InventEUrs: Fostering invention-based collaborative learning for social change

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Introduction

The **InventEUrs project** is inspired and revolves around a good practice: the **Inventors4Change (I4C) project** (http://www.inventors4change.org). This project, for the last 6 years has been connecting schools in India and Spain (recently also in Colombia) and promoting the collaborative work of disadvantaged children through innovative technologies for creative learning and digital media.

Videos of Inventors4Change:
- Introduction to the project: https://vimeo.com/129111438 (3 min)
- Activities of the academic year 2015-16: https://youtu.be/QLneiibkPV8 (2 min)

Inventors4Change's learning model is inspired by popular learning theories such as Social Constructivism, Constructionism and Connectivism, and by modern educational approaches and movements like Connected Learning or the Maker Culture.

We call I4C's model ***Invention-Based Collaborative Learning*** because we foster a collaborative learning (across different countries) where children work in teams to invent (imagine + create) something meaningful and linked to Sustainable Development Goals (SDGs) in order to promote Education for Global Citizenship.

InventEUrs is an Erasmus+ project and it replicates the same ideas and methodology than Inventors4Change, but changing the context (mainly Europe, but right now also open internationally) and focusing on newly arrived migrant children (and their families and teachers).

The implementation in schools follows this methodology: (1) we match classes from different countries; (2) we let the children research a topic linked to UN Sustainable Development Goals; (3) we promote that children themselves debate through a blog and videoconferences; and finally, (4) we promote that children divided into teams (and each team paired with another one) co-create (design and code) digital stories on the topic they previously researched.

The main differences with Inventors4Change are that in the InventEUrs project we have designed an ambitious plan to scale up and expand the model to many more schools. Right now, through InventEUrs we are already reaching more than 1500 students in 30 schools from 7 countries, and more than 300 teachers from all over the world.

The main products that are allowing us to achieve this goal are the co-creation platform called GlobalChangemakers (which is automating tasks that were previously done manually, for example the connections between teachers, classes and schools) and a MOOC (which is allowing us to carry out teacher training through a massive, open and online course).
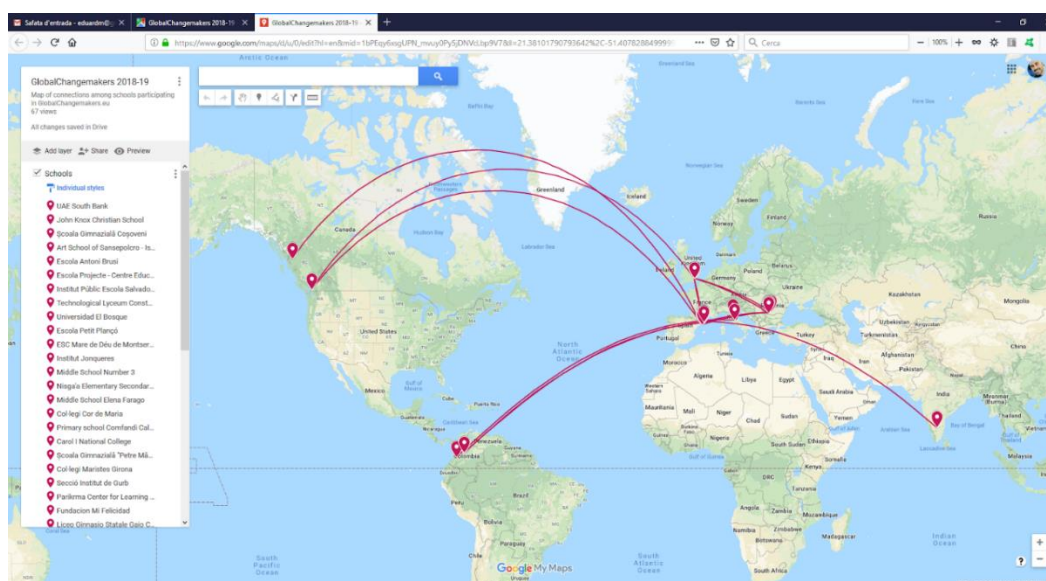
Fig. 1. Network of InventEUrs schools after 2 years of project.

