Islands, Faroe Island and Greenland participated in the project. Participants in the Biophilia Educational Project Evaluation were educators from the five Nordic countries and Åland Islands, Faroe Island and Greenland. Participants worked in various educational settings, from preprimary to higher education. The age of the participants was from 22 years old to 66 years old. Approximately 60% were women and 40% men. 50% of the participant had been more than 10 years in their current position and 34,5% less than five years.

In general, the participants were satisfied with the Biophilia Educational Project. According to the participants in a survey and focus groups the project had a positive influence on all the participants teaching / working methods as well as increased interest among participants to use creative approach in their teaching/ work. The results also show an increased interest in integrating different subjects in participants teaching/work. In most countries participants reported an increased interest among their students in music, creative ways of learning, technology and natural science. Results indicate some differences between the countries in objectives 1, 2 and 4.

The Biophilia Educational Project's strengths are that the project increased participants interest in using creative approach in their work, in integrating different subjects and in using technology as a part of their work. The project also seems to have increased many students interest in music, creative ways of learning, technology and natural science as well as giving more students opportunity to flourish through creative learning approaches.

The project's weaknesses are that the Biophilia Educational Project associated online forum did not work as intended. Some participants reported insufficient preparation, information, guidelines and instruction

in the beginning of the project and lack of collaboration between participants and between the five Nordic countries, Åland Islands, Faroe Islands and Greenland. In some countries there was not enough support from leadership/management.

Based on the results of this evaluation it is recommended to find ways to make it easier for participants to collaborate with each other both within countries and between countries. Provide information, guidelines and instructions before starting the program and following up on the projects goal throughout the project. Make sure that participants have support from their leadership/management as well as support from the municipality.

1. INTRODUCTION

The Biophilia Educational Project is a large-scale pilot project that builds on the participation of academics, scientists, artists, teachers and students at all academic levels. It is based around creativity as a teaching and research tool, where music, technology and the natural sciences are linked together in an innovative way. The project was originally developed by Björk Guðmundsdóttir, the City of Reykjavík and the University of Iceland, in connection with the release of Björk's 2011 album Biophilia.

The Biophilia Educational Project aims to inspire children to explore their own creativity, while learning about music, nature and science through new technologies. The project has this far mainly been aimed at children aged 10-12 years, and the program is based on Björk's Biophilia app suite of music and interactive, educational artefacts. Students learn through hands-on participation, composition and collaboration. Participants acquire the skills to develop their musical imagination, to push their creative boundaries and make music in an impulsive and responsive way, inspired by the structures and phenomena of the natural world. The Biophilia Educational project has the potential to bring arts experience to children who might otherwise not have access to it.

To commemorate its 2014 presidency of the Nordic Council of Ministers, the Icelandic government sought collaboration with the other Nordic countries Åland Islands, Faroe Islands and Greenland to further develop the project. Local collaboration networks were set up in all Nordic countries, Åland Islands, Faroe Islands and Greenland.

The five participating Nordic countries and Åland Islands, Faroe Island and Greenland chose a region and appointed steering committees which would be responsible for implementing and shaping the project locally, in collaboration with local interested parties. Each country was required to teach Biophilia in three to five schools, as a minimum. At the beginning of the project participants were 80 and three of them did not finish. Each steering committee was supposed to consist of representatives from the following fields; school authorities, a cultural institution and a science museum/university. The steering committees then formed a Nordic collaborative framework around the Biophilia educational project. All the participants were invited to attend a meeting in Reykjavík before the project started. Furthermore, a team from Iceland visited all the participating institutions and did a workshop with them.

The expected outcomes of the Nordic collaboration are to:

- promote innovation in schools through the development of educational methods which combine natural sciences, creativity, and technology
- break up traditional teaching practices through a cross-disciplinary approach, across all ages, subjects, and disciplines
- set up a Nordic collaborative network that will share experiences, ideas and further develop the project based on common Nordic values
- encourage young people's interest in creativity, natural sciences and technology, and thus progressively increase the competitiveness of the Nordic countries

2. METHODS

The aim of the Biophilia Educational Project Evaluation was to evaluate the implementation and methodology of the project with the cooperating partners. The evaluation should cover if and how the main objectives of the projects were achieved, the main strengths and weaknesses and suggest new projects that could be established in the future. The evaluation should gain information about the effect the Biophilia Educational Project has had on the participants, their work, their workplace as well as the children. The methods used in the evaluation were:

1. Review documents on the project.
2. Two surveys.
3. Focus groups among the participants in all countries.

Based on the expected outcomes of the Nordic Collaboration the Ministry of Education, Science and Culture in Iceland conducted an online survey among the Nordic participants using Survey Monkey in November 2015. The survey consisted of 12 close ended questions where the answers were given on a rating scale. One question was open ended to give the option for further explanations. The survey had 4 background questions determining gender, age, country, highest education and what kind of workplace. The survey was sent to 80 participants via email and the response rate was 95%.

Attentus conducted an online survey among the Nordic participants using Question Pro in May - June 2016. The survey consisted of 33 close ended questions where the answers were given on a 5 point Likert scale. (See Appendix 1). Some questions of the survey were open to give the option for further explanations. The survey had 6 background questions determining gender, age, country, highest education, what kind of workplace, and years in current job. The survey was sent to 77 participants via email and the response rate was 75%. Attentus interpreted the results from both surveys.

