



# eCraft2Learn

Digital Fabrication and Maker Movement in Education  
Making Computer – supported Artefacts from Scratch

## Deliverable D6.4

### eCraft2Learn Event Video Report



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## EXECUTIVE SUMMARY

In order to showcase the results from the projects, which were carried out by the students during the pilot stages, two eCraft2Learn events were held, one in Greece, as part of the annual Athens Science Festival and one in Finland, as part of the annual Science Festival held in Joensuu. These two events are described in this report. Video recorded material featuring stories and facts about the events and the people that participated is also presented in this report. The two events enabled students and teachers as well as the project consortium to present the project results and to promote the eCraft2Learn initiative to the general audience.

## 1 INTRODUCTION

“Sharing what you have made and what you know about making with others is the method by which a maker’s feeling of wholeness is achieved. You cannot make and not share”

(Maker Movement manifesto, p.14-15).

Embracing the idea that is documented in the Maker Movement manifesto (Hatch, 2014) about the interconnection among sharing and making, two well attending events were held in Greece and Finland where the students encouraged to take an active in presenting their projects (the computer-supported artefacts that had created) to the general public, elaborating on their making decisions, explaining the process that was followed, engaging visitors in hands-on practices (circuitry, visual programming, crafting) and interacting with people of all ages and from varying scientific and professional backgrounds.

This report describes the two eCraft2Learn events that were held in Athens as part of the Athens Science Festival and in Joensuu as part of the SciFest festival. The activities that took place in the eCraft2Learn events in Greece and Finland included discussions on the eCraft2Learn initiative and methodology, hands-on experimentations with the eCraft2Learn tools and technologies, real time presentations by the participating students, an introduction to emerging (by that time) findings of the project to interested individuals, training workshops as well as the video recording of the comments and the feedback from the participants, namely students, teachers and visitors (Section 4, Table 5).

**Sections 2 and 3** focus on the description of the eCraft2Learn events in Greece and Finland that were organised as part of the Athens Science Festival 2018 and SciFest 2018, respectively. The context of the festivals is described together with important information about the organization of the events, the activities that took place, and the participating people.

**Section 4** provides access to real episodes that were video-recorded during the festivals. These videos reconstruct the atmosphere in the festivals and feature facts and stories about the events and the people that participated. The students’ interaction with the audience of the festival is showcased. The comments raised by the participating students, teachers and visitors are also highlighted. **Section 5** then presents the conclusions and remarks, summarising the experiences gained in the two eCraft2Learn events in Greece and Finland.

### Connections with other tasks and work packages within eCraft2Learn

Focusing on **project implementation**, it is worth mentioning, that the work described in this video report informed and assisted other project tasks and work packages within eCraft2Learn. More precisely, the video recordings that were pursued for the needs of this video report were an important source of feedback that was analysed and documented in D5.4 (WP5) significantly contributing on the impact measurement on participating teachers and students. The video recordings are also used for supporting the validation of claims (D5.6) especially when it comes to the development of collaborative and team working skills. Last, the videos that have been developed (Section 4) are in a form that can be directly disseminated, thus inspiring more teachers to offer their students opportunities to share their ideas, accomplishments and struggles with others in the context of well attending events and beyond. The video recordings can act as an inspiration but also as proof that *‘it can be done and is an added-value practice’*. As that, the produced videos can be used as Open Educational Resources in future teacher training workshops keeping the eCraft2Learn initiative live and informing the project exploitation and sustainability (WP6).

### Key takeaways from the eCraft2Learn events for the teachers

- **Sharing matters in the eCraft2Learn ecosystem.** It is important to provide students with opportunities to share their ideas, accomplishments, experiences and struggles with each other. It is important to show them that they can build upon the experiences and results of others, and that others can learn from their own experiences and outcomes. Active participation and sharing in well attending events can be a way towards this direction.
- **Sharing with an authentic audience.** It is important to take students' work out of the four walls of the classroom and place it in the real world. When students share their learning with an authentic audience, they have the opportunity to share their story, reflect on their growth, and engage in real dialogue with others about their learning and their futures.
- **Display in public and authentic motivation.** The authentic motivation that students feel when they know that their work will be displayed in public is invaluable to continued student growth and can significantly contribute to the development of self-confidence and self-esteem.

