



Ark of Inquiry: Inquiry Activities for Youth over Europe

Deliverable D7.4

# Report of dissemination and exploitation activities 3

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## List of Acronyms

DoW	Description of Work
EC	European Commission
ECSITE	European Network of Science Centres and Museums
ESEA	European Science Education Academy
ESERA	European Science Education Research Association
EU	European Union
HQ	Headquarters
IBSE	Inquiry-Based Science Education
MINT	Mathematics, Informatics, Natural Science, Technology
ReSciTEG	Research Group on Science Education and Technology, University of Cyprus
RRI	Responsible Research and Innovation
SCN	Science Centre Network
STEM	Science, Technology, Engineering, and Mathematics
WP	Work Package

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## Summary

This report describes both the planned and completed dissemination and exploitation activities in the Ark of Inquiry project. An update on progress is provided against Year 3 (March 2016 – February 2017) for the promotion and circulation of the shared key messages and objectives of the project and for advertising the Ark of Inquiry platform to the key stakeholders of the project (pupils, teachers, teacher educators, scientists, staff of universities, museums and science centres, and research institutions).

First, the introduction of the report briefly recalls the groundwork around which the principles for dissemination and exploitation were organized, including the targets for dissemination. The document then discusses any changes to the various internal and (primarily) external dissemination and exploitation activities undertaken by the project partners, followed by a short analysis of the cumulative results. Some “in-house” recommendations for accelerating progress towards the stated objectives follow each section.

The document concludes with an analysis of progress towards reaching the target audiences and a discussion on the project’s vision for the sustainability of the results achieved and risks associated with dissemination. Finally, an overview of the strengths and weaknesses of the Year 3 dissemination and exploitation activities is presented.

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# 1. Introduction

Work Package 7 (WP7) of the Ark of Inquiry project relates to Dissemination. The objective of Deliverable 7.4 is to report on and provide a short analysis of those dissemination and exploitation activities that have taken place during Year 3 of the project. It augments the information provided in Deliverables 7.1 (Report on public website and dissemination materials about Ark of Inquiry), 7.2 (Report of dissemination and exploitation activities for Year 1) and 7.3 (Report of dissemination and exploitation activities for Year 2), and provides additional information on how those tools and activities are being used to help reach the identified target groups in the Description of Work (DoW).

Dissemination and exploitation activities of the Ark of Inquiry project have been divided into internal and external dissemination. The main aim of the **internal dissemination** is to coordinate an effective information flow between all individual partners and institutions participating in the project, contributing and providing support to the communications goals, priorities and strategies set for the project. Internal dissemination activities may include, but will not be limited to, the development/use of internal communication tools and templates, the facilitation of regular and ad-hoc meetings for the purposes of sharing information, and the undertaking of regular reports to the donor in order to advance the completion of project deliverables.

The main aim of the **external dissemination** is to support the Ark of Inquiry project through the expression and promotion of commonly shared key messages and objectives of the project and ensure regular information flow to key stakeholders and the general public at national and European levels. External dissemination activities may include, but are not limited to, participation and organization of national and international workshops and conferences, science contests and fairs, open information days, workshops, science contests for teachers and learners, thematic meetings with external experts, presentations in conferences and publications in peer reviewed and general public journals.

As already described in previous deliverables, the dissemination of information surrounding the Ark of Inquiry project is taking place over three distinct yet interrelated phases:

1. Development phase: general promotion of the project itself and its objectives;
2. Piloting phase: expansion of the testing ground into new arenas; and
3. Implementation phase: the marketing or “selling” of the results, tools and techniques used in the Ark of Inquiry project for greater outreach of the project deliverables.

As regards dissemination, Year 1 was fully entrenched in the Development Phase, while Year 2 focused on the Piloting of those efforts. Throughout Year 3, the project has been fully engaged in the 3<sup>rd</sup> dissemination phase of “Implementation”, as described in the following sections of this report.



## 2. Year 3 Dissemination and Exploitation Activities

This section of the report provides a description and analysis of the various dissemination and exploitation activities, internal and external, planned and undertaken during Year 3 of the Ark of Inquiry project (March 2016 – February 2017).

### 2.1. Internal Dissemination and Exploitation Activities

As stated in Deliverable 7.2, the main aim of internal dissemination activities is to coordinate an effective information flow between all individual partners and institutions participating in the project, contributing and providing support to the communication goals, priorities and strategies set for the project.

In Year 1 of the project, WP7 was tasked to develop a **detailed dissemination plan** describing the relevant activities that the consortium will undertake. The plan has been updated in Year 2 of the project to include the **set of commonly shared key messages** elaborated for each of the target groups. Key messages were elaborated for teachers and teacher educators, scientists (including STEM researchers), science centres and museums, policy-makers, and media and the public at-large. Parents and pupils were considered to be indirect target audiences and so no key messages have been elaborated for them at this point in time. No further updates were made to the dissemination plan in Year 3.

Various tools and mechanisms have been used to ensure a constant and simple information flow between consortium partners, such as Google Drive, Skype and other existing online communication tools. Two (2) online WP7 meetings were held during Year 3 of the project (May and November 2016) according to the dissemination and exploitation needs of the project. Twelve and ten of the 13 project partners were present at each WP7 meeting, respectively, indicating an active participation and strong interest of the partners in the overall dissemination and exploitation activities of the project.

Online and offline forms for the collecting and monitoring of progress regarding external dissemination and exploitation activities were updated and used for gathering information for this report.

**Recommendations and Next Steps:** New dissemination materials should be checked against the key messages developed by target group and adjusted as/if needed. Internal dissemination tools (such as the dissemination plan and templates) should be reflected upon for updating if needed in Year 4 of the project. WP7 meetings will continue to be held on a regular basis as needed for the successful implementation of the dissemination and exploitation activities of the project. New forms for collecting data in Year 4 will be created.

## 2.2. External Dissemination and Exploitation Activities

As noted in Deliverable 7.2, the main aim of external dissemination and exploitation activities is to support the Ark of Inquiry project through the 1) expression and promotion of commonly shared key messages of the project and 2) ensure regular information flow to key stakeholders and the general public at national and European levels. While varying by the project phase, the direct **target audiences for external dissemination** are identified in the DoW:

- teachers and teacher educators
- scientists (including STEM researchers)
- science centres and museums
- policy-makers
- media and the general public

Indirect target audiences remain to be the pupils and parents, as they are both reached through either the teachers or through the public-at-large.

No specific targets and goals have been set in terms of planned outreach for each target audience, but it has been agreed to regularly monitor how many of each audience the project is reaching through its dissemination activities. A full analysis of the target audiences reached so far is available in section 2.3 of this report.

**Recommendations and Next Steps:** Reflect on if the progress for the above target audiences is adequate or if additional efforts should be taken.

### 2.2.1. Dissemination and Presentation Materials

Under the leadership of the University of Tartu (UT), a series of dissemination and presentation materials<sup>1</sup> were developed during Year 1 for use by the consortium partners in order to have a unified appearance and “brand” when promoting or discussing the Ark of Inquiry project. **New dissemination materials** were developed in Year 3 of the project, including a checklist for teachers on how to better engage girls in inquiry activities by empowering them in science, available as Appendix 1 to this report. The original document was finalised in English and is currently being translated into French, German, Hungarian, and other partner languages. An updated version of the project flyer in German, specifically about the national-level activities of the project, was produced and disseminated in Austria (see Appendix 2).

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<sup>1</sup> These materials are discussed fully in [Deliverable 7.1](#).

Four (4) new editions of the project’s **electronic newsletter** were published in Year 3 of the project (see Appendix 3 for the most recent version produced), for a total of eight (8) issues over the lifetime of the project to-date and are available for download on the project’s website<sup>2</sup>. Coordinated and produced by UT, the newsletter has grown to include many more success stories and in-depth content about the project’s activities in the different countries. One partner, HAN, has created its own [online newsletter in the Dutch language](#)<sup>3</sup>, modelled on that of the project but with news specific to the Ark of Inquiry community in The Netherlands. Another partner, BMB, created a Community Update in June 2016 in the German language (see Appendix 4), intended to reach the ECSITE Conference participants (50) and electronically to the Austrian community members (around 100). The next issue of the project newsletter is foreseen for March 2017; production is planned to continue on a quarterly basis for Year 4.

**Table 1.** Reported distribution of all dissemination materials to target audiences in Year 3<sup>4</sup>

Target Audience	Y2	Y3	TOTAL (Y2+Y3)
Pupils	399	277	676
Teachers & Teacher Educators	11,490	6,788	18,278
Science & Teacher Education Students	215	303	518
Science Centres & Museums	141	43	184
Scientists (STEM researchers)	1,481	245	1,726
Policy-makers	570	108	678
Media & General Public	404	1,955	2,359
<b>TOTAL</b>	<b>14,700</b>	<b>9,719</b>	<b>24,419</b>

As illustrated above in Table 1, teachers and teacher educators accounted for the receipt of about 70% of all **dissemination materials distributed throughout Year 3**, as reported by the partners. Considering that teachers have been identified as the primary target audience of the entire project, this is a positive sign as it indicates that this is where the partners’ main efforts are concentrated. A large jump was made in the distribution of materials to media & general public, which is comprised of mostly parents, according to the partners. The drop between Years 2 and 3 is evident in the materials directed towards scientists and also teachers and teacher educators; this could be attributed to a lack of reporting or simply that Year 3 focused on trainings those who were already approached initially with dissemination materials in Year 2 and there was no need to repeat.

**Recommendations and Next Steps:** Partners should now focus on the final dissemination materials needed for the project to complete its objectives. This includes Deliverable 7.6 Recommendations and Guidelines document, but may include others as well.

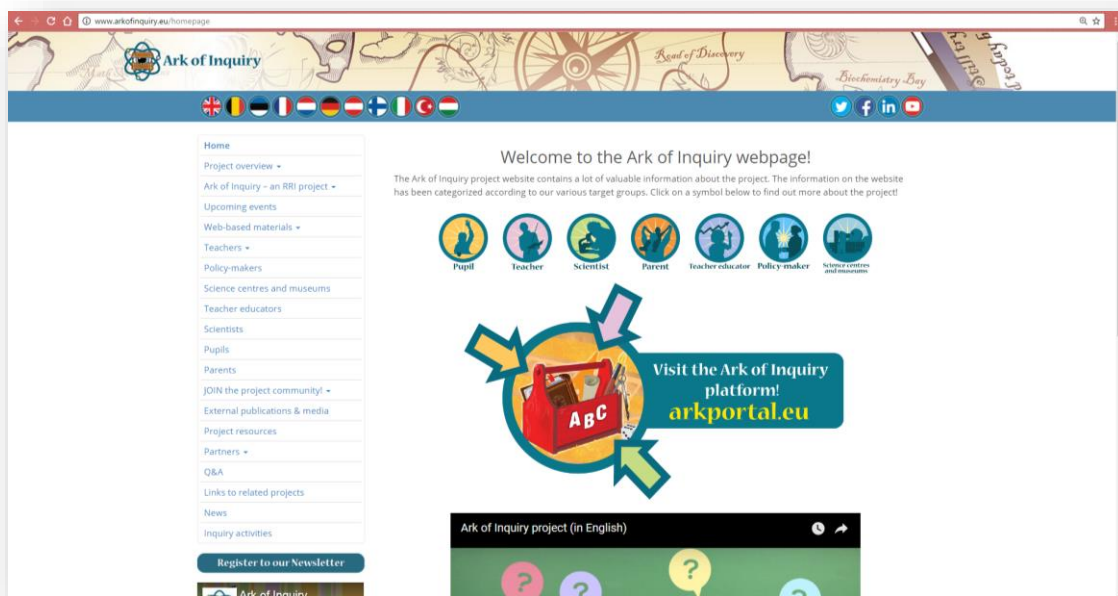
<sup>2</sup> Project newsletters can be downloaded from here: <http://www.arkofinquiry.eu/resources>

<sup>3</sup>[http://mailing.han.nl/927/Actions/Newsletter.aspx?messageid=7372&customerid=41430&password=enc\\_3741323144364344\\_enc](http://mailing.han.nl/927/Actions/Newsletter.aspx?messageid=7372&customerid=41430&password=enc_3741323144364344_enc)

<sup>4</sup> All dissemination materials, both electronic and in hard copy as discussed in Deliverable 7.1, are considered

## 2.2.2. Public Website and Online Presence

Complementary to the printed presence assured by the dissemination materials above is the online presence through the **official Ark of Inquiry website**, <https://www.arkofinquiry.eu>, live for the public since 14 March 2014. Designed and managed by the University of Tartu, the website is considered as the main tool for effective external communication and rapid dissemination of information about the project's objectives, partners, publications and events, related documents and dissemination materials. Drupal, an open source content management platform, is used to manage the website through the OpenScholar system. A snapshot of the current home page is presented in Figure 1 below.



**Figure 1.** Ark of Inquiry website (<http://www.arkofinquiry.eu/>)

The primary changes to the project website in Year 3 included the adding of the link to the now-active **platform** (<http://arkportal.ut.ee/>) of activities in the centre of the screen, a Facebook feed widget underneath the left-hand menu and a subscription link for the project Newsletter above the Facebook feed. Many submenus, mostly under the teachers' section, have also been added, as well as a page with the list of national coordinators.

Partners are also continuing to promote the official Ark of Inquiry website through their own **institutional websites**, often as a translation of part or all of the website or by promoting it with a hyperlink. Table 2 on the following page shows the updated status of how the partner institutions have promoted the Ark of Inquiry project on their own websites.