The project has been developed and implemented using a metaphor of waves. During the last two years we have implemented 3 waves, increasingly involving schools, teachers and children.

First Wave

During the first wave we connected 4 schools (1 from each partner country). Specifically, three of these schools are project partners (Veïnat School in Spain, Giovagnoli School in Italy and Constantin Ianculescu School in Romania). The fourth school was an educational centre under the umbrella of the South Bank University of London: the South Bank Engineering UTC.

The children of these four schools are clearly from the targets that we had set in the Erasmus+ proposal. Veïnat School and UTC School have large percentages of newly arrived migrant students, literally from dozens of different nationalities, and most of them belong to low income families (i.e. Veïnat School has more than 95% of newly arrived migrant children in its classes). In the case of Italy, the students were also from poor families, and they are also young people who have no prospects of higher education, and some of them are at risk of social exclusion. In Romania the picture is similar, but with many children whose parents have emigrated and they have stayed in Romania with grandparents or other relatives, and it is also a school with students from the Roma community.

During that first wave, we trained teachers in all those schools (the trainings were carried out by the universities: Girona, Perugia and South Bank; and also by Constantin Ianculescu school itself). We also designed some creative learning activities and educational materials (involving teachers in it) to introduce the methodologies and technologies that we would later use during the implementation of cultural exchanges and co-creation projects.

Then we focused on the actual implementation of activities in schools. The schools were paired with each other, and in each of the participating classes, the children were divided into teams, each paired with another team from their partner school.

Together we decided on a social topic that the children and teachers would investigate and from which they would build the digital stories: the journey. The idea was to understand the "journey"

as a metaphor that could represent the journey through life, or the geographical journey made by migrants, or other possible visions and ideas.

The children and teachers began to investigate the topic, the teams introduced themselves through a blog (with recorded videos, photos, etc.), and in the same virtual space they shared their findings and opinions, they debated and began to get to know each other. During those weeks they also held videoconferences between classes, not only to discuss the topic researched but also as a means to promote cultural exchange.

Fig. 2. Students of Veïnat School using the Kidblog platform

After this phase, "true" co-creation begins. Each pair of teams thought up a story about the topic they had explored. They designed the story (writing a script, or drawing a storyboard), created the necessary characters and scenarios (artwork on paper or directly on the computer), and finally coded the digital animations through Scratch, following a methodology of co-creation based on shifts (pass-it-on) where the partner teams pass on their projects and remix them until they reach the final version.
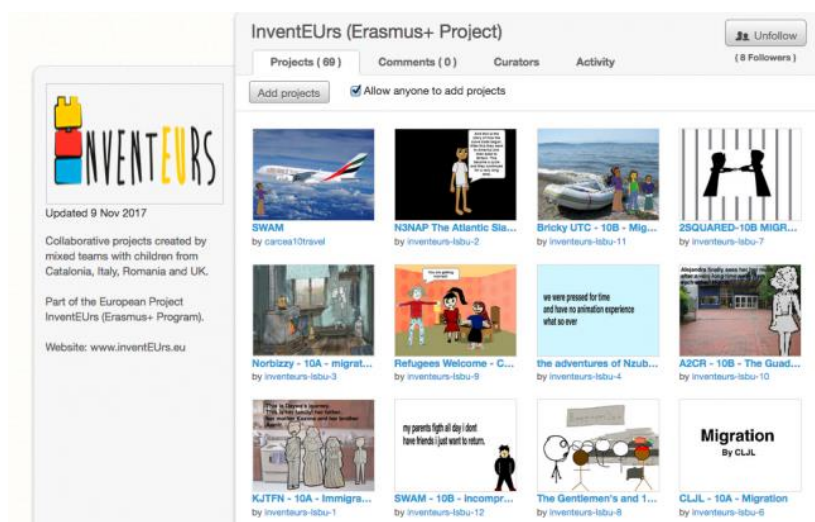

Fig. 3. Final projects / Wave 1: https://scratch.mit.edu/studios/4443203/

Second Wave

The second wave followed exactly the same steps explained above, but expanding the network of schools. Each of the participating countries added two non-member schools, so there were 3 schools in each country, making a total of 12 schools for the second wave. Most of the schools were very similar to those explained above.