In the following sections, the use of the word “teachers” refers to the teachers (formal teachers, informal teachers, educators) that participated in the capacity building workshops (D5.2), worked with the learners in the context of the small-scale pilot studies in formal and informal pilot sites in Greece and Finland (D5.5) and supported discreetly the students during the Athens Science Festival 2018 and SciFest 2018. The use of the word “visitors” refers to the people comprising the audience of the festivals that interacted with the eCraft2Learn groups. Young students, adults of varying professional and scientific backgrounds, expertise and ages comprised the audience of the festivals.

## 2 eCRAFT2LEARN EVENT AT ATHENS SCIENCE FESTIVAL 2018

The eCraft2Learn event in Greece was organised in Athens as part of the Athens Science Festival 2018<sup>1</sup>. The festival is devoted to Science and Innovation since 2014 and is an established cultural landmark in the field of Science, Technology, Innovation and Art in Greece. For over 5 days every spring, residents and schools in and around Attica region have the opportunity to explore scientific and technological advancements in a playful, innovative and interactive manner. At the same time, researchers, scientists, educators, and artists give their best to communicate science and create meaningful educational experiences.

Athens Science festival has brought together more than 5,000 scientific associates, 590 speakers, 250 artists and 1,400 volunteers. The festival is repeatedly justifying its social impact having reached out to more than 107,000 visitors over the past 5 years.

The festival aims at linking everyday life to science and highlights the important role of science and technology in the society; by presenting and demonstrating high quality scientific research conducted in Greek academic institutions, by providing dialogue platforms where we can explore insights to complex and controversial scientific issues, by inspiring and creating high standards in the field of science communication and by encouraging young people to consider a science related career. Last

<sup>1</sup> <http://www.athens-science-festival.gr/en/>

but not least, the Athens Science Festival has managed to continuously show to people of all backgrounds and age that science is not only about knowledge but can also be recreational and fun.

This fun, educational and engaging setting was considered ideal for the eCraft2Learn event. The eCraft2Learn event lasted 4 days, from April 26-29, 2018. The project consortium partners represented by Edumotiva and Technopolis participated in the event. In addition, the students and the teachers from both the formal and the informal Greek pilot sites took part in the event. The following table (Table 1) shows the activities that were carried out during the 4 days:

*Table 1: Information about the eCraft2Learn event in Athens Science Festival*

eCraft2Learn Event in Athens Science Festival 2018		
Description of the activities		
<b>26<sup>th</sup> of April 2018</b>	Project presentation by the eCraft2Learn consortium <b>10:00-13:00</b>	
<b>27<sup>th</sup> of April 2018</b>	Formal pilot group presentations in the interactive exhibition zone <b>10:00-14:00</b>	
<b>29<sup>th</sup> of April 2018</b>	Informal pilot group presentations in the interactive exhibition zone <b>11:00-18:00</b>	
<b>30<sup>th</sup> of April 2018</b>	Informal pilot group presentations in the interactive exhibition zone <b>11:00-18:00</b>	Training workshop with 20 adult participants <b>16:00-18:00</b>

The event started with the presentation of project objectives, activities and results by the consortium partners. While the project partners were providing information about the eCraft2Learn project, video recorded episodes taken during the pilots were being projected on the wall. This helped the visitors to better visualize the process that was followed by the piloting groups.

An integral part of the event was dedicated to students' presentations. More precisely, the students that participated in the pilots were invited to present their projects in public, to showcase their work and share their know-how and experiences with the visitors of the festival. The presentations took place in the interactive exhibition zone of the festival. It is estimated that more than 5000 people interacted with students' exhibits (computer supported artefacts) and were informed about the eCraft2Learn project.



*Figure 1: Students from the formal pilot site at the eCraft2Learn event in Athens Science Festival 2018*



*Figure 2: Students from the informal pilot site at the eCraft2Learn event in Athens Science Festival 2018*

The projects that were presented in the festival were the ones that had been developed in the pilot sessions (D5.5). The students were seen to present their projects to the general public with excitement engaging visitors in hands-on practices (mainly circuitry and visual programming), to explain how their artefacts work, to provide technical information, and interact with people of all ages and from varying scientific backgrounds as well as with other groups of students that participated in the festival either as exhibitors or visitors. The teachers supported discreetly the students. Moreover, they interacted with the visitors of the festival by providing information about the eCraft2Learn initiative, their roles and experiences.

The eCraft2Learn event was concluded with a training workshop with 20 adult participants (among which in-service and perspective teachers and several professionals with interest in making and digital fabricating). The idea underpinning this training workshop was to familiarize the participants with the eCraft2Learn methodology and basic tools. The workshop started with a short introductory speech about the eCraft2Learn initiative and the technological core and continued with hands-on practice in electrical circuit making and visual programming. The hands-on practice was placed in the context of a project, and more specifically in the context of the lighthouse project scenario (D5.5).