**Table 2.** Status of Ark of Inquiry promotion on consortium partners' websites, Y2-Y3<sup>5</sup>

Partner	Language	Status	Y2 Page views <sup>6</sup>	Y3 Page views
UT	Estonian, English	<a href="#">Project description</a> included on Centre for Educational Technology workgroup website, with an <a href="#">English version</a> also available	N/A	N/A
EA	English	<a href="#">Project description</a> included on website	N/A	N/A
UTU	English, Finnish	Dedicated project pages in both <a href="#">English</a> and <a href="#">Finnish</a> on the website of the Faculty of Education	N/A	N/A
UCY	Greek, English	Project description promoted in both <a href="#">Greek</a> and <a href="#">English</a> on the website of the Research in Science and Technology Education Group (ReSciTEG)	0	N/A
UNESCO	English	<a href="#">Dedicated project page</a> of Ark of Inquiry project on Venice Office website	1,763	3,036
HAN	Dutch	<a href="#">Dedicated project page</a> on the website of the Research Centre for Quality Learning; additional pages added	224	688
BMB	German	<a href="#">Dedicated project page</a> on the website of the Virtual School (Virtuelle Schule Österreich) with several sub-pages; also promoted on the <a href="#">e-Education platform Austria</a> and through a <a href="#">Moodle Online Platform</a> developed for the Austrian Ark of Inquiry teacher community.	1,144	1,097
UBER	English	<a href="#">Dedicated project page</a> on the website of the Chemistry research group	50	193
BEKAS	Turkish	<a href="#">Dedicated website</a> to the project	629	374
EADN	French	<a href="#">Dedicated project pages</a> on website	N/A	N/A
UCLL	Dutch	<a href="#">Dedicated project page</a> linked to Ark of Inquiry website	N/A	N/A
HRTA	Hungarian	<a href="#">Dedicated project page</a> on website	200	425
AHHAA	Estonian	<a href="#">Dedicated project page</a> on website	2,346	236
<b>Totals</b>			<b>6,356</b>	<b>6,050</b>

As also noted in Table 2 above, one can see the number of page views that each partner's dedicated website or webpage has received in the past two years. Over 12,000 page views in addition to those of the project's official channels, can be accounted for via this method of dissemination.

In order to drive traffic to their institutional page for the project and encourage teachers to sign up for the project's trainings, one partner, HAN, recently engaged in a **Google AdWords campaign**. People of the target group who searched on Google for 'Inquiry learning in the classroom' (in Dutch) would see an advertisement for the Ark of Inquiry training to the right of their results list. The campaign will last for 3 months (January-March 2017) but already the first results are visible: the Dutch training website gets far more page views than before (at least 670 hits within the first 6 weeks of the campaign) and has directly led to at least 10

<sup>5</sup> Website addresses for the above partners' websites are available in Appendix 5 of this report

<sup>6</sup> Approximate number of page views since project page or website was created.

teachers signing up for the training in the first month alone. A snapshot of the AdWords campaign can be seen in Figure 2.



Figure 2. Google AdWords Campaign in the Netherlands (HAN)

In addition to the official Ark of Inquiry website, the project has developed a solid **social media** presence with tools such as Facebook, YouTube, Twitter, and LinkedIn. Facebook pages are accessible in both English and Estonian languages at [www.facebook.com/ArkofInquiry](http://www.facebook.com/ArkofInquiry) and <http://www.facebook.com/uuringulaegas> (see Figure 3 below). 210 and 76 people have “liked” the two pages, respectively, as of 15 February 2017 (up from 140/29 and 54/14 “likes” from Y2/Y1). Ninety-seven (97) posts have been made in Year 3 (54 posts to the English page and 43 posts to the Estonian page), an improvement to the 72 total posts that have been made to the English and Estonian pages in Year 2, and the 24 total posts made in Year 1. A closed Facebook group for the partners to share internal information amongst themselves was also created and to which 33 individuals from the overall project team have subscribed. Only nine posts were shared in this internal communication group in Year 3, significantly down from the 45 and 51 posts that were shared in Years 2 and 1, respectively. However, it should be noted that more partners (other than UT who currently manages the page) shared items, which is an improvement from years’ past.



Figure 3. Ark of Inquiry Facebook pages in English and Estonian



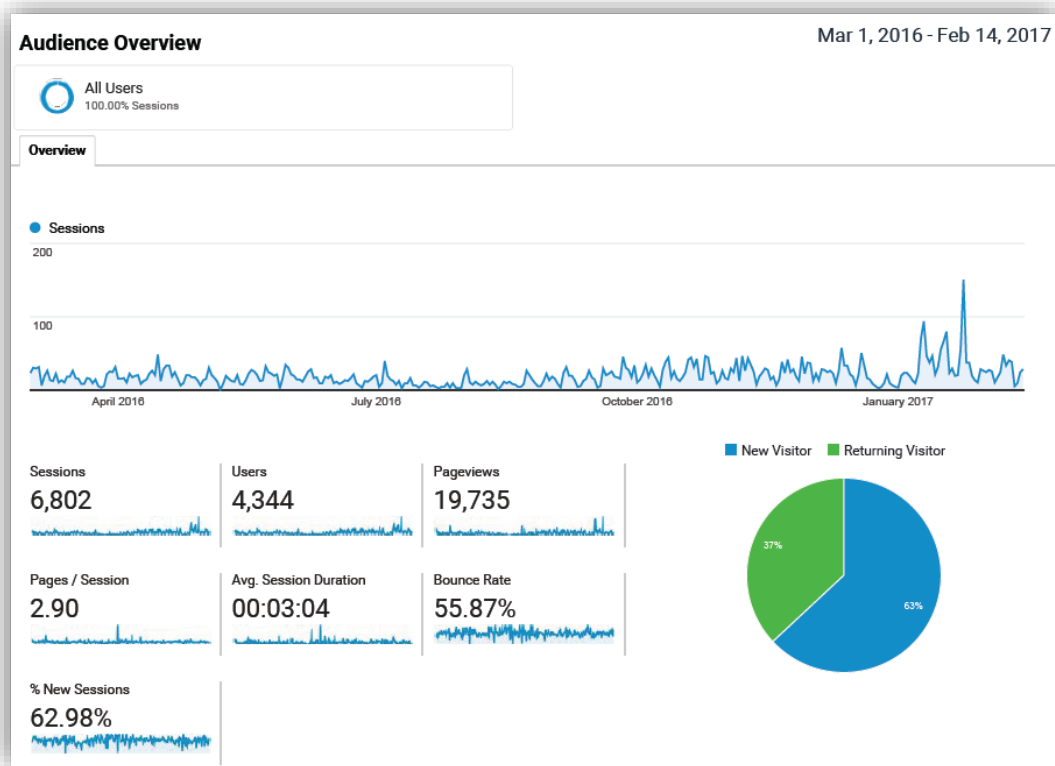
Two social media tools that are not yet being fully utilized are the project’s Twitter (<https://twitter.com/ArkofInquiry>) and LinkedIn accounts ([www.linkedin.com/groups/Ark-Inquiry-Inquiry-Awards-Youth-6921276](http://www.linkedin.com/groups/Ark-Inquiry-Inquiry-Awards-Youth-6921276)). In the two years of its existence, the Twitter account has made 41 “tweets” and obtained 60 followers. The LinkedIn account, while technically still alive, has only 13 members and has made a total of only 4 posts in the three years of the project. WP7 members already decided in Year 2 to deemphasize the use of the LinkedIn account; the Twitter account seems to be slowly picking up speed, which will hopefully peak by the end of the project with the results of the final conference and dissemination products.

The [YouTube channel](#) set up for the project to disseminate videos both produced by the project and share those produced elsewhere that have an added value for project activities has continued to improve in Year 3. As illustrated in Table 3 below, overall views of the three videos produced by the project has more than doubled from the previous year, from 587 views in Year 2 to 1,382 views in Year 3. While a strong overall increase, it is evident from the table that the use of videos as a tool is utilized more in some countries than in others.

In addition to the 1,382 views garnered by the three videos that have been uploaded to the account, an additional 98 views were made to other videos not produced by the project but shared through the channel. In its second full year of operation, the channel currently has only 8 subscribers and thus could be better promoted both within the project consortium and to external stakeholders.

**Table 3.** Number of views per video and language as registered by YouTube

Language/version	General intro to Ark of Inquiry	Video targeting Teachers	Intro to Platform	Y3 Total	Y2 Total	Δ (Y3-Y2)/Y2
Original English / no subtitles	3	616	79	698	246	184%
Original Hungarian / no subtitles		258		258	170	52%
Dutch subtitles	4	1		5	2	150%
English subtitles	68			68	41	66%
Estonian subtitles	13	12		25	13	92%
Finnish subtitles	7	8		15	7	114%
French subtitles	0	2		2	0	200%
German subtitles	35	3		38	27	41%
Greek subtitles	10	15		25	5	400%
Hungarian subtitles	41			41	14	193%
Italian subtitles	85	67	22	174	55	216%
Turkish subtitles	20	13		33	7	371%
<b>TOTAL</b>	<b>286</b>	<b>995</b>	<b>101</b>	<b>1,382</b>	<b>587</b>	<b>135%</b>



**Figure 4.** Snapshot from Google Analytics report, “Audience Overview”, accessed 14 February 2017

**Google Analytics** is used to monitor website activity. As illustrated in Figure 4 above, during the second year of operation (1 March 2016 – 14 February 2017), the website registered 6,802 sessions viewed by 4,344 users. Nearly 20,000 pages were viewed during those sessions, resulting in an average of 2.90 page views during each session. Each session lasted an average of 3:04 minutes, and about 37% of all sessions were made by returning users. Considering that the majority of repeat users had longer session durations and more page views (3:52 minutes average session duration and 3.37 page views) compared to new users (2:35 minutes average session duration and 2.63 page views), this would make sense as many of these repeat visitors are probably from the trainings, which would have directed trainees back to the website on a regular basis. Visitation of the website peaked at around 150 sessions/day in late January 2017, while maintaining an average of 25-30 sessions per day throughout the year.

**Table 4.** Website statistics, Years 1-3

Marker	Year 1	Year 2	Year 3	Cumulative
# of sessions	3,208	5,973	6,802	22,785
# of users	1,604	3,737	4,344	14,029
Page views	22,686	20,660	19,735	63,081
Ave. page views/session	7.07	3.46	2.90	4.48
Ave. time spent/session (min)	7:02	3:24	3:04	4:30



As illustrated in Table 4 above, compared with previous years' activity, Year 3 saw a continuous increase in overall sessions, users. However, despite the overall substantive growth in terms of sessions and users, the overall number of page views dropped by 4.5%, which is also reflected in the drop in the average number of page views per session and the average time spent per session. This seems to indicate that more people were visiting the website, perhaps with more targeted intentions, driven perhaps by the teacher trainings, as less time was spent looking around on the website.

Cumulatively, over 14,000 users have visited the project website during over 22,000 sessions, resulting in over 63,000 page views. Looking at the entire period from March 2014-February 2017 (a 3-year period), the average (weighted) number of page views per session was 4.48, with users spending a (weighted) average of 4:30 minutes each session.

**Table 5.** Top visited sections of project website in Year 3 with rank compared to previous years

Website section	Est. Page views	Percent of total page views	Rank Y1	Rank Y2	Rank Y3
Home page	5,483	27.78 %	1	1	1
Target audience pages	3,779	19.15 %	2	2	2
Project overview	2,250	11.40 %	3	3	3
Project resources	2,006	10.16 %		5	4
RRI	1,774	8.99 %		6	5
Web-based materials <sup>7</sup>	1,030	5.22 %		7	6
Links	390	1.98 %		8	7
News	339	1.71 %		4	8
Partners	272	1.38 %		10	9
Join project community	237	1.20 %		9	10
<b>Totals</b>	<b>17,560</b>	<b>88.98 %</b>			

During the third year online, the most visited page within the Ark of Inquiry website was still the home page, with well over a quarter of the total 19,735 page views. The webpages set up for each of the target audiences were the next most visited, representing nearly one-fifth of the total page views. The project overview and related webpages were the third most visited on the website, representing around 11% of the total page views – these pages also included all of the evaluation and assessment tools available online. The biggest change in Year 3 is the drop in ranking of the news section. Table 5 above illustrates the remaining distribution of the page views of the project's website.

Of the target audiences' pages, the most visited in Year 3 were those of Teachers and Teacher Educators, as illustrated in Table 6 on the following page. This is consistent with the trends from Year 2 and reflects most likely the emphasis on the piloting and implementation phases of these years. These findings also correlate nicely with the goal of the project to

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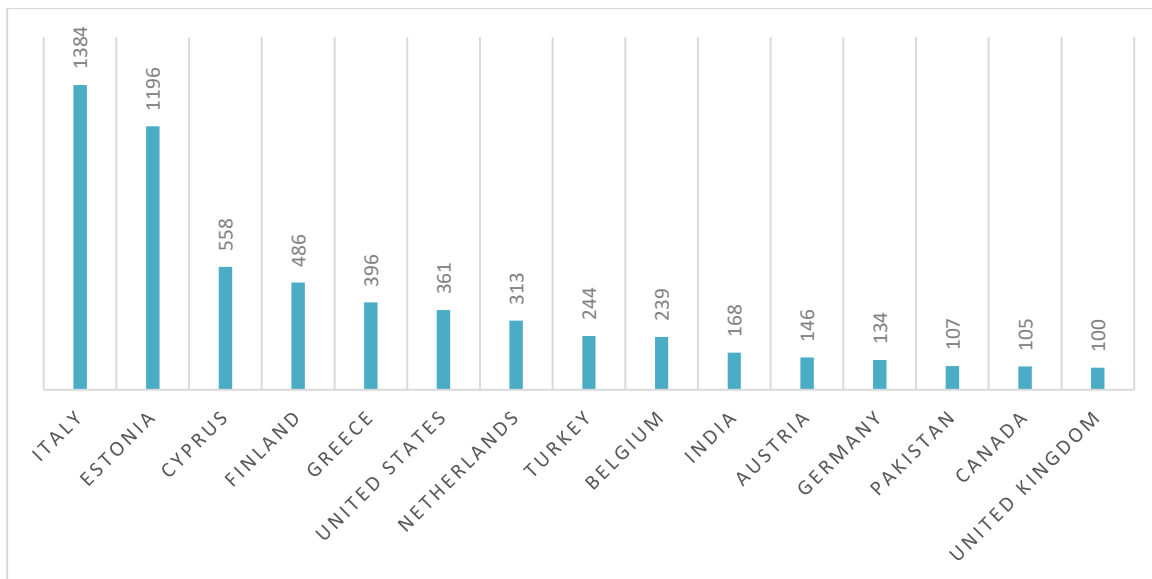
<sup>7</sup> This website section is available in English only; all others include figures from both English & Estonian versions

target teachers as the primary target audience of the project, with teacher educators and scientists as part of the supporting communities essential for ensuring sustainability of the overall project objectives.