The goal of running focus groups in evaluating the project in each country was to provide a depth of the participants' views and experience in the project. The 10 open ended questions used in the focus groups were based on the answers and statements in the survey which are important for reporting the effect the Biophilia Educational Project has had on the participants, their work, their workplace and their students, as well as reflecting upon successful aspects and things that could be improved in the future.

Attentus issued guidelines and provided consultation on running a focus group to the countries' project managers who selected the participants in the focus groups. In a way to make it as heterogeneous as possible and to represent the whole population the guidelines were to invite approximately 6-8 people selected according to specific criteria - e.g. age, gender and years on the job etc. Where there were fewer participants all should be invited.

The focus groups were conducted in August 10th – 25th. The participants in the groups were from 3 – 7 people. The groups were led by a facilitator, the project manager in each country, whose responsibility was to ensure that group discussions remained focused on the discussion area. The focus group discussion lasted approximately two hours and the material was transcribed. Attentus received the transcripts either in the countries native language or in English.

3. RESULTS

The aim of the Biophilia Educational Project Evaluation was to evaluate the implementation and methodology of the Nordic Biophilia Project with the cooperating partners. The evaluation should cover if and how the main objectives of the projects were achieved, the main strengths and weaknesses and suggest new projects that could be established in the future. The evaluation should gain information about the effect the Biophilia Educational Project has had on the participants, their work, their workplace as well as the children.

3.1. BACKGROUND QUESTIONS AND GENERAL QUESTIONS

Participants in the Biophilia Educational Project came from all the five Nordic countries and Åland Islands, Faroe Islands and Greenland. 80 participants started the project and 3 did not finish. Iceland had the most participants and Åland Islands the fewest. Tables 1- 5 show results from background questions and general questions regarding the participants and their workplace.

TABLE 1. COUNTRY

Countries	Survey 1		Survey 2	
	N	%	N	%
Denmark	6	7,9	6	10,3
Faroe Islands	7	9,2	2	3,4
Finland	12	15,8	10	17,2
Greenland	8	10,5	4	6,9
Iceland	28	36,8	20	34,5
Norway	6	7,9	6	10,3
Sweden	6	7,9	6	10,3
Åland Islands	3	4,0	4	6,9
Total	76	100	58	100

N=Number of participants
%=Percentage

TABLE 2. GENDER

Gender	Survey 1		Survey 2	
	N	%	N	%
Female	44	57,9	35	60,3
Male	32	42,1	22	37,9
Missing	0	0	1	1,7
Total	76	100	57	100

N=Number of participants
%=Percentage

Participants in the Biophilia Educational Project evaluation were educators from 22 years old to 66 years old and the mean age was 43,6 years. Approximately 60% were women and 40% men.

TABLE 3. HOW LONG HAVE YOU BEEN IN YOUR CURRENT PROFESSION

	N	%
Less than 1 year	3	5,2
1 – 5 years	17	29,3
5 years and 1 day – 10 years	8	13,8
10 years and 1 day – 15 years	10	17,2
More than 15 years	19	32,8
Missing	1	1,7

Total	58	100
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N=Number of participants

%=Percentage

TABLE 4. WHERE DO YOU WORK

	N	%
Preprimary	11	19
Compulsory	17	29,3
Upper secondary	13	22,4
Higher education	4	6,9
Youth center / Afterschool	2	3,4
Music school / Institute	5	8,6
Other	6	10,3
Total	58	100

N=Number of participants

%=Percentage

TABLE 5. WHAT IS YOUR HIGHEST EDUCATION

	N	%
Doctorate degree (Phd. etc.)	2	3,4
Master´s degree	25	43,1
Bachelor degree	19	32,8
Some college	4	6,9
Diploma	2	3,4
High school Graduate	3	5,2
Other	3	5,2
Total	58	100

N=Number of participants

%=Percentage

50% of the participant had been more than 10 years in their current position and 34,5% less than five years. Most participants worked in the compulsory schools, in the upper secondary and preprimary education.

In survey 1, 93% state that they regard their participation in the Biophilia Educational Project as an opportunity for professional development while 6,7 % do not agree. In Survey 2 88% regard their participation in the project as an opportunity for professional development and 6,9% say they do not agree with that.

TABLE 6. GENERAL QUESTIONS

	m	Denmark	Faroe Islands	Finland	Greenland	Iceland	Norway	Sweden	Åland Islands
My workplace is well suited for participation in this type of project	4,1	3,7	4,5	4,6	3,75	4,1	4	3,8	3,75
I have good knowledge of technology	3,9	4,5	4,0	3,7	4,25	3,6	3,8	4,3	4,0

Answers are on a 5 point Likert scale (see Appendix I)

m=mean

As table 6 shows most participants say their workplace was well suited for the Biophilia Educational Project and that their knowledge of technology was good. There seems to be some difference between the countries in both statements.

In the focus groups participants were asked what was a well suited workplace for this kind of a project, if their workplace was well suited or not and in which way. Most participants felt the project was well suited for most workplaces, schools and ages as long as the management of the workplace are supportive, educators are interested and willing to work on the project. All participants agree that it would be helpful to get more preparation from the workshop they got in the beginning. Some participants say that they are not used to work in an unstructured environment and that it would have been good to get more structure and training on how to use Biophilia. Educators working with upper secondary students encountered some problems when trying to implement the Biophilia Educational Project in to their curriculum. They found the framework of the schools to be too formal and lack of creative subjects was a barrier for the schools.