*Figure 3: The training workshop*



Figure 4: Practicing circuitry and visual programming in the training workshop

The activities that took place during the 4 days included also discussions on the eCraft2Learn initiative and methodology, hands-on experimentations with the eCraft2Learn tools and technologies, an introduction to emerging (by that time) findings of the project as well as the video recording of the comments and the feedback from the participants, namely students, teachers and visitors (Section 4, Table 5, *Athens Science Festival: Part A-C*).

It is estimated that more than 5000 visitors were informed about the eCraft2Learn initiative and engaged in the eCraft2Learn activities that were planned in the context of the event. More details about the number of the participants appear below (Table 2):

Table 2: Number of participants in the eCraft2Learn event in Athens Science Festival 2018

eCraft2Learn Event in Athens Science Festival 2018	
Participants	
Project consortium members	6
Participating teachers (both from the formal and the informal site)	15
Students (both from the formal and the informal site)	25
Estimated number of visitors in the festival	>30000
Estimated number of visitors engaged in the eCraft2Learn activities during the 4 days	>5000

### 3 eCRAFT2LEARN EVENT AT SCIFEST 2018

SciFest<sup>2</sup> is a yearly international festival located in Joensuu, Finland and organised by the Joensuu Science Society since 2007. In 2018, the event was held from 17th to 18th of May. During the festival visitors are discovering and learning about science, technology and environment when working in different workshops. Annually, visitors can experience and explore STEAM with hands-on activities in over 80 workshops organised by school groups, universities, vocational schools, NGOs, companies and other organisers. The workshops are inquiry-based and innovative allowing visitors to test, try out and gain understanding of various STEAM topics. Moreover, science is brought to children and youth in fun and engaging ways that boost creativity and problem solving. Alongside the workshops, there are science cafés, lectures with public speakers, teacher trainings, musical performances and a national robotics competition tournament presented in the SciFest event.

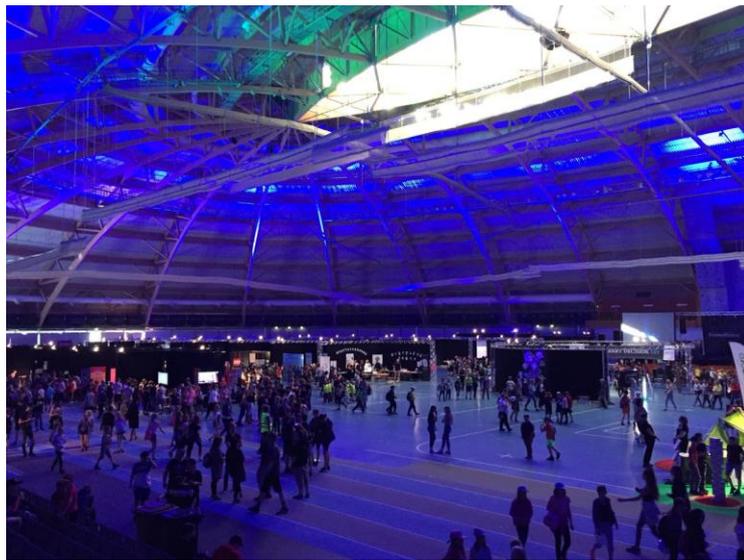


Figure 5: SciFest - the annual festival on Science, Technology and the Environment

The target groups of this science festival are primary, secondary and high school students, teachers and headmasters, though the event also attracts a general audience such as families and seniors. The event is free of charge as the aim is to provide open science available for everyone, to increase youth interest on science and technology, and to promote possible careers within these areas.

SciFest event is strongly oriented towards the future perspectives of society and aims to provide innovations for education as well as the future workforce challenges. Each year SciFest has a unique theme that forms the core of the event and many workshops are trying to identify challenges around this theme and/or provide solutions for these challenges. Previous years the themes had varied from chemistry and water to biodiversity and space. The theme for SciFest 2018 “*Science goes Arts*” was linked to the European Year of Cultural Heritage<sup>3</sup> 2018 and promoted the ‘A’ in the STEAM even more strongly. Each year SciFest gathers approximately 10,000 visitors to enjoy science and technology. In year 2018, over 9000 people from over 30 countries visited SciFest.