**Table 6.** Page views and percentages per target audience webpage, Years 1-3

Target Audiences' pages	Page views			
	Y1	Y2	Y3	TOTAL
Teachers	505	1,669	1,440	3,614
Policy-makers	N/A	113	92	205
Science centres & museums	261	451	209	921
Teacher educators	331	1,500	1,081	2,912
Scientists	632	543	268	1,443
Pupils	452	421	473	1,346
Parents	145	347	216	708
<b>TOTAL</b>	<b>2,326</b>	<b>5,044</b>	<b>3,779</b>	<b>11,149</b>

As can be seen in Chart 1 below, considering the number of sessions, Italy has replaced Estonia as the top location where users of the project's website were based in Year 3, accounting for 1,384 or the 6,802 sessions recorded (20.35%). In terms of individual users, Estonia still topped out the pack at 726 users compared to Italy's 703 (out of the 4,288 total users). The rest of the top 15 countries (87.3% of all sessions made during Year 3) where users are located represent the host countries of the other project partners, with the notable exceptions of the United States, India, Pakistan, Canada and the United Kingdom. Visitation from these countries could be explained by some of the dissemination activities of the project partners (conferences in Pakistan and the UK, for example) as well as the expansion of the Ark of Inquiry network via UNESCO interns (interns were received from Canada, India and Japan in Year 3). Low partner country visitation was registered for France (16<sup>th</sup>, 88 sessions) and Hungary (20<sup>th</sup>, 45 sessions). The website was visited by people from nearly all European countries; Belarus, Bosnia and Hercegovina, Czech Republic, Luxembourg, Kosovo (under the 1999 United Nations Security Council Resolution 1244) and The former Yugoslav Republic of Macedonia stand out as having zero sessions registered from these locations during Year 2.



**Chart 1.** Top 15 Ark of Inquiry website user locations by country (by number of sessions)

The statistics also show that of the 6,802 sessions, 2,875 (42%) were conducted from an English-language device, keeping par with the previous two years' analyses which had 44% and 46% of sessions conducted from an English-language device. The use of Italian-language devices grew from 13% in Year 2 to nearly 18% in Year 3. Dutch, Estonian and Greek-language devices round out the top five, with Finnish-language devices coming in a close 6th. The high number of devices in these languages correspond to the user locations as noted in Chart 1 above.

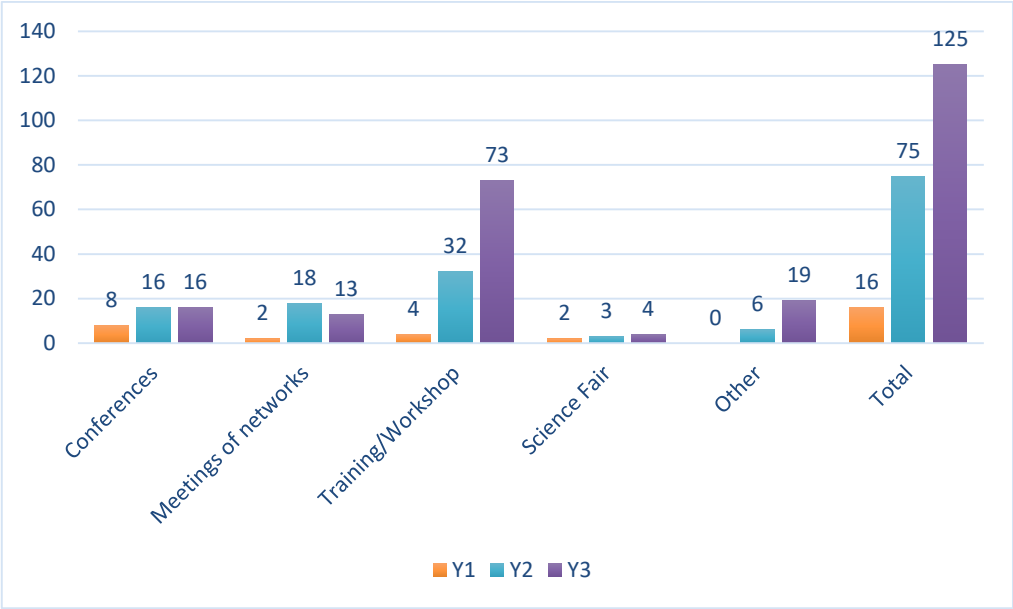
About 83% of sessions were made from a desktop computer, with the remaining 17% made from mobile devices such as a tablet or phone, a slight increase over the 13% of sessions that used such devices in the previous year and the 9% used the year before that. Nearly half (46%) of the mobile device users accessed the website via an Apple product (iPad or iPhone), with the large majority of the remaining visitors using an Android-based device (54%), consistent with past years' data.

Most users accessed the project website from a search engine, such as Google, Bing or Yahoo (51% of sessions) or directly (25%). Nearly 19% were referred from partner websites and a small percentage (2.5%) came via social media (primarily Facebook). The remaining referrals came from various other sources external to the project.

**Recommendations and Next Steps:** Strategize how to maximize online resources to disseminate the information about the project's final conference and dissemination products. Identify how and what of the project's online presence to keep active after the project closes. Website usage should continue to be monitored via Google Analytics in Year 4.

### 2.2.3. Events

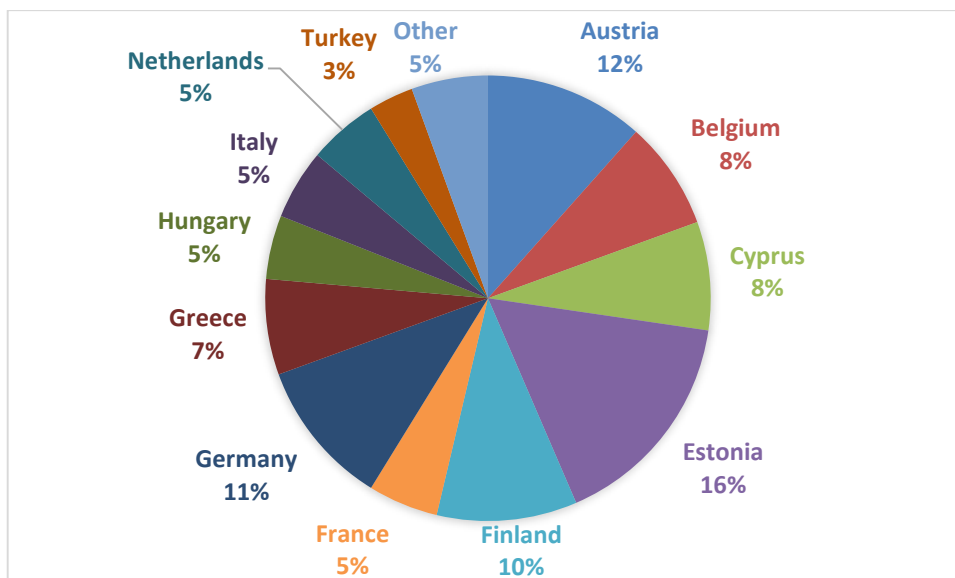
The Ark of Inquiry community encourages participation in a variety of **scientific and popular events** to disseminate the ideas and outcomes of the project. In Year 3, consortium partners participated in 125 events<sup>8</sup> in which the Ark of Inquiry project was promoted or discussed. These events included conferences, meetings of networks, trainings/workshops, science fairs, and others; trainings/workshops were the predominant event in Y3, accounting for 58% of all events and reflecting the current implementation stage of the project as the teacher trainings (see deliverables for WP4) are also counted here. Other activities undertaken in Year 3 were primarily activities in a classroom with pupils, as well as the mid-term review of the project, held 7-8 June 2016 in Brussels, Belgium. More information for years 1-3 can be compared in Chart 2 below.



**Chart 2.** Types of events in which Ark of Inquiry participated in Years 1-3

As illustrated in Chart 3 below, events are regularly spread out in all of the partner countries over the past three years. While Germany hosted the most events in year 3 (20), overall Estonia has played the largest host throughout the lifetime of the project, hosting 35 out of 216 total events reported. Four events were held outside of the 12 participating partner countries in Year 3, representing teacher trainings in Pakistan and Switzerland and Conferences attended in Portugal and Spain.

<sup>8</sup> Raw data for the dissemination events reported in Year 3 is available upon request.



**Chart 3.** Location of events in which Ark of Inquiry participated in Years 1-3

More information on the trainings and workshops that took place in Year 3 will be covered in the forthcoming *Deliverable 4.3 Report on Teacher Training Sessions* (due October 2017).

Of the remaining 52 events reported, a novel approach to conference participation was taken in Years 2-3 with the joint participation in a “virtual poster session” of the annual conference, *New Perspectives in Science Education*, held 17-18 March 2016 in Florence, Italy. As no partners could physically represent the project at this event, a video presentation was jointly prepared under the leadership of UNESCO with contributions by UT, HRTA, BEKAS, and UBER. Featuring case studies of Estonia and Italy, the presentation shared the initial results from the pilot phase of the project in the form of a [10-minute video hosted online](#)<sup>9</sup> on the conference website.

On 9-11 June 2016, the ECSITE Annual Conference was hosted in Graz, Austria. Three partners, AHHA, BMB and EA all participated in this event. AHHA, as the sole representative of science centres and museums in the project, introduced the Ark of Inquiry project during a session dedicated to inquiry learning sponsored by the RRI TOOLS project. BMB, working closely with one its key national partners and official host of the conference, the Science Centre Network in Austria, contributed dissemination material (project leaflets in German and English, bookmarks in English) and information about national Ark of Inquiry events and teacher trainings (i.e. new German flyer on National activities, Austrian Ark of Inquiry Community Update). An EA representative gave a poster presentation on the Ark of Inquiry project, which was on display during the whole conference.

BMB also presented the Ark of Inquiry project at a Scientix-Ark of Inquiry joint session at the ‘eLearning Experts Conference’ in Eisenstadt, Austria. The nationwide conference, which has

<sup>9</sup> [http://conference.pixel-online.net/NPSE/virtual\\_presentation\\_scheda.php?id\\_abs=1591](http://conference.pixel-online.net/NPSE/virtual_presentation_scheda.php?id_abs=1591)

been held for the 13th time this year, has become a regular and well known training and networking event in the area of information and communication technology for teachers of all types of schools. More than 400 participants came to learn more about the implementation of the digital revolution in education in workshops. The Ark of Inquiry workshop focused on the topic educational resources for responsible research in MINT subjects.

The most important upcoming event for the final year of the project is the final conference of the project, scheduled to take place in November 2017 at UNESCO HQ in Paris, France. Project partners have finalized a concept note (see Appendix 6) for the event and presented it to the Director-General of UNESCO for her endorsement of hosting the final conference during the 39<sup>th</sup> General Conference of UNESCO for optimal visibility among key, high-level stakeholders.

Of special note is the planned Ark of Inquiry Summer School being organized by EA from 9-14 July 2017. This one-week opportunity will allow science teachers and other professionals an in-depth look at the inquiry cycle, learn how to adapt inquiry activities to their classrooms and through site visits, understand how to make the connection for their pupils between their classroom and the real world. More information on the Summer School can be found at <http://ark.ea.gr/>.

Other events foreseen for Year 4 include the conclusion of the trainings held in the partner countries, as well as participation in relevant conferences and science fairs and festivals.

**Recommendations and Next Steps:** The concept note for the final conference will be executed and participation in planned dissemination events completed.

## 2.2.4. Collaboration with other European projects

**European science- and education-related networks** have been identified in the DoW as an important resource for the Ark of Inquiry project, primarily in terms of dissemination but also provide valuable inputs for the execution of project deliverables. Further, these valuable partnerships offer opportunities for the future sustainability of project activities and results beyond the final conference, and could serve to maintain the promotion of inquiry-based science education for the next generation of European projects to draw from.

The Ark of Inquiry consortium itself was built through a network of contacts and partnerships from previous or closed projects, such as Open Discovery Space (ODS), Discover the Cosmos Initiative, Go-Lab, PROFILES and Science Created by You (SCY). Currently, the Ark of Inquiry project has connections with at least five active, related European projects through the participation of its member partners. Below in Table 7 is visible a snapshot of

how partners are actively engaged with other science- and education related projects in Europe.

**Table 7.** Participation of Ark of Inquiry consortium partners in active, related European projects

Project	Brief Description	Partners involved
<a href="#">SSE</a>	The project SSE (Schools Study Earthquakes) aims to prepare teachers to teach concepts related to earthquakes using real seismographs, focusing on the study in the reality of classroom practice of a physical phenomenon with great societal impact and proposes pedagogical practices based on inquiry-based methods that are more effective in science education.	UCY, EA, BEKAS
<a href="#">PLATON</a>	PLATON aims to promote learning approaches such as IBSE for the teaching of natural sciences.	UCY, EA
<a href="#">Hypatia</a>	The Hypatia project engages 13-18 year-old girls both in and out of the school environment by bringing together science centres and museums, schools, research institutions and industry with gender experts and teenagers themselves.	AHHHA
<a href="#">Creations Project</a>	The Creations Project seeks to develop creative approaches based on art for an engaging science classroom, implementing and promoting inquiry-based science teaching and learning, and will establish a pan-European network of scientists, teachers, artists and students.	EA
<b>Next-Lab</b> (website under construction)	Next-Lab (Next Generation Stakeholders and Next Level Ecosystem for Collaborative Science Education with Online Labs) is a new follow-up project of the Go-Lab project. It follows the strategy of Go-Lab by introducing IBSE in European schools, providing access to online labs worldwide and training teachers in the use of innovative teaching technologies.	UT, UCY, EA

Links to these projects, as well as other related projects to which the consortium partners are not participating are featured on the Ark of Inquiry project website, to help facilitate connections and shared use of each other's resources. Now that the project will be entering its final phase of dissemination of results in Year 4, overlap and connections with other European projects needs to be fully realized for optimal sustainability of results.

Other ongoing European projects for the Ark of Inquiry project to collaborate with include:

- Wider outreach to teachers outside the project's 12 partner countries could be supported through a partnership with [European Schoolnet](#), which is a consortium of 30 different educational ministries. European Schoolnet is participating in over 50 active and closed projects that could benefit Ark of Inquiry, such as the [Future Classroom Lab \(FCL\)](#) project (which offers a fully equipped, reconfigurable, teaching and learning space developed on its Brussels premises) or the [European Schoolnet Academy](#) (which offers online professional development courses for teachers).