To shed a better light on technical knowledge needed for the project participants were asked in the focus group what kind of technical skills were needed for the participants to have in this kind of a project and what kind of a technical support was needed. Most of the participants in the focus groups agree that no prior technical skills are needed for this project. Many participants mention that it is good to have some basic knowledge on how to use an iPad and to be familiar with how to download an app. Many participants report the importance of having access to technical assistance, not just in the beginning of the program but throughout the project. This is especially important when participants do not have any prior experience with using iPads, computer etc. Some participants mentioned that their computers were too old and could not be used. Other participants never got iPads so their students could not use the Biophilia app. Other participants could not use the app for other reasons and had to find other ways to work on the project.

3.2. EFFECTS ON EDUCATORS AND THEIR WORK/WORK METHODS

One of the evaluation’s goal was to view if participating in the Biophilia Educational Project had an effect on the participants’ work/work methods. Participants answered various questions in an online survey (Survey 2) and participated in the focus groups. The following chapter outlines the results from these evaluations.

TABLE 7. HAS PARTICIPATING IN THE BIOPHILIA EDUCATIONAL PROJECT:

	m	Denmark	Faroe Islands	Finland	Greenland	Iceland	Norway	Swedenn	Åland Islands
Decreased or increased your interest in using technology as a part of your teaching/work?	3,9	3,7	3,5	4,0	3,0	4,22	4,7	3,5	3,75
Decreased or increased your interest in integrating different subjects in your teaching/work?	4,2	4,4	3,5	4,4	3,5	4,4	4,4	3,8	4,0

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Decreased or increased your interest in teaching / working on natural sciences?	4,0	3,8	3,0	4,0	3,5	4,0	4,7	3,8	4,25
Decreased or increased your interest in using creative approach in your teaching/work?	4,2	3,5	4,0	4,5	3,25	4,63	4,33	3,5	4,5
Decreased or increased your interest in using technology as a part of your teaching/working methods?	3,9	3,7	3,5	4,0	3,0	4,22	4,7	3,5	3,75
I will continue to use the Biophilia teaching method next school year.	3,6	3,3	3,0	3,6	3,3	4,1	4,0	3,2	3,5
Had a positive or negative influence on your teaching/working methods?	4,5	4,2	4,0	4,6	4,0	4,6	4,7	4,33	5,0

Answers are on a 5 point Likert scale (see Appendix I)
m=mean

As table 7 shows participating in the Biophilia Educational Project had a positive influence on the participants' teaching/working methods. To get a better insight they were asked in an open ended question in Survey 2, in what way participating in the Biophilia Educational Project had a positive influence on their teaching/working method?

Majority of the participants say they are more open to use and integrate different teaching methods after participating in the Biophilia Educational Project. Most participants also report they see new ways to use technology (iPads, computers etc.) in their teaching/work. Many say they are more open minded, think more outside the box and that the participation increased creative thinking. "The teachers got ideas on how to integrate subjects and sometimes got unexpected results".

TABLE 8. HAS PARTICIPATING IN THE BIOPHILIA EDUCATIONAL PROJECT MADE YOU MORE OPEN TO NEW WAYS OF TEACHING/WORKING?

	N	%
Yes	47	81
No	4	6,9
Other	3	3,4
Missing	4	1,7
Total	58	100

N=Number of participants

%=Percentage

As table 8 shows 81% state that participating in the Biophilia Educational Project made them more open to new ways of teaching/working and 6,9% state it did not happen. In the focus groups some participants said they were already open to new ways of teaching and participating in this project did not change that. Survey 1 showed that 97% of participants are always looking for new ways to improve their work/teaching.

3.3. EFFECTS ON PARTICIPANTS' WORKPLACES

The following chapter shows the results from survey 2 and focus groups on the effects participating in the Biophilia Educational Project had on the participant's workplaces.

TABLE 9. HAS PARTICIPATING IN THE BIOPHILIA EDUCATIONAL PROJECT:

	m	Denmark	Faroe Islands	Finland	Greenland	Iceland	Norway	Sweden	Åland Islands
Increased or decreased team work at your school / workplace?	3,9	3,7	3,5	4,0	3,5	4,0	4,0	3,5	4,5
Increased or decreased experimentation with new teaching /work methods at your school/workplace?	3,9	3,2	3,5	4,0	3,25	4,4	3,7	3,7	3,8
Increased or decreased integration of different themes/subjects at your school/workplace?	3,9	3,5	3,0	4,0	3,25	4,4	4,0	3,5	4,0

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Increased or decreased work or teaching across different age groups at your school/workplace?	3,4	2,8	3,0	3,4	4,0	3,5	3,3	3,3	3,0
Increased or decreased teachers/employees use of iPads in teaching at your school/workplace?	3,7	3,0	3,5	3,6	3,3	4,1	3,7	3,5	3,8
Increased or decreased teachers/employees use of android tablets for teaching at your school/workplace?	3,1	2,9	3,0	2,9	2,3	3,4	3,3	3,3	3,0
Increased or decreased the use of thematic work/teaching at your school/workplace?	3,7	3,0	3,0	3,6	3,3	3,9	4,0	3,5	4,5
Increased or decreased the use of creative teaching/working method at your school/workplace?	3,8	3,2	3,5	3,9	3,25	4,15	3,7	3,5	4,3
Increased or decreased the times spent on working with/ teaching natural science at your school/workplace?	3,6	3,2	3,0	3,5	3,0	3,8	3,7	3,5	4,3
Increased or decreased the time spent on working with/ teaching music at your school/workplace?	3,8	3,2	5,0	3,6	3,5	4,3	3,0	3,0	4,3

Answers are on a 5 point Likert scale (see Appendix I)
m=mean

One of the outcome for the project was to promote innovation in schools through the development of educational methods which combine natural science, creativity and technology. Regarding effects on participants’ workplaces table 10 shows that there seems to be a difference between the countries.