Fig. 4. Network of schools and universities from the four partner countries during 2nd Wave.

During the second wave the topic chosen for research was "Reduced inequalities" directly linked to Sustainable Development Goal 10.
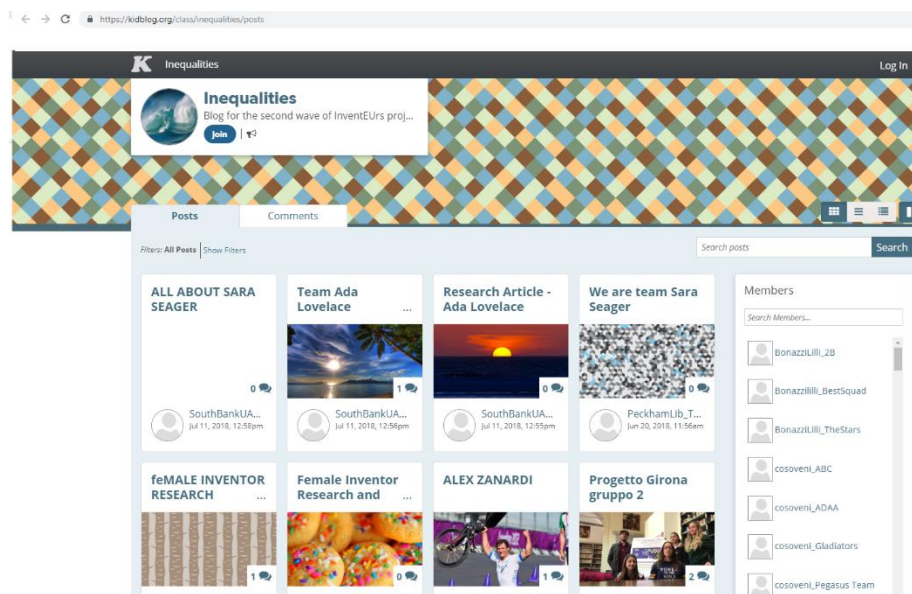

Fig. 5. Kidblog about Reduced Inequalities – 2nd Wave: https://kidblog.org/class/inequalities/posts

In the second wave, an additional effort was made to deepen the debate and conversations among the children's teams. In primary schools this is especially complex, because the children's level of English is sometimes not sufficient for them to deepen the conversations. One thing that is clear to us is that the involvement of foreign language teachers is very important for the success. In this project children learn global citizenship, art and programming, but language is the key element in collaboration and co-creation. In this wave, the conversations became richer and the children also started to use the blog as a resource sharing tool during the co-creation phase (by exchanging storyboards and drawings of characters and scenarios).

Third Wave

The third wave is different from the previous two. From the beginning, we thought of it as a "tsunami". The idea was to open up the initiative internationally through an online platform for participating teachers, and an MOOC for large-scale teacher training without the need to go to schools in person.

GlobalChangemakers Platform

We designed an online platform that would automate pairing between schools (taking into account characteristics such as language, age of children, number of pupils, etc.). The virtual space also had to allow teachers to see the phases and steps to be taken and the deadlines, to share resources among themselves, to see news about the project, and to keep us informed of their progress. In addition, we as administrators had to be able to edit the pairings (in case there were dropouts or problems) and see the progress of each pair of schools to make sure they don't get stuck at some stage.