- Ark of Inquiry could become more involved with [Scientix](#), in order to spread information and awareness to researchers, centers, teacher training facilities and ministries of education across Europe. The Scientix Moodle (online learning platform) could be used to offer trainings for teachers who cannot join for in-person training opportunities.
- The [European Science Education Academy](#) (ESEA), hosted by the European Physics Association, supports the modernization and continuous development of STEM education and training. ESEA provides numerous training activities, tools and resources that enable teachers in STEM to maximize their efforts in the design of inquiry-based learning activities as well as to create motivating and engaging lessons that inspire young pupils and students to take up a career in STEM. The Ark of Inquiry project is connected through the summer 2017 course being offered by EA through the Academy's Inspiring Science series.
- The European project [PARRISE](#) (Promoting Attainment of Responsible Research & Innovation in Science Education) shares and improves best practices of professional development of science teachers for primary and secondary teachers across Europe, specifically inquiry-based science education and learning based on socio-scientific issues, which introduce the challenges of Responsible Research and Innovation in education. The project will be hosting its final conference in August 2017 and this could be a good occasion to link together the results from our two similar projects.
- Ark of Inquiry can participate in conferences hosted by [Engage 2020](#) for dissemination. Also, Ark of Inquiry can adopt some of their policies and recommendations relating to societal engagement for effective dissemination of science education deliverables once such concrete policies are formulated by the project.
- The [Science: It's a girl thing!](#) initiative offer activities and information that will aim get girls involved in science fields. The projects promoted by this initiative offer resources for teachers who want to get all of their pupils involved in science, and complement the tools for empowering girls in science produced by Ark of Inquiry, too.
- Projects that focus on providing scientific educational resources for teachers should also be further explored, such as [Xplore Health](#) and the [Chain Reaction Project](#).
- A final underutilized network is that of the UNESCO Institutes, Category 2 Centers and University chairs ([UNITWIN programme](#)). Many of these institutes, centres and chairs specialize in science- or education-related issues and could help with dissemination and outreach to teachers outside of the initial 12 target countries. A list of such UNESCO contacts can be found in Appendix 7.

Further, while no longer active, Ark of Inquiry has also leveraged the results that are still available from closed European projects that its members have contributed to:



- [RRI TOOLS](#) recently hosted its final conference in 2016, when it presented a set of digital resources to advocate, train, disseminate and implement RRI under Horizon 2020. Ark of Inquiry partners EA and AHHA have worked to incorporate the tools and information on RRI from this project, into the WP4 teacher training materials on RRI.
- The [Go-Lab project](#) concentrated on providing access to online laboratories in order to enrich classroom experience in schools as well as learning activities out-of-class. It developed several tools, apps and inquiry learning spaces based on the 5-phase inquiry cycle model. Ark of Inquiry partners UT, UCY and EA are again collaborating in the project's spinoff, the Next-Lab project (see Table 7 above).
- The [Quantum SpinOff](#) project brought science teachers and their pupils in direct contact with research and entrepreneurship in the high-tech nano sector. Teams of pupils, guided by their science teachers, were challenged to create a responsible and socially relevant valorization of a scientific paper in collaboration with actual researchers and entrepreneurs. They visited high-tech research labs and compete for a Quantum Spin-Off Prize. While ended in November 2015, all the related activities were uploaded on the Ark of Inquiry platform and the teachers from the Quantum project received a training on how to use the Ark of Inquiry platform and toolbox. UCLL, EA and UT were partners in the project.
- The [PATHWAY project](#) promoted the widespread use of inquiry- and problem-based science teaching techniques in primary and secondary schools in Europe and beyond. Directly supported by EA, UCLL, BMB and UBER, it offered a set of inquiry activities, added to the Ark of Inquiry platform, as well as a compendium of teacher training resources that were consulted in developing the Ark of Inquiry WP4 training modules.
- The [Science Created by You \(SCY\)](#) project aimed to take science education to the next level by developing a flexible, open-ended learning environment that engaged and empowered adolescent learners. Through Ark of Inquiry partners UT and UCY it provided a number of inquiry activities that fed into the project's platform.
- More than 2,500 science teachers in 12 countries participated in the [SAILS](#) (Strategies for Assessment of Inquiry Learning in Science) teacher education programs. Teachers can utilize the assessment techniques and tools developed by SAILS for assessing the activities found on the Ark of Inquiry platform.
- Closed in July 2016, UBER and EA contributed to the success of the [Inspiring Science Education](#) project, which provided digital resources and opportunities for teachers to help them make science education more attractive and relevant to students' lives and lives on through the Inspiring Science Academy series hosted by EA in the context of the European Science Education Academy.
- The [Irresistible project](#), which ended in October 2016, developed IBSE modules based on RRI for topics specific to a region; these multi-lingual modules could be added to the Ark of Inquiry platform of activities.

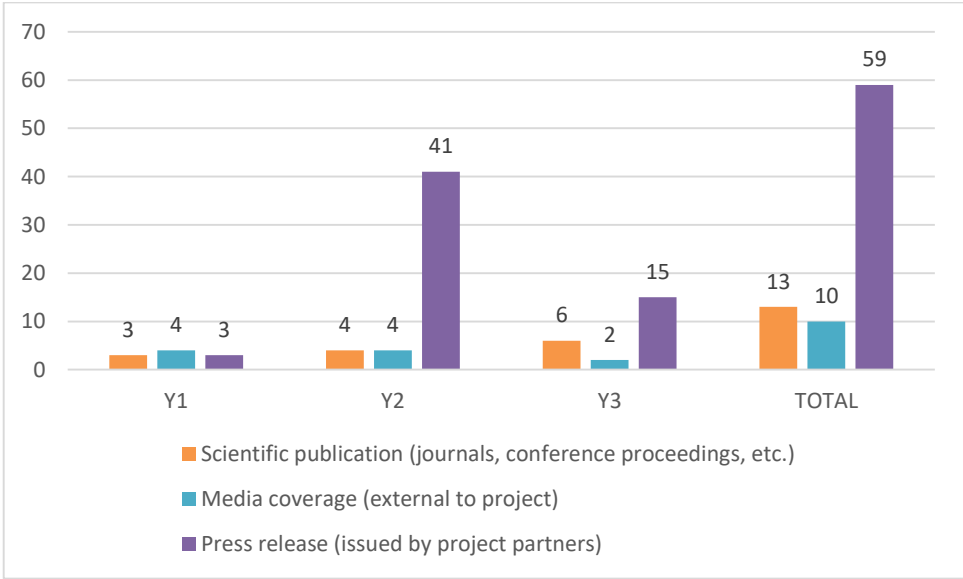
- [PROFILES](#) (Professional Reflection-Oriented Focus on Inquiry-based Learning and Education through Science) promoted IBSE through raising the self-efficacy of science teachers to take ownership of more effective ways of teaching students, supported by stakeholders. Much of the basis for the development of the Ark of Inquiry approach builds upon the work / findings of this project and the project's teaching and learning materials were incorporated into the Ark of Inquiry portal.
- The aim of the [PROGRESS](#) project was to bring together organizations and projects that work on RRI, which would be a good resource for Ark of Inquiry for dissemination purposes.
- [Project CoReflect](#) (Digital support for Inquiry, Collaboration, and Reflection on Socio-Scientific Debates) developed a European-wide network of local working groups involving university researchers, educational authorities and practicing teachers at the local level. CoReflect activities could be offered on the Ark of Inquiry platform in various languages.
- [Open Discovery Space](#) addressed various challenges that face the eLearning environment in the European context, and worked to introduce a 'pull' rather than 'push' approach in the modernization of school education. Ark of Inquiry partners EA, BMB, UCLL and UNESCO collaborated for the creation of a multilingual portal that offered eLearning resources, and served as a prototype for the Ark of Inquiry portal.

**Recommendations and Next Steps:** As evidenced, there are multiple opportunities for the Ark of Inquiry project to benefit from or collaborate with other European projects, both open and closed. The main aim of the upcoming final year of the project should be to identify those opportunities most likely to succeed and to have the greatest impact, particularly considering the project's somewhat limited time/financial resources available, and pursue them. An emphasis should be put on those collaborations that will augment the project's sustainability after its official closure at end February 2018.

## 2.2.5. Publications

Despite the fact that Ark of Inquiry is not a research project, **publications**, from scientific journals to media coverage, are essential for ensuring that the project findings and results are documented for posterity. To this end, the project intends to publish in at least ten journals referred to by the Thomson Reuters Web of Science (formerly Thompson ISI Web of Knowledge) database; additional publications, such as conference proceedings and articles in national scientific journals, are also planned and anticipated to be published during the third phase of dissemination, Implementation.

Only 23 publications were issued by the partners of the Ark of Inquiry project in Year 3 as illustrated in Chart 4 below, a decrease by almost 50% over Year 2 publication activity. Nineteen of the publications were at the European or international level (85%) and the rest were at national-level (France and The Netherlands). The large majority of these publications were press releases or news articles published by the project, predominantly on the project’s website but also on the various partner websites. All international publications were produced in English.



**Chart 4.** Publications issued on the Ark of Inquiry project in Years 1-3

Of the ten journals referred to by the Thomson Reuters Web of Science, two (2) publications were produced in Year 3 that meet this criterion:

- Bardone, Emanuele; Lind, Marianne (2016). Towards a phronetic space for responsible research (and innovation). *Life Sciences, Society and Policy*, 12 (1), 1–19, s40504-016-0040-8.

- Burget, Mirjam; Bardone, Emanuele; Pedaste, Margus (2016). Definitions and Conceptual Dimensions of Responsible Research and Innovation: A Literature Review. *Science and Engineering Ethics*, 1–19, s11948-016-9782-1.

A third article in the is also underway for publication in Spring 2017 (*Selected Papers from the ESERA 2015 Conference*). As the results of the implementation phase (WP6) come in and the conclusions are drawn from the evaluation studies (WP5), meeting this goal of 10 publications will be a main focus of year 4 dissemination efforts. There is a standing offer to dedicate an issue of *Science Education International*<sup>10</sup> solely to the publication of 6-7 articles from the Ark of Inquiry consortium, which would in fact meet this target of the project.

**Recommendations and Next Steps:** Explore further the opportunities for publishing information stemming from the WP5 evaluation studies, in particular the dedicated issue of *Science Education International*. Note that funds have not been requested from the EU at the beginning of the project for open access permissions; alternatives need to be identified.

## 2.3. Analysis of Year 3 Dissemination and Exploitation Activities

As stated in previous WP7 deliverables, the implementation targets of the Ark of Inquiry project and the dissemination target audiences slightly differ; thus, it was agreed not to identify target figures for the dissemination target audiences, just to periodically track and review where that dissemination is made. Taking into consideration all of the various sources of information available, this review for Year 3 is presented in Table 8 below. (NB: N/A indicates no data or not enough data is available.)

**Table 8.** Year 3 indicative progress towards reaching target audiences

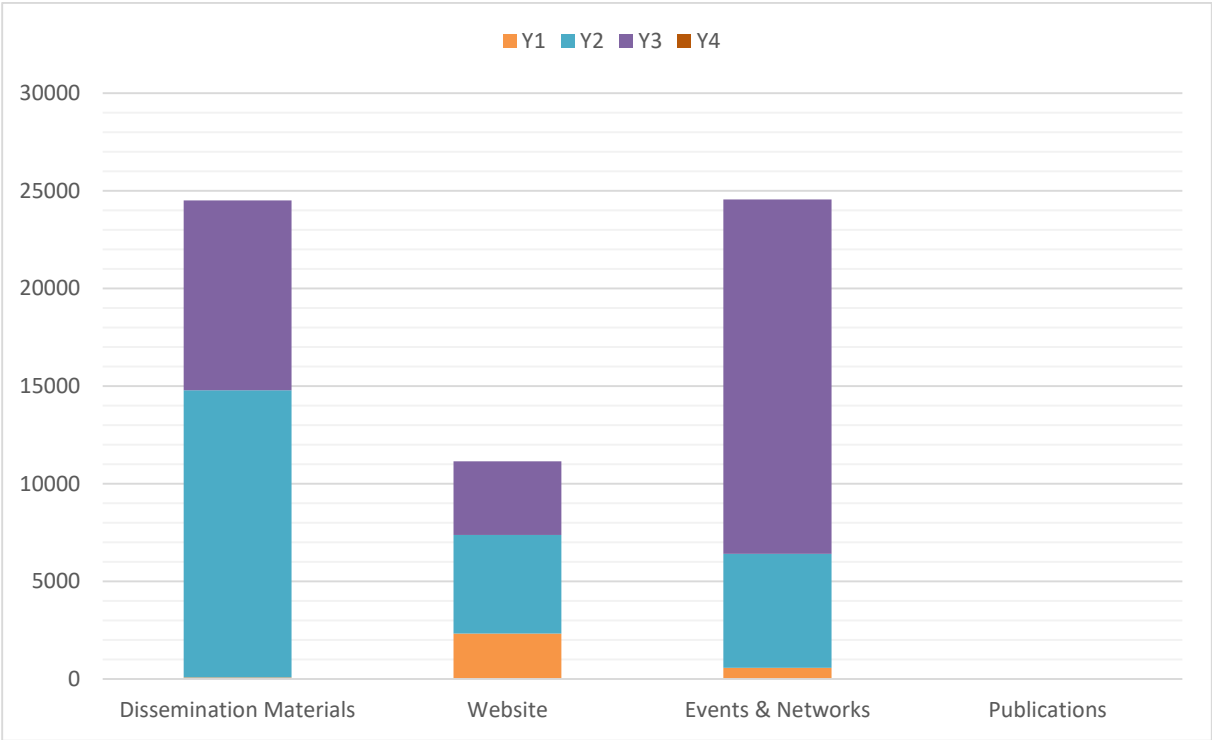
Type of activity	Pupils	Teachers & Teacher educators	Science & teacher education students	Science centres & museums	Scientists (STEM researchers)	Policy-makers	Media & General Public	Total
Dissemination Materials	277	6,788	303	43	245	108	1,955	<b>9,719</b>
Website	473	2,521	N/A	209	268	92	216	<b>3,779</b>
Events & Networks	6,497	4,072	907	3,150	755	217	2,556	<b>18,154</b>
Publications	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>N/A</b>
<b>Totals</b>	<b>7,247</b>	<b>13,381</b>	<b>1,210</b>	<b>3,402</b>	<b>1,268</b>	<b>417</b>	<b>4,727</b>	<b>31,652</b>

<sup>10</sup> Science Education International is the in-house online publication of the International Council of Associations for Science Education (ICASE) - <http://www.icasonline.net/seiweb>

As evidenced in the table above, in Year 3 the project has reached the relevant target audiences over 31,000 times, with the greatest contribution coming from the events and networking activities. Again, the teachers and teacher educators are the most approached in terms of dissemination, as in years' past. Below can be seen the cumulative dissemination and exploitation activities of the project<sup>11</sup>.