In the focus groups participants were asked in which way participating in the project increased or decreased the integration of different themes/subjects at your school /workplace. Most participants in the focus groups agree that the project has led to more cooperation between teachers teaching different subject, especially between music teachers and teachers of other subjects. Most of the participants agree that participating in the project gave them ideas of new ways of integrating subjects especially music into other subjects and between age groups.

TABLE 10. HAS PARTICIPATING IN THE BIOPHILIA EDUCATIONAL PROJECT:

	m	Denmark	Faroe Islands	Finland	Greenland	Iceland	Norway	Sweden	Åland Islands
Had a positive or negative influence on the teaching/working methods in general at your school/ workplace?	3,9	3,3	3,5	4,3	3,8	4,3	3,7	3,5	4,0

Answers are on a 5 point Likert scale (see Appendix I)
m=mean

As table 10 shows none of the participants say that participating in the Biophilia Educational Project had a negative influence on the teaching/working methods at their workplace. In an open ended question in survey 2 participants were asked, in what way participating in the Biophilia Educational Project had a positive influence on teaching/working method at their school/workplace. Many of the participants’ report that participating in the Biophilia Educational Project increased teamwork at their workplace. Educators that were not directly involved in the project got more interested in the method and could see the possibilities for integrating different subjects. Some participants mention that it gave their students more freedom to work in creative ways and find their own ways to express themselves.

TABLE 11. HAS PARTICIPATING IN THE BIOPHILIA EDUCATIONAL PROJECT:

	m	Denmark	Faroe Islands	Finland	Greenland	Iceland	Norway	Sweden	Åland Islands
Participating in the Biophilia educational project has influenced change in the curriculum at my school.	3,2	2,7	2,5	3,4	2,5	3,4	3,8	2,3	3,8

The leadership /management at my school/ workplace were supportive of the Biophilia educational project.	4,0	3,8	5,0	3,9	3,8	4,2	4,5	2,7	4,3
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Answers are on a 5 point Likert scale (see Appendix I)
m=mean

Table 11 shows that support from management might have been lacking in some of the countries and answers to open questions in survey 2 indicate that support from leadership / management is important for participation in the project. A moderate positive correlation, $r= 0,5$ $p = \leq .01$, between the question *The leadership management at my school workplace were supportive of the Biophilia Educational Project*. The question *in general how satisfied or dissatisfied are you with the Biophilia Educational Project* was found. This indicates that a support from management might be an important factor for participants’ satisfaction with the project.

In the focus groups the participants were asked what kind of support was important. Many of the participant’s mention that the leadership has to encourage the educators and be supportive in many ways. Most of the participant’s state that the key personal in the Biophilia project need to have time dedicated to it and the schedules have to be flexible and aligned to the project for planning, continuity and reflecting. The leadership should also take care of financial issues. Some mention freedom and trust to try out and experiment while others report that involvement, feedback, follow up and information sharing from the leadership in the workplace as important, information sharing being especially essential when starting the project. In one country the participants said that the most important support came from their data management. In another country the participants report that the leadership should have provided more support in physics.

Participants in the focus groups where asked how well the project was suited for their age group and institution and in which way. All participants in the focus groups agree that the Biophilia Educational Project is well suited for the age group 5-16 years old and even for younger students. Upper secondary school students participating in the project and educators said the project might not be as well suited for them as for younger students. As mentioned on page 9 the participants found the framework of the schools to be too formal and lack of creative subjects was a barrier for the schools. Participants felt it was possible to adapt the project to their needs but it would take time.

3.4. EFFECTS ON STUDENTS

Table 12 shows results from survey 2 where participants were asked about effects on their students participating in the project.

TABLE 12. HAS PARTICIPATING IN THE BIOPHILIA EDUCATIONAL PROJECT:

	m	Denmark	Faroe Islands	Finland	Greenland	Iceland	Norway	Sweden	Åland Islands
Increased or decreased your students interest in learning in general?	3,8	3,0	3,5	4,1	3,5	4,0	4,0	3,5	4,0
Increased or decreased your students interest in natural science?	3,8	3,2	4,0	4,25	3,5	4,1	3,8	3,8	3,25
Increased or decreased your students interest in technology?	3,9	3,2	3,5	4,0	3,25	4,3	4,17	4,0	3,8
Increased or decreased your students interest in creative ways of learning?	4,0	3,33	3,5	4,4	3,5	4,5	3,8	3,5	4,3
Increased or decreased your students interest in music?	4,1	3,0	3,5	4,25	3,5	4,6	4,0	3,8	4,0

Answers are on a 5 point Likert scale (see Appendix I)
m=mean

According to the participants in the focus groups the project increased many students interest in creative ways of learning, music, technology and natural science. Participants in the focus groups were asked in which way the project affected their students and why. „Teaching became a playing field open to ideas.“ This quote reflects what most of the focus groups report. The way of teaching changed. There

were many different tools available, enabling teachers and students to choose various approaches to learning according to their interests and ability. The students became active, creative, curious and had fun. “They were fascinated by some of the apps. They had stars in their eyes... “

Many of the participant’s mention that students who normally were weak, not willing to participate or express themselves found their place and flourished which increased their self-confidence. Some report improved motor skills and that some autistic children experienced an alleviation of compulsive movements, e.g. a child that was hitting itself would calm down spontaneously. Other mention that the students loved to listen to experts visiting the school and they learned complicated things which the teachers would not have thought young children could master. Conflict among students in a group was solved through their collaboration in the project and an example is cited where girls became very competent in technical issues. Other talk about students who were very proud of being able to compose music.