We decided on a name for the platform: GlobalChangemakers. Since its launch it supports InventEUrs schools and Inventors4Change as well. To make the launch we created a call for teachers in video format, and we got a very good response in just few days.

In a few days, many schools from the four partner countries and from three other countries (India, Colombia and Canada) joined. The result is that in the third wave more than 1000 children and 40 classes have participated. There are hundreds of posts and comments on the Kidblog (we had to create two blogs due to the number of children: 1 & 2) and hundreds of Scratch projects published online (here a collection).

The topic for the 3rd wave was Sustainable Cities and Communities (UN Sustainable Development Goal 11).

Fig. 6. GlobalChangemakers platform interface

With the lessons learned during the first two waves, materials were prepared that turned out to be very useful for the teachers, such as a step-by-step tutorial to learn the co-creation process in Scratch (depicting the asynchronous working methodology of alternating remixes: pass it on).

In this third wave, although we continue by all means to focus on schools with large numbers of migrant students, schools of many typologies have joined, and this in fact generates interesting new pathways to social inclusion, through pairing disadvantaged schools with private schools for wealthy families, and creating connections between children who would rarely have contact with each other. For example, a private school in Catalonia has been connected and working with an Colombian school for children from the slums of Cali. Out of the more than 1000 children who participated in this wave, approximately 30% were not our main target, but the remaining 70% were still newly arrived migrant children and children from low income families. We want to emphasize this aspect, as we really believe that to achieve social inclusion, you have to work to change all the society. In this sense, InventEUrs has proven to work very well in creating connections and promoting co-creation between children with very different backgrounds and life stories.

The 100% of teachers who answered the feedback questionnaire after using the platform in the 3rd wave, said that they would participate in a future wave.

Fig. 7. Videoconference between London (UK) and Besalú (Spain)

MOOC

Most of the videos used internally in the MOOC where recorded during the in-person meeting in Perugia. All the partners were involved. The platform we chose was CANVAS, because London South Bank University already had previous experience with it. After a first edition of the MOOC we can say that the platform has worked very well and we will repeat with it.

More than 270 teachers from around the world joined the MOOC and have been actively participating through lessons, through forums, creating blog contributions and even learning Scratch and programming and publishing their own projects.

The MOOC has also contributed to the international opening of the project. In fact, the continent from which most teachers have signed up is Asia. Many of the teachers are from developing countries in Asia and Latin America. This is the exact distribution of teachers who joined the first

edition of InventEUrs MOOC: North America (2%), Latin America (7%), Europe (11%), Middle East/North Africa (5%), Sub-Saharan Africa (5%), Asia-Pacific (68%).

It is also interesting to note that English is the primary language of only 19% of teachers enrolled in the MOOC. So many of them are making an important extra effort, as the working language has been English.
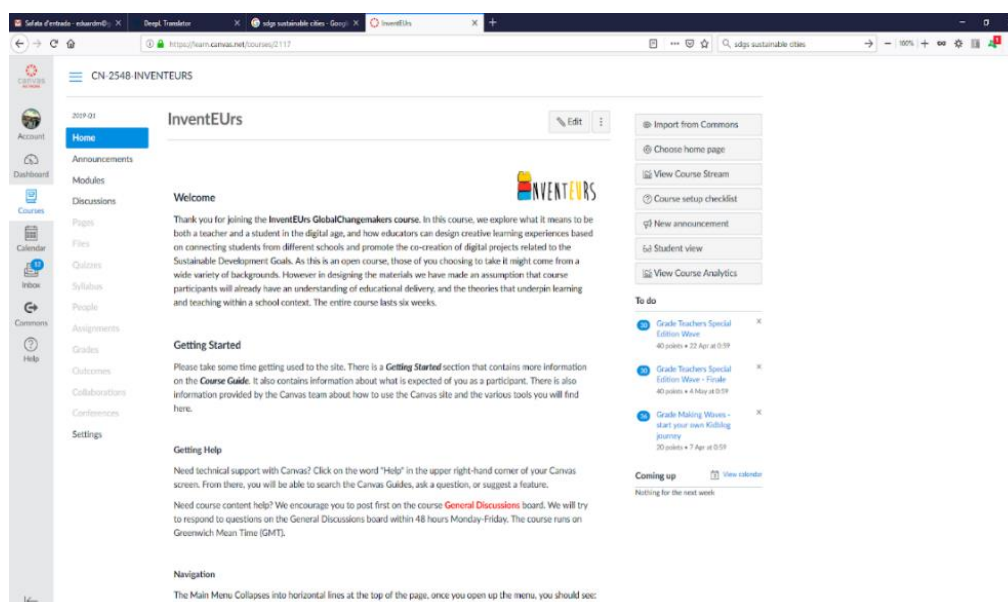