**Table 9.** Cumulative, indicative progress towards reaching target audiences

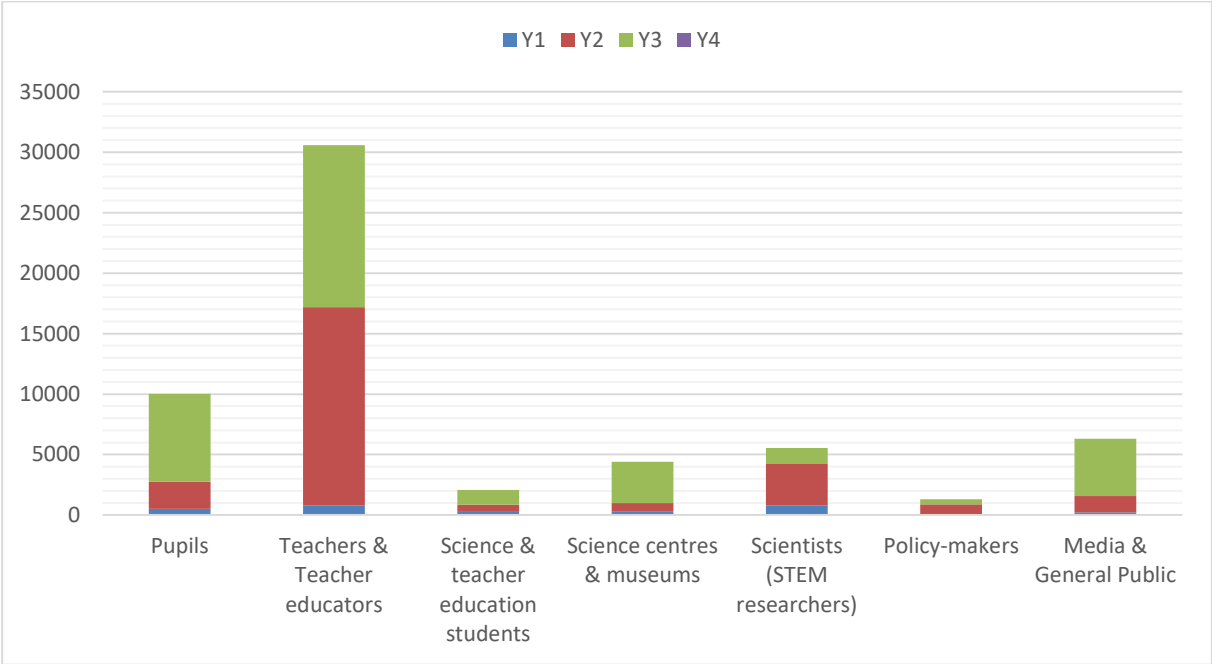
Type of activity	Pupils	Teachers & Teacher educators	Science & teacher education students	Science centres & museums	Scientists (STEM researchers)	Policy-makers	Media & General Public	Total
Dissemination Materials	676	18,358	518	184	1,726	678	2,359	<b>24,499</b>
Website	1,346	6,276	250	921	1,443	205	708	<b>11,149</b>
Events & Networks	8,001	5,949	1,300	3,292	2,369	412	3,237	<b>24,560</b>
Publications								
<b>Totals</b>	<b>10,023</b>	<b>30,583</b>	<b>2,068</b>	<b>4,397</b>	<b>5,538</b>	<b>1,295</b>	<b>6,304</b>	<b>60,208</b>



**Chart 5.** Cumulative dissemination and exploitation by type of tool (Years 1-3)

<sup>11</sup> It should be noted that both the above tables and the following two charts do not account for any duplication that may have taken place. Thus, the figures need to be considered as *indicative only* of the project's breadth and depth of dissemination and exploitation activities.

In Chart 5 on the previous page, it is clear to see that partners are making a good use of all of the dissemination tools available. Dissemination materials and events/networking opportunities have evened out over the past three years as the most used dissemination tool. As noted in previous deliverables, it is impossible to track the dissemination efforts of publications. In Chart 6 below, it is clear to see that as discussed already in previous sections of this report, the project has been targeting primarily teachers and teacher educators through its activities.

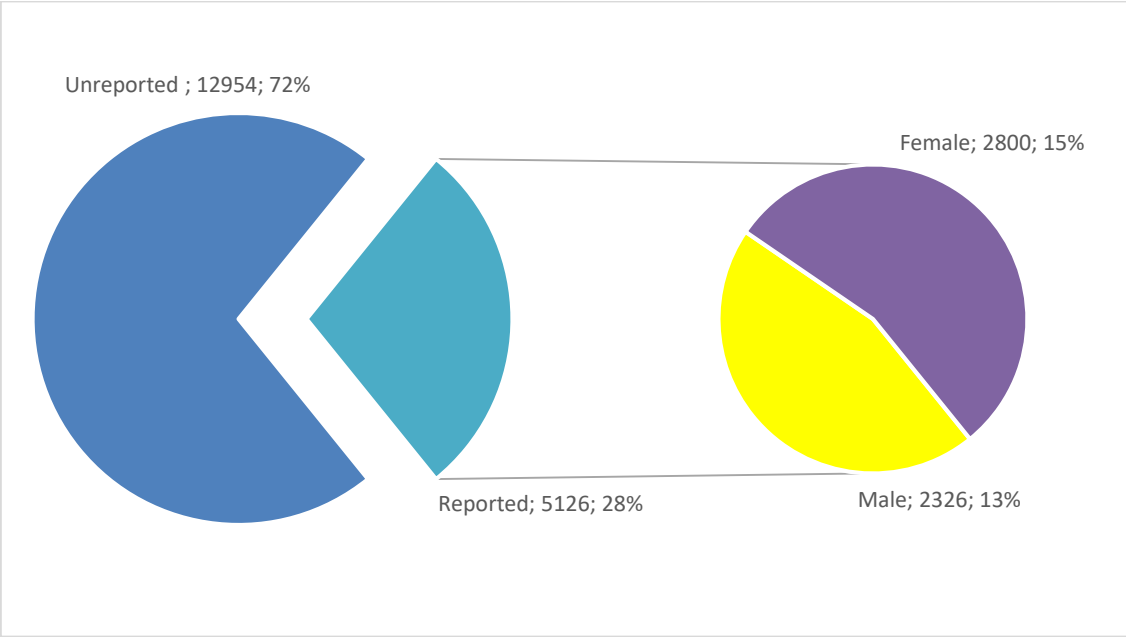


**Chart 6.** Cumulative dissemination and exploitation by target audience (Years 1-3)

It should be noted that the above representations exclude any outreach from large events where participation is mixed and difficult to tabulate. For example, in Year 1 it was estimated that there were at least an additional 1,000 individuals reached at events; in Years 2 and 3, only a couple events reported each year did not include estimations and/or the breakdown for the target audiences reached (additional figures unknown). In addition, the 12,406 website visitors to the partners’ websites, as reported in Table 2 on page 13, cannot be broken down into the various target audiences. Therefore, the **total number of individuals reached through dissemination and exploitation activities during Years 1, 2 and 3 of the Ark of Inquiry project** (not counting for any overlap) **approaches 74,000.**

The DoW also asks the consortium partners to pay particular attention to avoiding any **gender gap** in project activities, and this includes the dissemination of information as well. While partners are asked to report on the gender dimension in their activities, this is not always easy: at an event, it could be rather easy to get a list of participants; but for other tools such as publications, unless there is a face-to-face encounter, there is no way to tabulate this information. Thus, other than for events, gender outreach remains a challenging dimension to track.

Of the 18,080 participants reported as reached via events or networks, only 5,126 of those (28%) had the gender element reported, a proportion similar to past years' reporting. Of these, there appears to be a slight preference for women (54.6%) over men (45.4%), as illustrated in Chart 7 below, also nearly identical to Year 2 reporting. Assuming that for the rest of the events and networking opportunities (where gender wasn't reported) participation again averaged at 50/50 between male and female participants, this gap is anticipated to remain the same, after 3 continuous years of similar reporting.



**Chart 7.** Year 3 gender representation in events and networks

## 2.4. Sustainability and risk analysis of dissemination and exploitation activities

Programme sustainability is a key component of any successful project. Thinking ahead “now” for what will happen “then”, at the end of the project in the future, will greatly improve the chances of successful project closure and transition of ownership to the desired stakeholder groups. In the case of the Ark of Inquiry project, these stakeholder groups would likely be the main target groups: teachers, teacher students and teacher educators, policy makers and curricula developers.

The risks associated with dissemination and sustainability are well-known for grant-funded projects such as this one: once the regular project funding ceases, the website eventually shuts down, knowledge databases go dormant and communities and networks that were established during the lifetime of the project lose contact with one another without the push

of the project managers to keep it going. The impact of this on dissemination and exploitation activities is that the flow and exchange of information will stop reaching the target audiences, too.

Therefore, consortium partners have already begun to discuss how to best integrate the planned activities and results of the Ark of Inquiry project into those of external partners in order to render the project results sustainable. Proposals for working with teacher training institutions and with integrating inquiry-based standards into the national curricula of the countries have already been proposed and efforts to leverage the work of other EU projects for such sustainability are also being initially explored. The model provided by the European Science Education Academy could perhaps be considered. Yet, there remains much to be done to ensure that the issue of sustainability is not glossed over in this project and tackled too late.

**Recommendations and Next Steps:** Project partners will continue and conclude discussions in Year 4 on how to sustain the dissemination of information about the Ark of Inquiry project after it will close. Such steps are also intricately linked to the work being done on the project platform and how the project as an overall entity will be sustained after February 2018.



### 3. Conclusion

Year 3 of the Ark of Inquiry project was fully immersed in the implementation phase of the project, concerning both the dissemination of information and the overall project implementation. At this point in the project, there is less emphasis on the planning and more emphasis on the doing. Some new dissemination tools were developed or older ones tweaked to have a greater impact on the dissemination audiences. Looking at the growth in numbers from Years 2 to 3, this appears to be a superficial success, at least in terms of reaching targeted individuals. As evidenced by the use of Google AdWords by HAN, it is clear that these dissemination efforts are having success in getting people to adhere to the Ark of Inquiry project and platform.

Internal dissemination tools are expected to continue in Year 4, with an emphasis on reflecting on the key messages for the final target audiences. This is particularly important for the creation of Deliverable 7.6 Recommendations and Guidelines Document, which will rely on the inputs of all partners, to take account of their lessons learned. All partners have prioritized outreach to teachers, which as the primary target audience of this project, indicates a focused success. The project will need to consider how to tabulate outreach to pupils, as over 23,000 of them should be engaged by the project throughout its lifetime; about a third of that number has been reached so far via dissemination tools, albeit these are also indirect means. It also will be interesting to report in the next deliverable, after the implementation phase has peaked, how the multiplication of the teachers (and hence, pupils) reached will grow, stemming from those first teachers that have been officially trained by the project.

Engagement of the project partners in dissemination activities has improved from the first year: in Year 1, only 10 of the 13 consortium partners reported any dissemination and exploitation activities outside of the online web presence; in Years 2 and 3, all partners have reported having disseminated materials and/or participated to events/networking opportunities. Events tended to be mostly trainings and workshops, which also reflects the implementation phase of the last year and will likely maintain as partners fulfil their training obligations of the project in Year 4. Publications in scholarly, peer-reviewed journals will be prioritized and a targeted plan made for achieving this in a reasonable timeframe.

Nonetheless, as the project heads into its final year, completing its implementation phase and disseminating the lessons learned and results from that implementation, the sustainability of those dissemination and exploitation results past the project's end date will become one of its highest priorities. This point will necessarily be addressed in the final annual reports, Deliverable 7.5, as well as Deliverable 7.6, the Recommendations and Guidelines document.

# Appendix 1: Empowering Girls in Science Checklist



Ark of Inquiry

ADAPTED FROM PEDAGOGICAL SCENARIO D

## EMPOWERING

# GIRLS

## IN SCIENCE

CHECKLIST

1	2	3	4
<p>ESTABLISH ENGAGING, LEARNER-CENTERED ENVIRONMENTS FREE FROM BIAS</p>	<p>ENCOURAGE THE USE OF RESPONSIBLE RESEARCH AND INNOVATION (RRI) IN THE INQUIRY PROCESS</p>	<p>AVOID STEREOTYPES COMMONLY ASSOCIATED WITH WOMEN IN STEM FIELDS</p>	<p>USE FEMALE ROLE MODELS AS EXAMPLES OF SUCCESSFUL SCIENTISTS</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			
<p><b>Develop a gender lens by identifying your own biases (see Resources)</b></p> <p><b>Be an approachable educator to build a rapport with all pupils</b></p> <p>Effectively group pupils for the equal participation of girls and boys in class discussions to build confidence and model how to incorporate different perspectives (Jumpstarting Jill)</p>	<p><b>Connect knowledge to current world news so pupils can relate learning to their own lives</b></p> <p><b>Focus class discussions on real-life scientific problems and think of how to solve them</b></p> <p>Research shows that girls tend to orient themselves to STEM content that considers ethics; teach lessons about climate change, the environment, health, etc.</p>	<p><b>Conduct interviews with female pupils and staff about stereotypes in science</b></p> <p><b>Give examples of how STEM fields are becoming more diverse (ex. more women are joining them)</b></p> <p>Telling women that STEM fields are becoming more diverse makes them more likely to consider these fields for their future studies (Sapna et al. 2013)</p>	<p><b>Encourage pupils to take risks and try new things by giving examples</b></p> <p>Share stories of women who took risks in science (Jumpstarting Jill)</p> <p>Undergraduate women who saw biographies of female engineers had more positive attitudes toward math compared to women who saw biographies of male engineers (Stout et al. 2011)</p>

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# STRATEGIES

## TO INCLUDE GIRLS IN SCIENCE



### ORIENTATION

- Use metaphors and examples such as a bus or the school building to explain science concepts; use words to which all pupils have access ([girlfriendlyphysics.co.uk](http://girlfriendlyphysics.co.uk)).
- Have the same high expectations for all of your pupils: having high expectations means pupils generally rise to meet them (Blickenstaff 2006).

### CONCEPTUALIZATION

- Encourage equal sharing during questioning and hypothesis generation to build confidence. Ex. Assign roles to pupils in class groups so everyone participates in their own way (see Resources section).
- Look at the groups' gender balance; how many girls are there? Are they actively involved?