3.5. NORDIC COLLABORATION

One of the project’s outcomes was to set up a Nordic collaborative network to share experiences, ideas and further develop the project based on common Nordic values. This was evaluated both in Survey 2 and focus groups. Table 13 shows the results from survey 2.

TABLE 13. HAS PARTICIPATING IN THE BIOPHILIA EDUCATIONAL PROJECT:

	m	Denmark	Faroe Islands	Finland	Greenland	Iceland	Norway	Sweden	Åland Islands
To what extent did you take advantage of the Biophilia educational project’s associated online forum where teachers/participants can exchange experience and ideas?	2,3	1,5	3,0	2,2	2,0	2,6	1,8	2,8	2,5

Answers are on a 5 point Likert scale (see Appendix I)
m=mean

As table 13 shows the mean score for the question *to what extent did you take advantage of the Biophilia Educational online forum* is 2,3 out of 5. Asked about the reason why participants did not take more advantage of the forum the participants in the focus groups said that the forum was complicated, not user friendly, there were technical problems, i.e. Word files could not be saved in there, and they did not have time. „The structure was confusing. “ „Extremely poor and old fashioned “, „I was in there a couple of times and found a lot of good shared material. But in a very busy day-to-day teacher job I think most of us simply don’t have more time to be part of these online forums. “, „As it was, almost no-one updated anything on the Nordic site, people just uploaded things to their own country’s site. “Many participants mentioned that Facebook would have been more accessible forum.

One of the main objects for the Biophilia Educational Project was to set up a Nordic collaborative network to share experiences, ideas and further develop the project based on common Nordic values. As seen in table 14 survey 2 indicated a lack of cooperation between the five Nordic countries and Åland Islands, Faroe Islands and Greenland. In the focus groups participants were asked how the cooperation was between the five Nordic countries, Åland Islands, Faroe Islands and Greenland and how the cooperation

could be improved in similar future projects. All the participants agree that cooperation between the countries was lacking and that more cooperation between the five Nordic countries, Åland Islands, Faroe Islands and Greenland would be beneficial for participants and for the project.

3.6. IDEAS ON IMPLEMENTATIONS, PRACTICES AND METHODS

In survey 2 participants were asked what practices they have developed that were particularly relevant or meaningful to them. While participating in the Biophilia Educational Project participants have developed many and diverse practices, programs and methods.

- A successful outreach program between High school students and students from public schools has been developed where students teach other students.
- Diverse teaching program which includes dancing, singing and playing music.
- A cross disciplinary theme based teaching including, waves, math, hearing, biology, psychology and music.
- A way to learn how to explain complicated musical themes to children, see how they understand it, get the children to express themselves, think about solutions and work together.
- Working with special needs children where the teacher reached the children in different ways using music and movements.
- Many participants mention collaboration with other teachers

„I have developed a story for a 'dream-travel', supporting our theme. The students are lying on a soft underlay, and are 'talked' into a light trance, with focus on breath and relaxation, while they hear 'Air' by J. S. Bach in the background. They are guided through a story, where they become eagles, and see their home area from high above “.

Participants were also asked what action they have taken to implement what they have learned while/or after participating in the Biophilia Educational Project. Majority Participants say that they will continue to use this method for integrating different subjects. Many participants report that participating in the project has given them a new mindset, open their minds to using technology (apps etc.) in their teaching and brought on a new curiosity of integrating also other subjects. Participants mention ways of working with the project e.g. writing a project development journal, creating projects using the children's and coworkers' ideas, written songs about the theme they worked with.

“The participation in Biophilia has strengthened the conversation and the real integration of subjects. It has encouraged and inspired teachers, through the experience, to integrate in a more meaningful and effective way. It also has inspired teachers to be creative in their teaching”.

3.7. THE THREE MOST IMPORTANT FACTORS TO EMPHASIZE IN THE PROJECT MANAGEMENT

To get a better insight into how educators experienced participating in the project they were asked in the focus groups: *Based on your experience in participating in the Biophilia Educational Project what are the three most important factors to emphasize in the Project Management of similar future projects?*

1. Almost all participants in the focus groups reported that sharing experiences through meetings both within their workplaces and countries was very important and it was interesting and inspiring to hear what other people were doing. Many mentioned the meeting in Iceland being very useful and other said they would have liked to learn more about other countries' approach.
2. Many talked about that having well defined goals for each project, receiving information, instruction and guidelines in the beginning was significant for them to be able to run the project according to its goal.