Fig. 8. Homepage of InventEUrs MOOC

Main outputs of the project

- **Creative Learning Activities:** This output is a detailed description of the Creative Learning Activities for each wave. These are activities designed to be conducted at the beginning of the waves, in order to introduce the methodologies and the technologies to the children. Universities and schools participated in their design. The ones that we proposed as examples for the teachers involved in the 3rd wave (that is mostly teachers totally news to the project and with no experience in this kind of projects) were very well received and the feedback has been very positive. Thanks to this feedback we will be able to create new introductory activities for future waves.

- **Educational Materials:** This output is the collection of educational materials to describe the UN SDGs, introduce the topic and introduce Scratch to the kids. These materials were created or selected mostly by partner teachers (and then by teachers from non-partner schools). Thanks to this feedback we got in the 3rd wave, now we will be able to create new educational materials for future waves, or to link already created materials discovered by the previous teachers.

- **Children's blog:** Children contributed with their opinions about the chosen topic for each wave by using a blog. The blog is also a space for debate, a place to give them a voice, a place where they can introduce and present themselves, and a place for exchanging materials and ideas.
  Wave 1: https://kidblog.org/travel
  Wave 2: https://kidblog.org/class/inequalities

Wave 3 (1st blog): https://kidblog.org/class/globalchangemakers
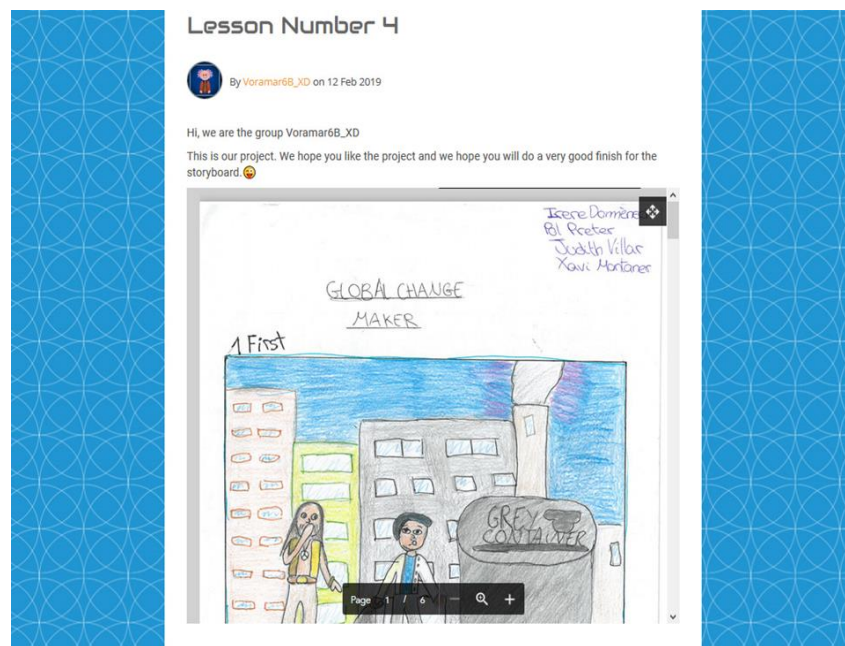Wave 3 (2nd blog): https://kidblog.org/class/globalchangemakers2