### INVESTIGATION

- Give specific feedback related to pupils' learning strategies. Ex. tell pupils that they used good critical thinking skills to make their hypotheses, rather than just telling them "good job". Share stories about women in science/ STEM who took risks (Jumpstarting Jill).
- Model problem-solving by sharing your own stories of success/failure in science (Jumpstarting Jill)

### CONCLUSION

- Ask pupils to share their learning experiences in the science classroom (using a journal or discussions). This will allow you determine pupils' interests and determine the effectiveness of your teaching strategies.
- Encourage pupils to use their new scientific knowledge to reflect and make conclusions.

### DISCUSSION

- Be approachable as an educator, offer ungraded assignments, and encourage pupil collaboration; 90% of pupils who chose to switch out of a science degree in university felt their science instructors were unapproachable, and used competitive grading too often. This stopped them from improving their understanding in a collaborative setting (Blickenstaff, 2006)

### RESOURCES



1. Effective class grouping strategies: <http://www.scholastic.com/teachers/top-teaching/2013/11/15-quick-and-creative-ways-group-and-partner-students>
2. Outlines profiles of female scientists who invented useful items: <http://girlfriendlyphysics.co.uk/women.html>
3. Gives information about women in science, and offers support for educators who want to ensure girls' success in science: <http://sciencegrrl.co.uk/>
4. Gives examples of current female scientists. Pupils can take quizzes that match their interests to explore careers in STEM: <http://science-girl-thing.eu/en>
5. Shows how to develop a gender lens for different work environments: <http://unesdoc.unesco.org/images/0015/001548/154837e.pdf>
6. Interactive online resource offered in multiple languages. Allows investigation without assigned grades: <http://www.experiencingmaths.org/>



## Appendix 2: New national project flyer in German



### Ark of Inquiry (Aoi)

#### Inquiry Awards for Youth over Europe

*Raising youth awareness to Responsible Research and Innovation through Inquiry Based Science Education*



#### Kurzinformation

Das EU-Projekt Ark of Inquiry hat sich zum Ziel gesetzt, das Bewusstsein der Heranwachsenden in Europa für einen verantwortungsvollen Umgang mit Forschung und Innovation zu stärken. Dafür wird für Schüler/innen aller Altersgruppen (7-18 Jahre) ein Pool an motivierenden Lernaktivitäten verfügbar gemacht, die einerseits die Schüler/innen an das „wirkliche“ Forschen heranführen und die sie gleichzeitig auf ihre aktive und verantwortungsvolle Rolle bei der Gestaltung von Forschung für Ihre Zukunft vorbereiten sollen. Lehrer/innen lernen didaktische Werkzeuge und digitale Unterrichtsmaterialien kennen, um ihre Schüler/innen mit den Konzepten des Forschenden Lernens und des verantwortungsvollen Umgangs mit Forschung vertraut machen zu können. Im Unterricht sollen Schüler/innen schließlich selbst die Rolle des/der Forschers/in übernehmen, Experimente durchführen und ihre Erkenntnisse präsentieren.

#### Content Portale

Alle deutschsprachigen Unterrichtsmaterialien sind frei (Als Gast anmelden) über unsere Ark of Inquiry – Unterrichtsmaterialien Moodle-Seite zugänglich:  
<http://www2.lernplattform.schule.at/vis/course/view.php?id=57>

Alle international entwickelten Unterrichtsmaterialien sind frei über die Ark of Inquiry-Plattform zugänglich: <http://arkportal.ut.ee/>. Die Registrierung erfolgt in wenigen Schritten.

#### Geplante Ergebnisse

- Kostenlos zugängliche digitale Unterrichtsmaterialien in den Content Portalen
- Trainingsaktivitäten mit Science Centres und Schulen, die Forschung erlebbar machen
- Didaktische Methoden zum Einsatz von Verantwortungsvollem Forschen im Unterricht
- Förderung von informellen Lernaktivitäten und persönlichen Lernansätzen

#### Projektdaten

**Förderprogramm:** FP7-SCIENCE-IN-SOCIETY-2013-1, **Projektlaufzeit:** 2014- 2018

**EU-Projekt Themencluster:** Forschendes Informelles Lernen, Online Portale, Science Centres

**Zielgruppen:** Lehrer/innen, Lehramtstudierende, Schüler/innen zw. 7-18 Jahren, Science Centres, Bildungsexpert/innen, politische Entscheidungsträger/innen

**Fächer:** STEM (Mathematik und Naturwissenschaften), Sachunterricht

**Projektkoordination:** University of Tartu, Estonia (UT)

**12 Partnerinstitutionen aus:** AT, EE, EL, FL, FR, NL, GE, GR, HU, NL, TK

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<http://e-education.at>

# Appendix 3: 8th edition of the *Ark of Inquiry Newsletter*



## Welcome, dear Subscriber!

This is the eighth official newsletter of the Ark of Inquiry project. We are thankful for your interest in the project. In the newsletter, you will find information about the latest news and upcoming events.

We hope that you have had a wonderful year and are ready for winter and the seasonal holidays.

As you may already know, Ark of Inquiry is a teacher training project which aims to train at least 1100 pre- and in-service teachers in inquiry learning and raise their awareness of Responsible Research and Innovation (RRI). The trainings have already started and will take place in 12 European countries: Estonia, Finland, Hungary, Germany, Italy, Greece, Cyprus, Turkey, Belgium, the Netherlands, France, and Austria. All interested teachers and educators are more than welcome to participate in the trainings. You will be able to learn more about inquiry learning, RRI, the Ark of Inquiry portal and find out how to support pupils in their inquiry activities. If you are interested in finding the nearest training session, contact us via [arkofinquiry@gmail.com](mailto:arkofinquiry@gmail.com) and we will put you in touch with the local coordinator!

In this issue, you can read about the first impressions from the teacher training sessions held in Estonia, Italy, Turkey and the Netherlands and find out about recent project-related events in Greece, Austria and France. As always, we will also introduce some of the inquiry activities that can be found in the Ark of Inquiry platform. This week we focus on those that support teaching and learning about sustainability. You will learn what has happened in the past couple of months and find out which events are worth looking forward to in the upcoming months.

Starting from this issue, we welcome input from all teachers who have participated in the Ark of Inquiry teacher trainings or other project-related events to share their impressions directly with us. Contact us via [arkofinquiry@gmail.com](mailto:arkofinquiry@gmail.com) to submit your story!

On behalf of the Ark of Inquiry team, we wish you a wonderful winter and happy holidays. We hope to see you at our trainings!

## Upcoming events

EA will organize a workshop about the Ark of Inquiry project in Athens, Greece on 18 December 2016 during HISTEM2016, a conference on learning and teaching, organized by the University of Patras, the National Kapodistrian University of Athens and the Hellenic Open University (16–18 December 2016).

The conference provides a platform for dissemination of best practice in teaching and learning in Greece and will inspire and empower STEM educators to improve teaching quality, to increase engagement in STEM education and career pathways, to connect pupils with real-life industry relevancy, and to drive creativity, inquiry learning, problem-solving and project-based learning. In the workshop on the Ark of Inquiry project, the participants will learn about the Ark of Inquiry portal, be exposed to the various resources for teachers developed in the project and find out more about the concept of RRI.

## More upcoming events on our website!

## About the project:

### Project Title:

Ark of Inquiry: Inquiry Awards for Youth over Europe (FP7, No. 612251)

### Funding Scheme:

EU-FP7-SCIENCE-IN-SOCIETY-2013-1 (CSA-SA)

### Duration:

4 years (March 2014-Feb 2018)

**Consortium:** 13 partners coordinated by Tartu Ülikool (University of Tartu), Estonia; Ellinogermaniki Agogi Scholi Panagea Savva AE, Greece; Turun Yliopisto (University of Turku), Finland; Panepistimio Kyprou (University of Cyprus), Cyprus; UNESCO Regional Bureau for Science and Culture in Europe, Venice, Italy; Hogeschool van Arnhem en Nijmegen (HAN University), The Netherlands; Bundesministerium für Bildung (Ministry of Education), Austria; Humboldt-Universität zu Berlin (Humboldt University), Germany; Bahcesehir Egitim Kurumları Anonim Şirketi (BEKAS), Turkey; Ecole de l'ADN (DNA Learning Centre), France; University Colleges Leuven-Limburg (previously KHLim), Belgium; Kutató Tanárok Országos Szövetsége (Hungarian Research Teachers' Association), Hungary; SA Teaduskeskus AHHA (AHHA Science Centre), Estonia

European Union's  
Seventh Framework Programme





Where to find Ark of Inquiry? Visit our website!



## Teacher feature from Turkey



We asked one of the teachers, Erdoğan DEMİRÇİ, who participated in the Ark of Inquiry teacher training in Turkey to share his experiences with the project and with inquiry learning in general. Erdoğan DEMİRÇİ is a science teacher at Makbule Süleyman Alkan Secondary School, Head of Science Teachers Committee in Buca-Izmir and Vice President of Science Teachers Association in Turkey. Here is what he had to say:

"I learned about necessary methods and techniques related to inquiry based science education 6 years ago. As an active science teacher, I am still using effective teaching and learning approaches such as multiple intelligences theory and its implementations in my classrooms. I strongly believe that these methods increase pupils' interest and motivation dramatically.

It is clear from my observations in my inquiry learning classroom that through inquiry, pupils have more opportunities to discover the world and to construct their own science concepts without getting extra help from teachers. Inquiry learning helps to integrate previous concepts with new ones and develop science process skills. Pupils who have learned through inquiry are more successful in their academic development and more interested in conducting scientific research to find solutions to socio-scientific issues.

However, it should be taken into consideration that inquiry learning takes more time than rote learning and that time management is a very important aspect to consider for teachers when using IBSE- and RRI-based materials in the classroom. More teacher trainings and professional development seminars are needed for teachers to fully understand the meaning of RRI and IBSE. In addition to the time constraints, the current science curriculum also makes it difficult to implement IBSE teaching and learning modules.

I strongly believe that the Ark of Inquiry project and its platform with inquiry learning materials will provide more opportunities to science teachers and their students to enhance and extend the quality of science education."

The Ark of Inquiry project aims to raise youth awareness to Responsible Research and Innovation (RRI) and to build a society skilled in RRI and related scientific communication. It will provide young European citizens (7 to 18 year olds) with a pool of activities to improve their inquiry skills, increase their awareness and understanding of conducting 'real' science, and prepare them to participate in different roles in the European research and innovation process.

To this aim the project will:

- develop a framework for identifying inquiry activities that promote pupils' awareness of RRI;
- collect existing inquiry activities and environments from various national and international projects;
- make activities available across Europe through the Ark of Inquiry platform (implement the inquiry activities on a large-scale across a European school network such as the UNESCO Associated Schools Programme Network (ASPnet) so to bring together learners, and supporters (teachers, science and teacher education students, and staff of universities and science centres). During the project it is expected that at least 20 000 students will participate in the Ark of Inquiry.
- train at least 1,000 teachers to support pupils' inquiry activities in a manner that attracts pupils' interest and motivation towards RRI.

**Where to find Ark of Inquiry? Visit our website!**

## News from the field

### Ark of Inquiry teacher trainings kicked off in Estonia

63 Estonian teachers and staff of science centres and museums participated in the first Ark of Inquiry teacher training sessions in Estonia, held on 21—22 October 2016 and 23—24 November 2016. The overall aim of the course was to introduce inquiry learning and to encourage educators to implement inquiry learning in their everyday work. As a practical outcome of the course, we expected the teachers to create their own inquiry activities which suit their specific needs and target groups.

The participants had a very diverse background, but most of them had solid previous work experience as educators and more than 77% of the participants had previous experience with inquiry learning. During the first day, the teachers got acquainted with the inquiry cycle model and experienced inquiry as learners. Based on previous experience with Estonian teachers, we know that they find Go-Lab inquiry learning spaces (ILSs) very useful for inquiry learning, so we decided to dedicate the whole second day to introducing the possibilities offered by the Go-Lab Portal and Graasp environment. The teachers became familiar with the different online labs, apps and various tools that could be used in their own inquiry activities which they will create at the end of this course. Then, the teachers got acquainted with the ILSs through a series of hands-on activities in the computer lab. In the afternoon, the teachers were grouped according to their teaching level (primary, middle, secondary, vocational schools and science centres and museums) and the groups drafted a simple inquiry activity. At the end of the day, the teachers presented their inquiry activities and got feedback from each other. The last point on the agenda was a visit to AHHA Science Centre where the teachers participated in a hands-on activity based on the inquiry cycle in the laboratory.

The teachers were very happy with the training and felt motivated to start implementing inquiry in their classrooms. We will meet those 63 participants again in December 2016 and January 2017 when they will share their experience with implementing inquiry learning in their everyday work and reflect on their work so far. As a preparation for the last part of the course, the teachers will also participate in a Moodle course where they will be introduced to the Ark of Inquiry web-based platform and the concept of RRI.

The next training groups begin in January and March. We hope to train more than 80 educators in inquiry in Estonia. We also hope the teachers become inquiry ambassadors and share their knowledge of inquiry learning with their peers and colleagues who could not participate in the trainings.



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## Where to find Ark of Inquiry? Visit our website!

### Ark of Inquiry was introduced during a national conference in Greece

On 4–6 November 2016 Ellinogermaniki Agogi (EA) organized a national conference with the aim to introduce and discuss the notion of “Open School”. An “Open School” is a school that effectively introduces and implements educational innovations and is an engaging learning and teaching environment that brings together not only the pupils and teachers but also families, community groups, local businesses, experts, universities, and others into an innovation ecosystem.

More than 150 educators from all over Greece participated in the three-day conference that offered a series of lectures, workshops and keynote speeches. In this context EA held a workshop on the Ark of Inquiry project on Saturday for 25 educators. Teachers had the chance to learn about RRI and to explore the Ark of Inquiry portal and the available resources for teachers.



### First impressions from trainings in the Netherlands

The first training in the Netherlands took place this autumn. 8 teachers from primary and secondary education and senior students participated in the training sessions. The Water Museum in Arnhem is the partner in this training session for the region Arnhem/Nijmegen, so the first training module took place in the museum. The participants were introduced to the concept of inquiry learning, followed by several hands-on inquiry activities in the museum. The participants experimented with a topographical map of the Netherlands, which showed the differences in height in the Dutch landscape. They added water to this 3D model to investigate questions such as: What would be the effects of a rising sea-level? Which parts would be flooded when the level rises two meters, etc.? The participants were also challenged to make the Dutch flag (red-white- and blue) with several liquids such as water, oil and methanol and dyes in a test tube.