The main objectives of eCraft2Learn workshop at SciFest 2018 reflected the aims and theme of the festival in a great extent. In SciFest, a participant can learn and teach by either taking part in workshops or by carrying out a workshop during the event. This is why from the pilot students’ perspective the eCraft2Learn workshop provided opportunities for them to be teachers to other students visiting SciFest. The eCraft2Learn workshop consisted of multiple activities, all organised in the same

<sup>2</sup> [http://www.scifest.fi/home\\_en.php](http://www.scifest.fi/home_en.php)

<sup>3</sup> <http://www.kulttuuriperintovuosi2018.fi/en/>

interactive zone. One activity included the visitors' participation in a hands-on task: creating a fruit-based music instrument or creating a Picasso painting robot, both tasks in line with the SciFest 2018 theme "Science goes Arts". Researchers in the consortium led this activity, and it required the participating groups to register beforehand. In parallel, another activity included the students who had taken part in the formal project pilots presenting their work to students and teachers visitors as well as teaching the visitors the basics of electronics and programming throughout the day.



Figure 6: Students and teachers in the eCraft2Learn workshop zone

Table 3: Information about the eCraft2Learn event in SciFest Joensuu 2018

eCraft2Learn Event in SciFest Joensuu 2018		
Description of the activities		
<b>17<sup>th</sup> of May 2018</b>	eCraft2Learn workshop for student visitors <b>9:00-16:00</b>	Formal pilot group presentations in the interactive workshop zone <b>12:00-14:00</b>
<b>17<sup>th</sup> of May 2018</b>	eCraft2Learn workshop for student visitors <b>9:00-16:00</b>	Formal pilot group presentations in the interactive workshop zone <b>11:00-13:00</b>

During the hands-on activity led by the consortium researchers, student visitors were following the eCraft2Learn pedagogical framework for developing an artefact in one and a half hour. In the task, art and technology were combined in a unique and creative way. With the Picasso painting robot task, the aim was to create a tool that would allow a semi-assembled robot to paint, as well as to program the robot to create an art piece according to the program code. In the fruit-based music instrument task, students needed to create and programme a machine that played a variety of tunes by having fruits and vegetables as keys (i.e., sensors). At the end of the workshop students could compose and play their own melodies on the machine they have built. Both tasks could be adapted to all participants' levels, starting with the basics of electronics and progressing towards more challenging programming. The more challenging versions of these two tasks were to utilise artificial intelligence

as part of the artefact. Students learnt to use speech recognition blocks in Snap4Arduino that enabled interaction with their machines.

Both tasks gathered attention, though the fruit-based music instrument was slightly more popular among participants. The “fruit instrument” also engaged general visitors to approach and try it out; most of the visitors were fascinated by the fact that fruits could be used as sensors with their electrical conductivity features. The basic instructions for these two activities were presented in worksheets that guided participants’ work throughout the tasks and encouraged self-regulatory work. The project members were actively providing support whenever needed to help participants acquire knowledge about electronics and programming in just one and a half hours. A video of the participants working on their artefacts can be seen from the video playlist (Section 4, Table 5, SciFest: Part A).

Many visitor teachers (both from Finland and abroad) were inspired by students’ pilot project presentations and showed great interest in the eCraft2Learn project and methodology. They also collected the worksheets of the tasks that were carried out in the stand as the two tasks provided some possible ideas for the visitor teachers to develop their own eCraft2Learn projects.