Fig. 9. Children using the blog to share their storyboards before programming with Scratch

- **Children's final projects:** The final projects co-created by children were published by themselves in the Scratch Website. We collected them in galleries called Scratch Studios. These are digital stories programmed with Scratch, and they are the culmination of a process that began with research and debate, which later focused on imagining the story, designing it through scripts or storyboards and programming digital animations (movements, stage shifts, conversations, etc.) through Scratch.
  Studio with final project about Travel (wave 1) and Inequalities (wave 2): https://scratch.mit.edu/studios/4443203/
  Studio with final projects about Sustainable Cities (wave 3): https://scratch.mit.edu/studios/5911623/
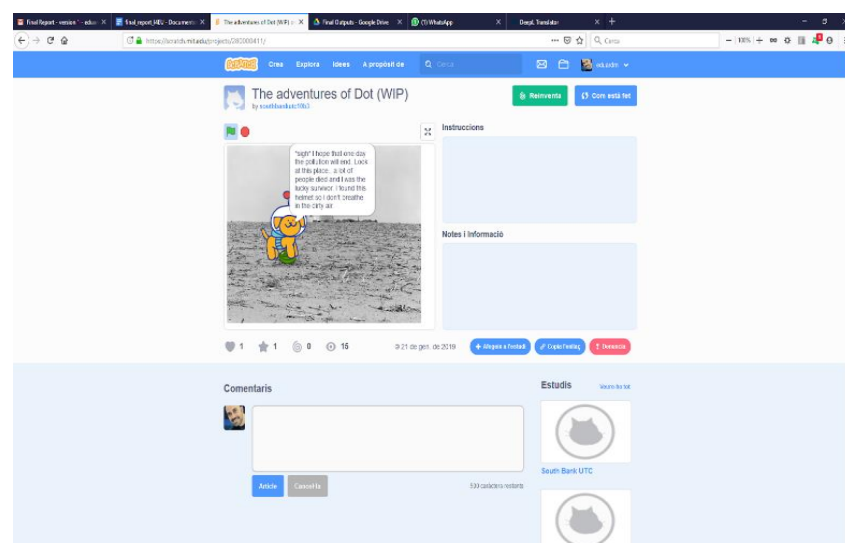

Fig. 10. Some of the projects were very imaginative, placing stories in the future, in other worlds, etc.

- **Co-creation platform:** This output is the online platform aimed to facilitate the way how schools are involved and participate in the project. This is one of the main results of the project, and was vital for the success of wave 3. This is a tool designed for teachers, who once they have registered in it, can pair up with other schools, and see all the steps that need to be taken to carry out the global education project with their children.
The platform is called GlobalChangemakers: http://globalchangemakers.eu/

- **MOOC:** This output is the InventEUrs Massive Open Online Course that let us do teacher training to hundreds of teachers. It's the second main result of the project and it has a very important role in the final part of the project, and especially to ensure its continuity from now. The idea is that it becomes the central tool for all future teacher trainings. It is structured to provide instructions for getting started, information about the InventEUrs philosophy, to show and practice how to implement InventEUrs in a school, and to create a community of practice. We used the platform CANVAS: https://learn.canvas.net/courses/2117

- **Project Website:** This output is the main website of the project. It has information about the objectives, partners, results, etc. and it links to the Kidblog, Scratch, platform and MOOC: http://inventeurs.eu

Dissemination actions

We share some examples of dissemination actions carried out during the last 2 years:

- Keynote by University of Girona about Inventors4Change/InventEUrs at *EdukaTIC 2017*, Universidad ICESI, Cali, Colombia (June 2017): http://edukatic.icesi.edu.co/2017/Conferencistas.php
- Presentation of InventEUrs by Universitat of Girona at the Scratch Conference 2017, Bordeaux, France (17-22 July 2017): http://www.scratch2017bdx.org/wp-content/uploads/2017/06/ProgramScratch2017BDXedition14Juillet.pdf
- *LSBU Freshers Fair 2017* - to promote InventEUrs project and obtain student volunteers through Robogals. London, UK (September 2017).
- Presentation of InventEUrs by LSBU team at the *National Enterprise Education Conference*, London, UK (November 6th 2017).
- Constantin Ianculescu teachers participated at a course named *EU project design and project cycle management for Education* which was part of an European project (K1 2017-1-RO01KA101-036473) called *Training, Engagement, Cooperation- necessary conditions for achieving school success*. Constantin Ianculescu team explained the InventEUrs Project. Romania (November 23, 2017).
- Meeting to share projects and ideas with researchers of University of Girona and *Srishti*
- Talk about InventEUrs by University of Perugia to the teachers who attended a training course on *Artificial Intelligence at school*, Gubbio (PG), Italy (24 January 2018).
- Presentation of InventEUrs by University of Perugia to the *Commission CINI (Consorzio Interuniversitario Nazionale Informatica)*, Bologna, Italy (11 June 2018).
- Presentation of InventEUrs by University of Perugia in the poster/project corner at *ICCSA 2018 (International Conference on Computational Science and its Applications)*, Melbourne, Australia (2-5 July, 2018).
- Members of UdiGitalEdu/UdG participate at the *Scratch Conference 2018* at the MIT Media Lab, Boston, MA, US (July 25-29 2018).

- LSBU team visited *Nº 10 Downing Street to meet Nero Ughwujabo (Special Adviser to UK Prime Minister on Social Justice)* and talk about outreach and widening participation work with initiatives like InventEUrs. The program was part of AFBE_UK (Making Engineering Hot). London, UK (October 26th 2018).
- LSBU team and UdG team attended the ceremony for the *Times Higher Education Awards (THEAwards 2018)*. LSBU/InventEUrs was nominated in Outreach Initiative category. London (Nov. 29th 2018).
- Escola Veïnat participated in the *XII Federico Mayor Zaragoza Awards* with a selection of their students final projects with Scratch: https://drive.google.com/file/d/1m_wU20J9-Iz-c0NdyNd7Tlk_3ur_v6ES/view (February 2019).

Links to results, resources and platforms:

www – web link	Comment/Description (key words suffice)
http://inventeurs.eu	Project website. Information regarding objectives, partners, outputs and materials
http://www.inventors4change.org	The good practice that we decided to replicate and upscale within Europe.
https://kidblog.org/class/globalchangemakers/	Kidblog (1) for the 3rd Wave (Topic: sustainable cities). A collaborative blog by participating children.
https://kidblog.org/class/globalchangemakers2/	Kidblog (2) for the 3rd Wave (Topic: sustainable cities). A collaborative blog by participating children.
https://kidblog.org/class/inequalities/	Kidblog for the 2nd Wave (Topic: inequalities). A collaborative blog by participating children.
https://kidblog.org/travel	Kidblog for the 1st Wave (Topic: travel). A collaborative blog by participating children.
https://scratch.mit.edu/studios/5911623/	Children's final collaborative projects made with Scratch (3rd wave). Scratch online studio.
https://scratch.mit.edu/studios/4443203/	Children's final collaborative projects made with Scratch (1st and 2nd wave). Scratch online studio.
https://youtu.be/CDI1v09q4BE	Video animation - GlobalChangemakers Call for Teachers
http://globalchangemakers.eu/	GlobalChangemakers Co-creation platform for Teachers.
https://learn.canvas.net/courses/2117	InventEUrs MOOC at the CANVAS platform.
https://www.youtube.com/watch?v=_kfsWiYrNpU	Video of stories from the first wave. The work done in Romania.
https://www.youtube.com/watch?v=Da4PD--rPIQ&feature=youtu.be	Video "example" of the Skype between Escola Veïnat (P2) and Constantin Ianculescu School (P3) – First wave (4 min)