One week later the participants met again in the teacher training institute of HAN for the second module. In this module they learned how to work with the Ark of Inquiry platform and the teachers’ toolbox, preparing themselves for the implementation of the Ark of Inquiry tools in their classes. In addition, they participated in another hands-on assignment, derived from the Ark of Inquiry platform, where the participants had to build a vehicle that would be able to move propelled by the wind (which was generated by a small table fan in our classroom). Our participants became very competitive during the activity and were eager to build a wind-vehicle that would be the quickest.

Then, after a few weeks, the third module took place. The teachers learned how to work with the pedagogical scenarios. We especially focused on an elaborated Responsible Research & Innovation scenario and implemented a practicum with mealworms to confront our participants with questions such as: Would insects become a proper substitute for eating meat? The teachers told us they had become aware that RRI is applicable in so many aspects of everyday life.

In the last training module, we used scenarios 4 and 5 together with the SIL framework to help the participant teachers to redesign a tasting practicum regarding the overall proficiency levels (novice, basic, advanced). The framework of the three levels helped teachers to think about more challenging introductions, how to guide formulating a hypothesis and so on. The teachers highly appreciated this hands-on redesigning activity. As one of the participants told us, “The model showed me that there are many possibilities to differentiate in inquiry learning, and that was what I was looking for”. We concluded the last module with reflection on our experiences during all the modules, and the teachers shared their impressions, successes and potential pitfalls regarding the Ark of Inquiry project.



## Where to find Ark of Inquiry? Visit our website!

### Two Ark of Inquiry workshops were held in Austria: Educational Resources for responsible research in MINT subjects

First of the two Austrian Ark of Inquiry workshops that was organized by BMB this autumn was held on 20 October 2016 during the "eLearning Experts Conference" in Eisenstadt.

The nationwide conference, which was held for the 13th time this year, has become a regular and well-known training and networking event in information and communication technology for teachers of all types of schools. More than 400 participants had come to learn more about the implementation of the digital revolution in education in workshops. The Ark of Inquiry workshop held during this conference focused on the topic "Educational resources for responsible research in MINT subjects" and led the participants through the following programme points:

- Ark of Inquiry project overview
- What do we mean by RRI - responsible research?
- The educational model of research learning in Ark of Inquiry
- Digital examples of responsible research (RRI)
- RRI with Raspberry Pi

Finally, the Ark of Inquiry project website as well as the portal and the Austrian Ark of Inquiry platform were presented and were well received by all participants.

The second workshop "Device development with the Raspberry Pi in the classroom: sensors and actuators" was held on 29 November 2016. During this workshop, the participants were introduced to Raspberry Pi, a powerful but affordable minicomputer, which was developed specifically for educational purposes. The main advantage of Raspberry Pi is the open electronic interface with 40 open connectors and the possibility to connect different sensors and actuators, which opens up countless possibilities for practical instruction in MINT subjects and for interdisciplinary teaching.

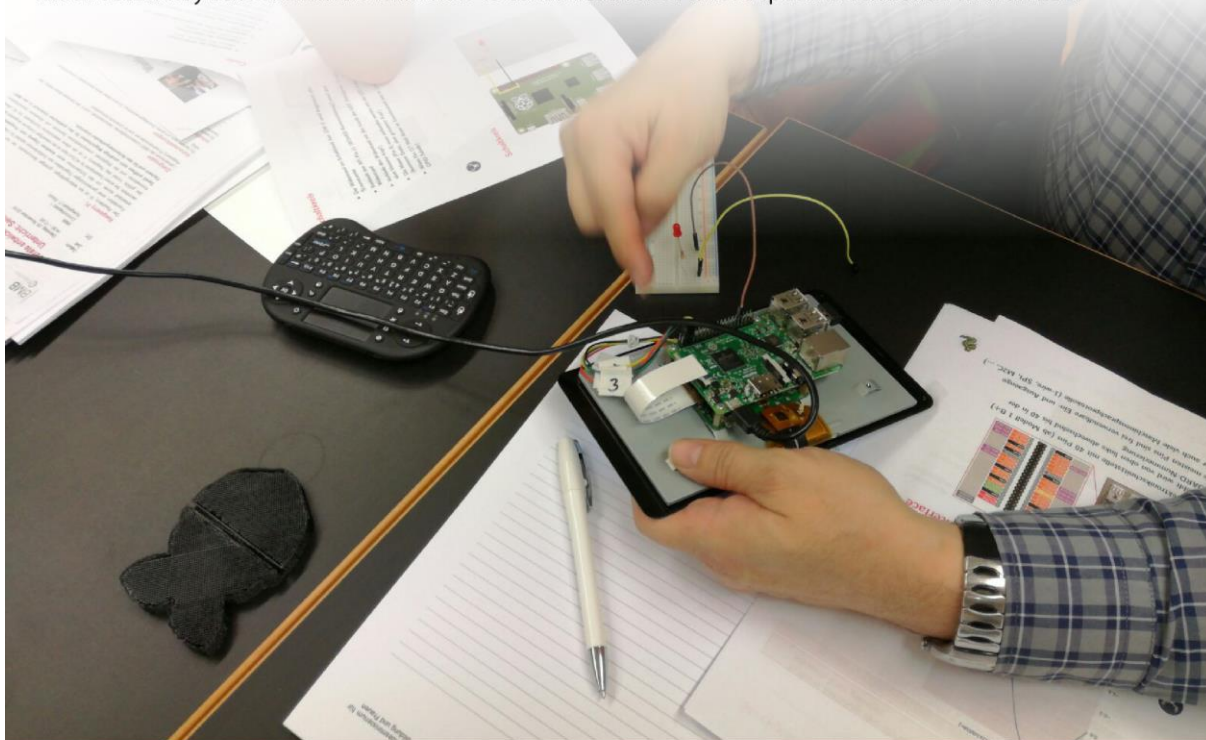


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## Where to find Ark of Inquiry? Visit our website!

The main aims of this Ark of Inquiry training workshop were to demonstrate the Raspberry Pi concept, the diverse components of the Raspberry Pi computer and its application possibilities in class. During the workshop, the participants could try out simple exercises: switching on LEDs, using motors, sensors, radio receivers and touch screens and smartphone remote controls. In addition, the participants were involved in creating a guide for the use of Raspberry Pi in class. Lastly, the participants familiarized themselves with the inquiry cycle model used in Ark of Inquiry and its RRI concept.

In 2017, BMB will organize a follow-up workshop called "Mindbot: a Raspberry Pi robot with thought control", in which secondary school teachers learn how to construct a robot whose speed is controlled with an EEG.



### Trainings and other project-related events took place in France

Several training sessions for French teachers (3 and 7 November 2016) and for pupils (11 October and 9 November 2016) were held in autumn near Paris and in Nîmes and Montpellier, during which the project and the collection of inquiry activities in the platform were introduced to teachers and the pupils could participate in hands-on inquiry activities on forensic DNA testing. The sessions with the pupils were organized in cooperation with the teacher Angélique Daum from the Lycée Daudet school in Nîmes and Christian Siatka (the DNA School of Nîmes). The teachers were happy to see that there are a lot of activities in the platform which are ready to be used in the classroom. The pupils were excited to analyse unknown DNA samples from a crime scene and compare their results with a reference DNA. It was regarded as an excellent approach to illustrate all the concepts of RRI to the pupils.

In addition to training sessions, Stephan Theulier from EADN presented the Ark of Inquiry project and the project activities during the national biology and geology teacher days held in Paris (18—19 November 2016) to 200 teachers all over France and performed some activities on a stand.



Where to find Ark of Inquiry? Visit our website!

## Teacher feature from Italy



Italian teachers have shared with us their experiences with the project. Here is what they had to say.

### Elisa, teacher: teamwork to reach all pupils

Teacher Elisa Puttin at the Istituto Comprensivo G. Ponti, Trebaseleghe (Padua) taught a lesson on atoms called “Build an Atom” in her class of 12–14-year-old pupils. She invited the English teacher at the school to collaborate in teaching the lesson. She commented that “the activity was very successful... It took longer than expected, of course I have a class of 26 pupils and 3 of them with special needs (they enjoyed the project).” So, with her ability to involve the pupils and adapt the lesson expectations and with the support of the pedagogical scenarios provided through the Ark of Inquiry project, the lesson was successfully concluded by a team of dedicated educators.



### Katia and Maria Luisa, teachers: effective grouping to increase communication

Katia Bottazzo and Maria Luisa Bianchi, teachers at the Istituto “A. Scotton”, Breganze (Vicenza) implemented with their pupils (aged 15–16) an activity entitled “Which soap is the best?” The teachers commented, “Our pupils have participated in this activity with great enthusiasm after having understood what they were asked to do.” Therefore, after some initial guidance, the pupils could complete the rest of the steps on their own. The pupils then reported their success in the activity as a group. Both teachers noted the following about the activity: “It was very successful... at the end of the project they [the pupils] spontaneously started to communicate between the groups to compare their main findings.” Katia and Maria Luisa said that they would like to use the same activity again next year, but with improvements focused on even more efficient in-class discussions.



### Katia and Maria Luisa, teachers: effective grouping to increase communication

Laura Biondi and Sara Passaler teach at the Istituto Caio Giulio Cesare, Mestre (Venice). They worked together to teach “Estimating the density of an endangered plant species in a named ecosystem” in their class of 12–13-year-olds. The lesson took place at the Natural History Museum in Venice, within the Project LIFE VIMINE and with support from their school’s ICT teacher, Franco Torcellan. Pupils were also able to go outside and work with other scientific experts for part of this activity. Laura noted that pupils “had the possibility to meet the LIFE VIMINE project operators and to learn about the method(s) they use to protect sandbank from erosion. Questions were asked and options were promoted”. The teachers mentioned that this ability to engage with their community and recognize their role in the protection of an endangered plant species improved pupils’ ability to make connections between knowledge and practice. Laura noted that “pupils realized how important it is to involve the community to maintain the ecosystem.” As a result, a successful lesson was carried out in a large class thanks to these teachers’ professionalism and commitment to teaching their pupils responsible research skills.

## Where to find Ark of Inquiry? Visit our website!

### Inquiry activities: activities that support sustainability

As many of you may have noticed, the Ark of Inquiry portal is now available to everyone at [arkportal.eu](http://arkportal.eu). The portal features an ever-growing collection of inquiry activities in different languages and domains. In our previous newsletters, we have brought to you a selection of inquiry activities with a strong RRI focus or those suggested by our pilot teachers. In the last issue, we presented to you a selection of activities that help to engage all learners with inquiry-based science. In this issue, we have decided to focus on activities that support teaching and learning about sustainability.

#### Harvesting the wind

Wind is a sustainable energy source which will always be available, just like solar energy, water power or biomass. Compared to oil and natural gas, it does not pose a threat to people or the environment. In this inquiry activity pupils will examine the ecologically sustainable benefits of wind technology. Pupils will understand the functioning principle of a wind turbine as well as the impact of fossil fuels and the benefits of renewable energy.

#### How does a sustainable lifestyle look like?

This activity is available in German and is developed as an online tool. This online tool features an educational game that fosters sustainable behaviour. The KonsuManiac tool allows pupils to catch a glimpse of the actual impact of their shopping. The pupils fictitiously shop at various shops: grocery, clothes shop, pharmacy and hardware store. At the end of the "shopping spree" the pupils finally see how sustainable or not sustainable shopping really is.

#### Everyday CO2 emissions footprint – My way to school

This activity is available in Finnish. In this activity pupils will determine how much CO2 their everyday transportation to school produces. Every pupil records the distance from home to school and the time it takes to cover the distance. If different means of transport are used, each type is recorded separately. Based on these recordings, the combined CO2 emissions are calculated for the entire class. The obtained results and suggestions on how to reduce CO2 emissions are shared with pupils' parents at parents meetings or family events.

#### What does our home produce?

In this activity pupils learn how they can reduce their use of water and energy at home. By the end of this activity pupils will have considered how they can reduce their water and energy consumption and what can be produced at home. This raises pupils' awareness of the use of limited resources and possible solutions at home.

### Upcoming events

**Christian Siatka, General Manager of Ecole de l'ADN (EADN), will represent the project during a national seminar in biology in the presence of the General Inspectors of National Education in France at the Ministry of National Education in France (14–15 March 2017).**

EADN will present the activities that have been developed by EADN and that have been included in the Ark of Inquiry platform.

### In the next newsletter:

- Find out more about the Ark of Inquiry platform and activities inhabiting it;
- see what was done in Ark of Inquiry during the winter months;
- and find out what events are worth looking forward to in spring.

Dear Subscriber, we wish you all the best and hope to see you again soon!



contact us at: [arkofinquiry@gmail.com](mailto:arkofinquiry@gmail.com)



# Appendix 4: Community Update in Austria, June 2016



Ark of Inquiry  
Teilhabe an Forschung im Unterricht vermitteln



## Ark of Inquiry – Community Update Juni 2016

### Einleitung

Das EU-Projekt Ark of Inquiry hat sich zum Ziel gesetzt, das Bewusstsein der Heranwachsenden in Europa für einen verantwortungsvollen Umgang mit Forschung und Innovation zu stärken. Dafür wird für Schüler/innen aller Altersgruppen (7-18 Jahre) ein Pool an motivierenden Lernaktivitäten verfügbar gemacht, die einerseits die Schüler/innen an das „wirkliche“ Forschen heranführen und die sie gleichzeitig auf ihre aktive und verantwortungsvolle Rolle bei der Gestaltung von Forschung für Ihre Zukunft vorbereiten sollen. Lehrer/innen lernen didaktische Werkzeuge und digitale Unterrichtsmaterialien kennen, um ihre Schüler/innen mit den Konzepten des Forschenden Lernens und des verantwortungsvollen Umgangs mit Forschung vertraut machen zu können. Im Unterricht sollen Schüler/innen schließlich selbst die Rolle des/der Forschers/in übernehmen, Experimente durchführen und ihre Erkenntnisse präsentieren.

### Was bisher geschah

Am 11.03.2015 fand unser erstes nationales Treffen im BMBWF zum Kennenlernen des Aoi-Projektes und zum Austausch von Erfahrungen im Unterricht und in Initiativen aus Österreich statt. Präsentiert wurden damals Projekte, die sich mit dem Experimentieren in der Volksschule und der Förderung von Mädchen in naturwissenschaftlichen Fächern befassen, weiters wurden mobile Science Center und Unterrichtsmaterialien zum Thema Umweltbildung und Nachhaltigkeit vorgestellt und diskutiert.