3. The third most important factors to emphasize seems to be support from the workplace leadership. The following quotes shed a light on what participants mentioned:

„The leadership has to show interest in the project and help out in planning and scheduling “. „The leadership has to be there for support “. „From the headmaster we got freedom and trust to try out what we wanted. “

To get an understanding on how the preparation for the project could have been better, participants in the focus groups were asked what would have improved in the preparation of the Biophilia Educational Project. It was mentioned that it would be more proactive if in the beginning of the project the iPads with the Biophilia apps were up and running, more information on how to use Biophilia in teaching and the educational project associated online forum, Facebook sides groups and other contacts information were available. Other say that it would have been better to get more structure and training on how to use Biophilia because they were not used to work in an unstructured environment.

Participants noted that it is important to involve the leadership/management in the workplace more from the beginning. Define their roles and have more knowledge about the purpose of the project so they could give participants more support.

4. STRENGTHS AND WEAKNESSES OF THE PROJECT

Strengths	Weaknesses
In all the countries the project had a positive influence on the participants' teaching/working methods.	The Biophilia educational project associated online forum did not function as intended.
On the whole the participants were in general satisfied with the Biophilia educational project.	In some case's lack of information, guidelines and instruction in the beginning of the project.
In general, participating in the project increased the participants', the workplace and other educators' interest in using creative approach in their teaching/work.	Not enough leadership/management support in some countries.
In general, participating in the project increased the participants' interest in integrating different subjects in their teaching/work and increased teamwork in their workplace.	Sharing experiences and information within the five Nordic countries Åland Islands, Faroe Islands and Greenland was reluctant.
According to the participants the project increased many students interest in music, creative ways of learning, in technology in natural science.	Some of the participants felt they could not adapt the project to their school and culture's needs.
According to the participants the project gave more students opportunity to flourish through creative learning approaches.	Language barriers when it comes to communication and cooperation between the participants.
In general, the participants' workplaces were well suited for participation in this type of project.	Old computers in some schools and not all participants got iPads.
Where the leadership/management at the participants' school/workplace were supportive of the Biophilia educational project it was a strength.	
In general, the project increased participants' interest in using technology as a part of their teaching/work.	
Majority of the participants say they will continue to use the Biophilia teaching method next school year.	
In general participating in the project increased teachers/employees use of iPads for teaching at their workplace.	

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. CONCLUSIONS

The aim of the Biophilia Educational Project Evaluation was to evaluate the implementation and methodology of the Nordic Biophilia Project with the cooperating partners. The evaluation should cover if and how the main objectives of the projects were achieved, the main strengths and weaknesses and suggest new projects that could be established in the future. The evaluation should gain information about the effect the Biophilia Educational Project has had on the participants, their work, their workplace as well as the children.

The expected outcomes of the Nordic collaboration are to:

1. promote innovation in schools through the development of educational methods which combine natural sciences, creativity, and technology
2. break up traditional teaching practices through a cross-disciplinary approach, across all ages, subjects, and disciplines
3. set up a Nordic collaborative network that will share experiences, ideas and further develop the project based on common Nordic values
4. encourage young people's interest in creativity, natural sciences and technology, and thus progressively increase the competitiveness of the Nordic countries.

The results from the surveys and focus groups report that in general the participants were satisfied with the Biophilia Educational Project. The results also show that the project had a positive influence on all the participants teaching/working methods. Furthermore, the majority of the participants report increased interest in using creative approach in their teaching/work and in integrating different subjects in their teaching/work. It should be reiterated that there are sometimes difficulties in interpreting the findings because of few participants who also might have different views. On the other hand, many findings reflect the picture nationally. In Denmark, The Faeroe Islands, Greenland and Sweden there seem to be less satisfaction with the Biophilia Educational Project than in the other four countries.

In Denmark the project was connected to the education studies preparing students for integration of music, science and technology in creative ways. The students became teachers the second year of the program. Two other teachers also participated in the project. According to the project manager these two teachers were not invited to the focus group as they did not use the Biophilia App but had developed teaching approach integrating science and music in innovative processes. In the focus groups a view was presented that because of the project structure it was difficult to find the focus, coordinate and schedule meetings. It was also reported that the students in the primary school did not like Bjork's music.

In the Faroes Islands and Greenland participants claim shortage of resources, i.e. time, information sharing and few teachers in each workplace. They also claim that the project should have more possibilities in adapting it to the countries' cultures. In survey 2 the participants from Greenland report that students from the upper secondary school worked with the students from the public school with great success.

In Sweden the survey reports the lowest score to the statement *The leadership/management at my school/workplace were supportive of the Biophilia educational project*. According to the participants in survey 2 and the focus groups workplace leaders were not involved, there was a lack of support regarding effort to make this work out, time and scheduling for the project. Sweden also had the lowest score on

the statement: *In general, how satisfied or dissatisfied are you in general with the Biophilia Educational Project.* As survey 2 shows there was a positive correlation between those two statements.

How well the five Nordic countries Åland Islands, Faroe Islands and Greenland reached outcome 1 and 2 in the Biophilia Educational Project seems therefore to be different between the countries.

The results report clearly that outcome 3 has not been reached. The Biophilia Educational Project associated online forum did not function as intended because of complicated, not user-friendly interface, and technical problems. Participants had limited time to work on the project which made it difficult for them to dedicate time to learn on the forum. Language barrier was also an important factor.

Results indicate that outcome 4 seems to be reached in most countries. Students were not asked directly but educators and teachers were asked to evaluate if their students interest in music, creative ways of learning, technology and natural science had decreased or increased while participating in the project. The result indicate that this goal was not reached in Denmark which might be because the focus in Denmark was more on incorporating the Biophilia Educational Project into the teaching education and less on incorporating it into the schools.