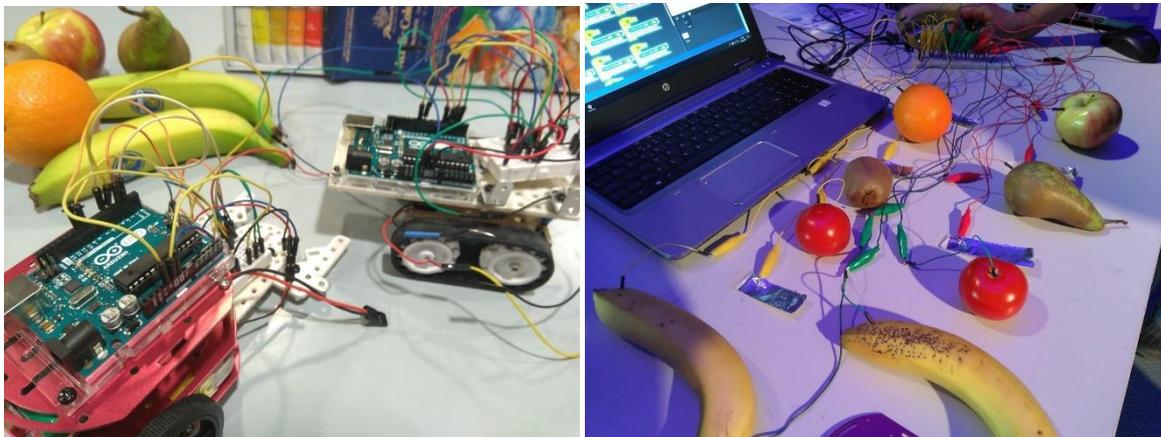


Figure 7: The eCraft2Learn workshop activities: “painting robot” and “fruit instrument machine”

The presentation of their work to the SciFest visitors during the two festival days was a significant opportunity for the students who participated in the pilots, from an educational point of view. The students reported that they enjoyed presenting to the public, explaining what their project was about and what they learnt during the pilots. Some students introduced the visitors to the basics of electronics and programming, and thus, not only diminishing the overall fear of such knowledge areas but also deepened and strengthened their own understanding of the underlying STEAM concepts. The students mentioned in the interviews (taken during the SciFest) that they practiced their language skills as there were many international visitors joining the workshop zone. The participating pilot teachers supported the students during these activities, but the students were mainly self-regulated and self-organised during the festival and so they did not need much assistance. The piloting teachers were encouraging visitors to enter the workshop area so that the students had an active role in demonstrating their artefacts and teaching visitors how to make similar constructions.



Figure 8: Students having participated in project pilots guiding visitors through basic electronics and programming exercises

Besides the activities that took place during the two days, discussions on the eCraft2Learn initiative and methodology were carried out and comments and feedback from the participants, teachers and students, were documented in video formats (Section 4, Table 5, SciFest: Part B).

Table 4: Number of participants in the eCraft2Learn event in SciFest Joensuu 2018

eCraft2Learn Event in SciFest Joensuu 2018	
<b>Participants</b>	
<b>Project consortium members</b>	4
<b>Participating teachers</b> (both from the formal and the informal site)	4
<b>Students</b> (both from the formal and the informal site)	11
<b>Estimated number of visitors in the festival</b>	>9000
<b>Estimated number of visitors engaged in the eCraft2Learn activities during the 2 days</b>	>2000

## 4 VIDEOS FROM THE FESTIVAL

In this section, we present a list of videos taken during Athens Science Festival 2018 and SciFest Joensuu 2018. The videos are accompanied with short descriptions, indicative to the content that they represent (Table 5).

Table 5: List of videos

Short description of the videos	Link in the eCraft2Learn YouTube Channel
<b>Athens Science Festival</b>	Full playlist <a href="https://www.youtube.com/watch?v=WDKUF8Qh8z8&amp;list=PLgKtrHOACe-IQowfFBrDy7TXHbo3uicYb">https://www.youtube.com/watch?v=WDKUF8Qh8z8&amp;list=PLgKtrHOACe-IQowfFBrDy7TXHbo3uicYb</a>
<u>Intro</u> <i>This is an introductory video that gives shortly a general impression of the eCraft2Learn event in the Athens Science Festival.</i>	<a href="https://youtu.be/WDKUF8Qh8z8">https://youtu.be/WDKUF8Qh8z8</a>
<u>Part A</u> <i>This video shows the formal and the informal pilot groups while presenting their projects in the general public and interacting with the visitors. Students' comments regarding their experience are brought into focus. Interesting incentives that took place are also highlighted by the participating teachers.</i>	<a href="https://youtu.be/P-vXNliGOZE">https://youtu.be/P-vXNliGOZE</a>
<u>Part B</u> <i>This video (which is a continuation of part A) shows episodes from the eCraft2Learn event in Athens Science Festival. It focuses more on students' thoughts on how their presentations were perceived by the audience and teachers' comments on students' presentations and feedback on the experience gained therein.</i>	<a href="https://youtu.be/82U15Sp45uk">https://youtu.be/82U15Sp45uk</a>
<u>Part C</u> <i>This video (which is a continuation of part B) shows episodes from the eCraft2Learn event in Athens Science Festival. It focuses more on teachers and visitors' experiences, thoughts and comments all revolved around the eCraft2Learn initiative and students' presentations in the festival.</i>	<a href="https://youtu.be/-xsbBV85Rg">https://youtu.be/-xsbBV85Rg</a>