Im November 2015 haben wir das Ark of Inquiry Projekt und unsere Pläne für die Umsetzung in Österreich auf dem World Science Forum in Budapest (<http://www.sciforum.hu>) präsentiert.

Beim zweiten nationalen Ark of Inquiry Meeting am 01.12.2015 stellten wir erste Unterrichtsmaterialien aus dem Projekt, die das Forschende Lernen im Sachunterricht und in der Sekundarstufe I nach dem Zyklus des Forschenden Lernens des Aoi-Projektes ermöglichen, vor. Wir gaben einen Einblick wie verantwortungsvolles Forschen (RRI) im Unterricht eingebracht werden kann und haben verschiedene didaktische Werkzeuge ausprobiert, um kontroversielle naturwissenschaftliche Themen in der Schule sowie in der Fortbildung mit Lehrkräften zu debattieren.

Als Ergebnis unseres Meetings haben einige Schulen, wie z.B. die Volksschule Gutenberg die Aktivität „Die Wissenschaft des Eierschalens“ im Unterricht ausprobiert und uns wertvolle Rückmeldungen geschickt.

Die Lehrerfortbildung „Explodierende Schwedenbomben und Zitronen mit Schwimmwesten“ für Volksschullehrer/innen steht ganz im Zeichen des Forschenden Lernens in der Primarstufe. Im Sommersemester 2016 wurde sie an der PH Wien um den Aspekt des RRI – angepasst an die Altersgruppe mit dem Fokus auf „Bildung für nachhaltige Entwicklung“ - erweitert. Dafür wurde auch eine entsprechende Lernaktivität „Alles rund ums Brot“ entwickelt und in Volksschulen getestet.

Alle Infos zu Ark of Inquiry Events in Österreich findet ihr auf unserem Ark of Inquiry – Community Moodle (Als Gast anmelden): <http://www2.lernplattform.schule.at/vis/course/view.php?id=51>

## Was gibt es Neues

Wir haben einige neue, spannende Unterrichtsmaterialien für Österreich adaptiert und entwickelt:

- Die Bienenforscher/innen (Sek I)
- Die Wissenschaft des Eierschälens (Sek I)
- Nano und Zukunft des Essens (Englisch, Übersetzung in Arbeit, Sek I und II)
- Kompostierung – der Kreislauf der Natur (Sek I)
- Forschungsprojekt – Ernährungstrends und Ernährungsverhalten (Sek II)
- Bildung für nachhaltige Entwicklung „Projekt Brot – Alles rund ums Brot“ (VS)
- Alle Unterrichtsmaterialien zum forschenden Lernen im Sachunterricht aus dem Projekt Pri-Sci-Net (VS)

Alle Unterrichtsmaterialien sind frei (Als Gast anmelden) zugänglich über unsere Ark of Inquiry –  
Unterrichtsmaterialien Moodle-Seite zugänglich:

<http://www2.lernplattform.schule.at/vis/course/view.php?id=57>

Wir haben ein playDecide Spiel weiterentwickelt, das als didaktisches Werkzeug zur Unterstützung von Meinungsbildung und Partizipation bei kontroversiellen, gesellschaftspolitischen Fragestellungen im Unterricht eingesetzt werden kann. Anschließend haben wir das Diskussionsspiel „Digitales Leben“ mit viel Spaß und Erfolg in der NMS am Bildungscampus Sonnwendviertel im April 2016 mit den Schüler/innen der 2e getestet. Die Ergebnisse der Veranstaltung sind auf unserem Community-Moodle: <http://www2.lernplattform.schule.at/vis/course/view.php?id=51> und auf der offiziellen playDecide Webseite: [http://www.playdecide.eu/view\\_the\\_results/events/166876](http://www.playdecide.eu/view_the_results/events/166876) dargestellt.

Seit Ende Mai 2016 ist die Ark of Inquiry Plattform Online. Sie bietet allen Interessierten freien Zugang zu Unterrichtsmaterialien für die Altersstufen 6-18, die Forschendes Lernen und verantwortungsvolles Forschen vermitteln. Im Vordergrund steht die intuitive, einfache Nutzung der Plattform. Wir laden alle ein, sich selbst ein Bild von den Materialien zu machen, in dem sie sich in der Plattform registrieren (Registrierung erfolgt direkt in wenigen Schritten).

Schaut euch die Unterrichtsmaterialien auf: <http://arkportal.ut.ee/> an und tretet der Community bei!



Teacher's toolbox



Inquiry activities



Community




My inquiry passport

### Was wir planen

Unser nächstes Ark of Inquiry Community-Building Meeting veranstalten wir im Herbst 2016. Es wird ganz im Zeichen des verantwortungsvollen Forschens (RRI) im Unterricht stehen. Forschung wird als ganzheitliches, transparentes Konzept vermittelt – von der Entwicklung der Idee, der Auswahl von Technologien, der Berücksichtigung gesellschaftlicher, ethischer und ökologischer Chancen und Risiken, der Formulierung von untersuchbaren Fragestellungen, der Erforschung von naturwissenschaftlichen Prozessen, der Interpretation der Ergebnisse bis zur kritischen Auseinandersetzung damit, wie die gewonnenen Erkenntnisse zur Lösung der großen gesellschaftlichen Herausforderungen verwendet werden. Wir freuen uns, euch bei diesem Treffen unser Konzept für einen modularen blended-learning Kurs zum Thema „Partizipation und Forschung im Unterricht“ vorzustellen.

Ab Herbst bieten wir interessierten Schulen Workshops zur Bewusstseinsbildung im Umgang mit sozialen Medien an. Ein erster Workshop findet mit dem playDecide Spiel „Digitales Leben“ findet in der NMS Glaser gasse in Wien statt. Wir freuen uns schon auf viele spannende Diskussionen mit den Schüler/innen!

Ab Herbst planen wir auch wieder Veranstaltungen um Experimente mit dem Raspberry Pi  im Informatik- und naturwissenschaftlichen Unterricht umzusetzen.

**Wir wünschen allen einen schönen Sommer und freuen uns auf ein Wiedersehen  
und auf einen angeregten Austausch im Herbst!**

**Monika & Marion**

## Appendix 5: List of partner website addresses where project is promoted

Beneficiary short name	Web address where the Ark of Inquiry project is currently promoted on the partner website	Language(s)
UT	<a href="http://haridustehnologia.ut.ee/">http://haridustehnologia.ut.ee/</a>	Estonian, English
EA	<a href="http://www.ea.gr/ea/main.asp?id=602&amp;proID=20100108133311&amp;lag=en">http://www.ea.gr/ea/main.asp?id=602&amp;proID=20100108133311&amp;lag=en</a>	English
UTU	<a href="http://www.utu.fi/en/units/edu/research/highlights/flagshipresearchprojects/Ark-of-Inquiry/Pages/home.aspx">http://www.utu.fi/en/units/edu/research/highlights/flagshipresearchprojects/Ark-of-Inquiry/Pages/home.aspx</a>	English, Finnish
UCY	<a href="http://www.ucy.ac.cy/resciteg/en/research/research-programmes">http://www.ucy.ac.cy/resciteg/en/research/research-programmes</a>	English, Greek
UNESCO	<a href="http://www.unesco.org/new/en/venice/resources-services/host-facilities/special-events/ark-of-inquiry/">http://www.unesco.org/new/en/venice/resources-services/host-facilities/special-events/ark-of-inquiry/</a>	English
HAN	<a href="http://www.han.nl/onderzoek/werkveld/projecten/ark-of-inquiry/">http://www.han.nl/onderzoek/werkveld/projecten/ark-of-inquiry/</a>	Dutch
BMB	<a href="http://virtuelleschule.bmbf.gv.at/projekte-international/eu-projekte-aktuell/ark-of-inquiry">http://virtuelleschule.bmbf.gv.at/projekte-international/eu-projekte-aktuell/ark-of-inquiry</a> <a href="https://education.at/">https://education.at/</a> <a href="http://www2.lernplattform.schule.at/vis/course/view.php?id=51">http://www2.lernplattform.schule.at/vis/course/view.php?id=51</a>	German
UBER	<a href="http://www.tiemann-education.de/forschung/ark-of-inquiry/">http://www.tiemann-education.de/forschung/ark-of-inquiry/</a>	English
BEKAS	<a href="http://www.bekas-aoi.org/">http://www.bekas-aoi.org/</a>	Turkish
EADN	<a href="http://www.ecole-adn.fr/?page_id=991">http://www.ecole-adn.fr/?page_id=991</a>	French
UCLL	<a href="http://www.vakdidactiek.be/ark_of_inquiry">http://www.vakdidactiek.be/ark_of_inquiry</a>	Dutch
HRTA	<a href="http://www.kuttanar.hu/ark-inquiry-0">http://www.kuttanar.hu/ark-inquiry-0</a>	Hungarian
AHHA	<a href="http://www.ahha.ee/meist/ahha-projektid/uuringulaegas-ark-of-inquiry">http://www.ahha.ee/meist/ahha-projektid/uuringulaegas-ark-of-inquiry</a>	Estonian



# Appendix 6: Concept note for project's final conference



## Concept note for Final Conference

Proposed timeframe: 30 October-14 November 2017 (during 39<sup>th</sup> UNESCO General Conference)

### Background:

"Ark of Inquiry:" (<http://www.arkofinquiry.eu/homepage>) is an EU-funded coordination project dedicated to the creation of a "new science classroom". This interdisciplinary project officially involves 12 UNESCO Member States (Austria, Belgium, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Republic of Cyprus, The Netherlands, and Turkey) and is currently expanding in now, its fourth and final year, into Member States of Southeast Europe (i.e. Albania, Bosnia and Hercegovina, Croatia, Serbia, tbc). The main aim of the project is to train science teachers in how to apply inquiry-based science education (IBSE) in their classroom through the provision of tools and trainings, including an online platform (<http://arkportal.ut.ee/#/>) that currently hosts over 500 vetted, successful inquiry activities for them to use in all areas of science and for all ages (7-18). Through its emphasis on promoting Responsible Research and Innovation (RRI) through the activities, the project also has a special focus on engaging girls in the science classroom.

From the DOW, Task 7.4: "UNESCO Regional Bureau also organizes a final conference of the project **highlighting the role of innovation in inquiry based science education (IBSE) and in particular the contribution of the Ark of inquiry project for youth in this field of education. The conference will be a venue to connect teachers with scientists and policy makers on this issue to further develop cognitive learning in science and foresee further advancement in science education in Europe. The conference will inform national stakeholders on the final output of the Ark of Inquiry project and on the evidence of its utility according to the experimentation and the collected narratives from several schools and teachers including UNESCO affiliated schools in South East Europe.**"

### Purpose of event:

- Present recommendations and guidelines document (D7.6) at **official side event during the SC Commission at the UNESCO General Conference**
- Lobby for policy-level change to high-level participants
- Offer validation of project success via participating teachers that the project has helped them
- Foster interface between teachers, scientists, and policy-makers

### Length of overall event: 3 days in total

- whole day final conference** followed by an evening **SIDE EVENT / RECEPTION** that launches the project's recommendations and guidelines and offers fun, hands-on inquiry activity for General Conference and final conference participants
- Next 1½ days used for **final consortium meeting**
- Also explore doing **poster session** ongoing for a few days/week/whole General Conference that shows the work done in each of the 12+ participating countries

**Participating Countries:** Austria, Belgium, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Republic of Cyprus, The Netherlands, and Turkey (plus some Southeastern European countries, tbd). Permanent delegations at UNESCO will be invited to attend the conference.

**Participants in final conference:** Around 100+ in total

- ~ 40-60 participants (3-5 from each of the 12 countries participating in the project)
- ~ 20-25 consortium members
- 4-5 UNESCO HQ staff
- 8 Advisory team + 3 project reviewers
- UNESCO Permanent delegations
- EC project officer
- Other EU projects – to be identified
- Keynote speaker(s)

**Structure of Conference itself:** (only ONE initial proposal for planning purposes, to be refined...)

Timing	Item
8:30	Registration
9:00	Opening with ADGs, Minister of Education (FR?), EU project officer?
9:30	Keynote speaker on role of innovation/RRI in IBSE
10:00	Presentation of project objectives, rationale and accomplishments, including platform (briefly)
10:30	Coffee break
11:00	10m Teacher testimonials from 12 countries
13:00	LUNCH
14:00	High level panel discussion – interface between scientists, teachers, policy-makers
15:30	Coffee break
16:00	Presentation of other related EU projects and platforms
17:00	Presentation of Recommendations and Guidelines document
17:30	Concluding remarks and invitation to reception
18:00	Evening reception, opening by ADGs
18:30	Live demonstration of inquiry activity with pupils
19:00	Reception with good food, wine, etc.

**Budget:** Estimated 31,500 EUR (UNESCO Regional Bureau to contribute EUR 15,000 plus in-kind contribution; Ark of Inquiry project partners share some costs. No funding from HQ required but welcome.)

**Contact persons:**

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## Appendix 7: UNESCO Institutes, Centres and Chairs

The following UNESCO Institutes, Centres and Chairs have been pre-selected from a list of nearly 150 of those involved in Science and/or Education. These remaining 12 represent a more targeted group from which to consider partnership and/or collaboration.

1. [UNESCO International Institute for Educational Planning](#), Paris, France
2. [International Bureau of Education](#), Geneva, Switzerland
3. [International Centre for Technical and Vocational Education and Training \(UNEVOC\)](#), Bonn, Germany
4. South Asian Centre for Teacher Development, Meepe, Sri Lanka
5. [Regional Centre for Educational Planning \(RCEP\)](#), Sharjah, United Arab Emirates
6. [Aalborg Centre for Problem-Based Learning in Engineering Science and Sustainability](#), Aalborg, Denmark
7. [African Union - International Centre for Girls' and Women's Education in Africa \(CIEFFA\)](#), Ouagadougou, Burkina Faso
8. [UNESCO Chair in Reorienting Teacher Education towards Sustainability \(430\)](#), York University, Canada
9. UNESCO Chair in Science Education with Emphasis on Natural Sciences (919), Belarusian State University, Minsk, Belarus
10. [UNESCO Chair for Science, Technology and Engineering Education \(891\)](#), AGH University of Sciences and Technology, Krakow, Poland
11. [UNESCO Chair in Environmental Education \(239\)](#), UNED- Universidad Nacional de Educación a Distancia, Madrid, Spain
12. [UNESCO Chair on Gender Equality and Women's Empowerment \(864\)](#), University of Cyprus, Nicosia, Cyprus