Survey 2 reports that there are more participants in Finland, Iceland and Norway that will continue to use the Biophilia teaching method next school year than in the other five countries. The other countries show more mixed views and many participants have not decided if they are going to use this framework next year or not.

The results clearly indicate that the participation opened participant's minds to new ways of thinking, teaching and integrating subjects. Even though some participants might not use this exact framework next year, most participants indicated that they will keep on exploring different ways of teaching and working.

5.2. RECOMMENDATIONS

Based on the results of this evaluation the following recommendations are made:

1. Finding convenient ways for the participants to share experiences through meetings both within their workplaces and between countries is very important. This could be done by taking advantage of Facebook or other similar technical solutions the participants know, start cooperation between participants in smaller groups, use Facetime, Skype or similar technology so students can share their projects with other students and/or sharing videos of the projects made, within and between countries.
2. Providing information, guidelines and instruction before starting a project like Biophilia. This seems to be significant for the participants to be able to run the project according to its goal, making it easier for them to make their own goals and approaches.
3. Support from the workplace leadership/management. The school and municipality need to be totally committed to a project like this by supporting the participants, in budgeting, planning and scheduling, and following up. As survey 2 and the focus groups showed this was a key element for a positive and successful participation in the project.
4. Schools participating in the project need to have technology up to date (e.g. iPads, computers etc.), this will make it easier for the schools to use e.g. the Biophilia app etc.
5. If decided to use social media like a Facebook group to get a better collaboration between the countries it is recommended that the project owner either provides or appoints someone to manage the group, support participants, encourage conversation, help keeping people active, especially in the beginning while the Biophilia community develops.

RESOURCES

Grant agreements between The Ministry for Education, Science & Culture and the participating countries.

Implementation plans from the participating countries.

ISCED 2011 levels of education.

Ministry for Education, Science & Culture, The Biophilia Educational Project. Retrieved June 2016 from <http://biophiliaeducational.org/>.

Rammekontrakt for Grön vækst - Biophilia 2014-2016, underskrevet af Nordisk Ministerråd og Ministeriet for Undervisning, Forskning og Kultur i Island.

Results from Survey 1 conducted by the Ministry for Education, Science & Culture.

Status reports from the participating countries.

APPENDIX 1:

SURVEY 2

Dear Participant,

First of all, we want to thank you for participating in the Biophilia Educational Project. The Biophilia Educational Project is a large-scale pilot project that builds on the participation of academics, scientists, artists, teachers and students at all academic levels. It is based around creativity as a teaching and research tool, where music, technology and the natural sciences are linked together in an innovative way. The Biophilia Educational Project was aimed to inspire children to explore their own creativity, and to learn about music, nature and science through new technologies and is based on Björk's Biophilia app suite of music and interactive, educational artefacts. In order to evaluate the Biophilia Educational Project we ask you to answer a short survey. Your input is very important for the future development of the Biophilia Educational Project. We strongly urge all participants to take part in this survey so that we can get a comprehensive view of your experience of participating in the Biophilia educational Project. The goal is to gain information about the effect the Biophilia educational project has had on you, your work, your workplace as well as the children. What was good and what we can do better in the future. The survey takes place on a special web site operated by Attentus – Mannauður og ráðgjöf (Attentus Human Resources Counselling) – which ensures that all answers are untraceable and that all the rules of the Data Protection Authority are upheld. If you have any questions regarding the implementation of the survey, please contact Birna Krístrún Halldórsdóttir (e-mail birna@attentus.is).

With hopes for a positive reaction,

On behalf of the Ministry of Education, Science and Culture.

Attentus – consultancy Birna Krístrún Halldórsdóttir, birna@attentus.is

Please note that:

The questions are not a test- There are no incorrect or correct answers

Please be as accurate and honest as possible

Please answer the following background questions about yourself and your workplace as accurately and honestly as possible.

What is your gender?

1. Female
2. Male

What is your age?

What country do you work in?

1. Denmark
2. Faroe Islands
3. Finland
4. Greenland
5. Iceland
6. Norway

7. Sweden
8. Åland Island

What is your highest education?

1. Doctorate degree (for example: PhD, EdD)
2. Masters degree (for example: MA, MS, MEng, MEd, MSW, MBA)
3. Bachelors degree (for example: BA, BS)
4. Some college
5. Diploma
6. High school graduate
7. Other (please specify) _____

Where do you work?

1. Pre-primary school,
2. Compulsory school
3. Upper secondary
4. Higher education
5. Youth center/Afterschool
6. Music school/Institute
7. Science center/institute
8. Other (please specify) _____

How long have you been in your current profession?

1. Less than 1 year
2. 1-5 years
3. 5 years and one day – 10 years
4. 10 years and 1 day – 15 years
5. More than 15 years

My workplace is well suited for participation in this type of project

1. Strongly disagree
2. Somewhat disagree
3. Neither disagree nor agree
4. Somewhat agree
5. Strongly agree

I have good knowledge of technology

1. Strongly disagree
2. Somewhat disagree
3. Neither disagree nor agree
4. Somewhat agree
5. Strongly agree

I regard my participation in the Biophilia educational project as an opportunity for professional development.

1. Yes
2. No
3. Other (please specify) _____

To what extent did you take advantage of the Biophilia Educational Project’s associated online forum (forum.biophiliaeducational.org) where teachers/participants can exchange experience and ideas?