Short description of the videos	Link in the eCraft2Learn YouTube Channel
<p><u>Part D</u></p> <p><i>This video shows episodes of the training workshop that was organised in the context of the eCraft2Learn event in Athens Science festival 2018. The workshop targeted 20 adult participants who expressed interest in learning more about the eCraft2Learn initiative and technologies.</i></p>	<p><a href="https://youtu.be/8Frz7oJmKsk">https://youtu.be/8Frz7oJmKsk</a></p>
<p><b>SciFest Joensuu</b></p>	<p>Full playlist  <a href="https://www.youtube.com/watch?v=0_X8TORYGeo&amp;list=PLgKtrHOACe-IEACzt3PhiMSLtwFsCvwt_&amp;index=2">https://www.youtube.com/watch?v=0_X8TORYGeo&amp;list=PLgKtrHOACe-IEACzt3PhiMSLtwFsCvwt_&amp;index=2</a></p>
<p><u>Part A: Students perspective</u></p> <p>The focus of this video is to capture the formal pilot students' voices during the SciFest even and the project as a whole. This video highlights the students' experiences when presenting their work for visitors and acting as mentors by guiding visitors with basic electronic circuit and programming exercises.</p>	<p><a href="https://youtu.be/nYfjIKDvHvY">https://youtu.be/nYfjIKDvHvY</a></p>
<p><u>Part B: Workshop visitor perspective</u></p> <p><i>This video includes extracts from the eCraft2Learn workshop organised as part of the SciFest Joensuu 2018 event. In this workshop, targeted for students, two different tasks were developed: the "Picasso painting robot" and the "fruit-based music instrument". The video emphasizes the participants' voices and experiences. Participating students and visitor teachers showed great interest towards the project and were fascinated about the connection of arts and technology in the tasks.</i></p>	<p><a href="https://youtu.be/0_X8TORYGeo">https://youtu.be/0_X8TORYGeo</a></p>

## 5 CONCLUSION

This report presented the activities that took place in the eCraft2Learn events in Greece and Finland. The events included discussions on the eCraft2Learn initiative, methodology and the emerging findings with interested individuals. They also included hands-on experimentations with the eCraft2Learn tools and technologies, engaging presentations by the students and the organization of training workshops either by students or project consortium members. The comments raised and the feedback provided by the participants, namely students, teachers and visitors were recorded and presented in the form of videos in this video report.

The sharing of the *making* projects and making experiences with others was associated with the development of collaborative and communication skills and considered of great significance by the school teachers. These claims were also confirmed by the participating students who apart from the development of cognitive skills, highlighted the opportunity that were offered to practice and further develop their team working skills.

Inspired by their experience in the festival, some students were seen to reflect upon their school experiences by critically comparing the way knowledge is gained through the formal school curriculum and the way knowledge was gained through constructions in the eCraft2Learn workshops. Some others, reflecting upon their experience in the festival reported enhanced confidence levels, improved presentation and public speaking skills. Their connection with a big audience and the positive reactions acted as a reminder that they have valuable experiences and know-how to share with the world.

The visitors (individuals and parents of the participating students) also provided positive comments and seemed to enjoy their interaction with the young makers. Reflecting upon their experiences, after their interaction with the students, they stressed the need to integrate the eCraft2Learn initiative in the formal school curricula and to re-approach the teaching of STEAM embracing interdisciplinarity and moving beyond subject-oriented approaches. They also recognised that the eCraft2Learn project moves beyond ready-made solutions providing students with opportunities to express and replenish their creativity and use their imagination. Last, eCraft2Learn welcomes all young students of both genders in STEAM activities. This is recognised during the events and described as a good practice that fights stereotypes and conveys important educational messages about the presence of girls in STEAM fields and the respect of gender equality.

This video report sets a basis whereupon key stakeholders, including school principals, teachers, teacher trainers, educators as well as the broader school communities, can build. The goal of this report is to encourage actions where making and sharing moves beyond the four walls of the classroom reaching and inspiring a bigger audience. The eCraft2Learn events in Greece and Finland disseminated successfully the project results in a meaningful and authentic way by giving an active role to the main actors of the eCraft2Learn learning intervention, primarily to the participating students and secondarily the participating teachers.

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European Year of Cultural Heritage, <http://www.kulttuuriperintovuosi2018.fi/en/>, last visited on 10.11.2018

SciFest Joensuu, [http://www.scifest.fi/about\\_scifest\\_en.php](http://www.scifest.fi/about_scifest_en.php), last visited on 10.11.2018