1. Not at all
2. Very little
3. Somewhat
4. Quite a bit
5. A great deal

Please answer the following questions as accurately and honestly as possible.

Has participating in the Biophilia educational project

	Decreased	Somewhat decreased	neither decreased or increased	Somewhat increased	Increased
Decreased or increased team work at your school / workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased experimentation with new teaching /work methods at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased integration of different themes/subjects at your school/workplace.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased work or teaching across different age groups at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased teachers/employees use of iPads in teaching at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased teachers/employees use of android tablets for teaching at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased the use of thematic work/teaching at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased the use of creative teaching/working method at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased the times spent on working with/ teaching natural science at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased the time spent on working with/ teaching music at your school/workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Has participating in the Biophilia educational project had a negative or positive influence on your teaching/working methods?

1. Negative
2. Somewhat negative
3. Neither negative nor positive
4. Somewhat positive
5. Positive

In what way has participating in the Biophilia educational project had positive influence on your teaching/working method?

In what way has participating in the Biophilia educational project had negative influence on your teaching/working method?

Would you like to elaborate further on that?

Has participating in the Biophilia educational project had negative or positive influence on the teaching/working methods in general at your school/workplace?

1. Negative
2. Somewhat negative
3. Neither negative nor positive
4. Somewhat positive
5. Positive

In what way has participating in the Biophilia educational project had negative influence on teaching/working methods at your school/workplace?

In what way has participating in the Biophilia educational project had positive influence on teaching/working methods at your school/workplace?

Would you like to elaborate further on that?

Please answer the following questions as accurately and honestly as possible

Has participating in the Biophilia educational project made you more open to new ways of teaching/working?

1. Yes
2. No
3. Other (please specify) _____

Has participating in the Biophilia educational project decreased or increased your interest in using technology as a part of your teaching/work.

1. Decreased
2. Somewhat decreased
3. Neither decreased nor increased
4. Somewhat increased
5. Increased

Has participating in the Biophilia educational project decreased or increased your interest in integrating different subjects in your teaching/work?

1. Decreased
2. Somewhat decrease
3. Neither decreased nor increased
4. Somewhat increased
5. Increased

Has participating in the Biophilia educational project decreased or increased your interest in teaching / working on natural sciences?

1. Decreased
2. Somewhat decreased
3. Neither decreased nor increased
4. Somewhat increased
5. Increased

Has participating in the Biophilia educational project decreased or increase your interested in using creative approach in your teaching/work.

1. Decreased
2. Somewhat decreased
3. Neither decreased nor increased
4. Somewhat increased

5. Increased

To what extent do you disagree or agree with the following statements

Participating in the Biophilia educational project has influenced change in the curriculum at my school.

1. Strongly disagree
2. Disagree
3. Neither disagree nor agree
4. Agree
5. Strongly agree

I will continue to use the Biophilia teaching method next school year.

1. Strongly disagree
2. Disagree
3. Neither disagree nor agree
4. Agree
5. Strongly agree

The leadership/management at my school/workplace were supportive of the Biophilia educational project.

1. Strongly disagree
2. disagree
3. Neither disagree nor agree
4. agree
5. Strongly agree

Please answer the following questions as accurately and honestly as possible.

Has participating in the Biophilia educational project

	Decreased	Somewhat decreased	Neither decreased nor increased	Somewhat increased	Increased
Decreased or increased your students interest in learning in general?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased your students interest in natural science?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased your students interest in technology ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased your students interest in creative ways of learning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased or increased your students interest in music?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In general, how satisfied or dissatisfied are you with the Biophilia educational project?

1. Dissatisfied
2. Somewhat dissatisfied
3. Neither dissatisfied nor satisfied
4. Somewhat satisfied
5. Satisfied

When answering following open questions please think about your experience of participating in the Biophilia educational project

What actions have you taken to implement what you have learned while or/and after participating in the Biophilia educational project?

What practices have you developed that have been particularly relevant or meaningful to you?

In your mind what went well?

What did not go well?

What would you suggest could be done differently to improve this?

Is there anything further that you would like to share?

APPENDIX 2

THE QUESTIONS FOR THE BIOPHILIA FOCUS GROUPS

1. In your opinion what is a well suited workplace for this kind of project? Was your workplace well suited or not? In which way?
2. What kind of technical skills are needed for the participants to have in this kind of a project? What kind of technical support is needed?
3. The survey reports the importance of the workplace leadership/management support. In your opinion what kind of support is important?
4. How well was the project suited for your age group and institution (Pre-primary school, Compulsory school, Upper secondary, Higher education, Youth centre/Afterschool, Music school/Institute, Science center/institute, other) In which way? *(Here the Project Manager can probe for the answers by asking further questions on the subject)*
5. In which way has participating in the project increased or decreased the integration of different themes/subjects at your school/workplace? *(Follow up by questions on technical issues, cooperation with other teachers etc.)*
6. In which way did the project affect your students? Why?
7. The survey indicates that there were not many participants who took advantage of the Biophilia Educational Project Associated Online forum. What was your experience? If you did not use the forum, why? If you used the forum, what was the benefits of it and what can be improved.
8. How was the cooperation between the Nordic countries? How can we improve the cooperation between the countries in similar future projects?
9. Based on your experience in participating in the Biophilia Project what are the three most important factors to emphasize on in the Project Management of similar future projects?
10. What would have improved in the preparation of the Biophilia Educational Project?
11. Anything further you would like to discuss?