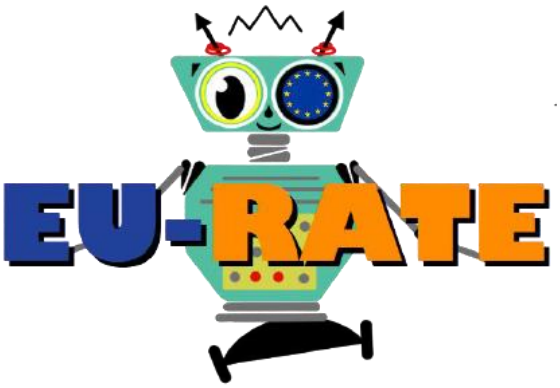

EU-RATE Robotics Access To Everybody

Diagnosis of practices and audiences & recommendations

Publication summary

Erasmus+
Scuola di Robotica
MNU
VERBAND ZUR FÖRDERUNG DES MINT-UNTERRICHTS HESSEN
GYMNASIUM GOETHESCHULE HANNOVER
ELEKTRONIS Libre
LIGUE de l'enseignement
FORMER. INFORMER. TRANSFORMER...!

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EleKtrons Libres (Pau, France) 4
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EU-RATE PROJECT

In a world where digital tools are increasingly part of our daily lives, educating children and young people in their use and understanding is the responsibility of educational actors. Machines, algorithms, and artificial intelligence are all terms that are now part of everyone's vocabulary, even though we do not always know what they mean. The issues of conscious use, access for all, understanding, ethics, personal data protection, but also technical training for the professions of tomorrow are today more than ever at the heart of the debates of European societies, and the questions arise from early childhood onwards. Digital education, and education through digital technology, offers opportunities in terms of education, creativity and innovation, in addition to meeting a societal need.
EU-RATE project aims to

1. make children and young people understand the making of information through action so that they become creative and responsible actors,
2. educate to computer science and raise awareness on algorithmic logic underlying all the tools we use,
3. promote the mainstreaming of digital competence provision across the curricula,
4. foster critical thinking especially through teaching technology and science in line with the priorities of school education,
5. prepare children and young people for robotics challenges, opportunities for learning in many fields (technology, mathematics, logic, English, project management...) and self-improvement,
6. make children and young people, especially girls, want to take an interest in engineering and digital professions.

DIFFERENT COUNTRIES, SIMILAR USES AND ISSUES

EU-RATE consortium is composed of 6 structures, from 4 different European countries. They share reflections and common objectives in terms of educating young people and educational actors to digital tools, and in particular to machines, in order to give the keys to citizens to become active and not passive users of the tools.

The transnational approach is really important to succeed. In Europe, in certain countries teaching robotics, coding and media literacy is already in the school programs, although in others, it is not obligatory but highly recommended.
So, the consortium will rely on the knowledge of partners, experts and the participation of the target groups (direct and indirect) to find the best way to answer the needs identified during the application of Erasmus+ by all consortium partners, experts and national and european studies.

The education of young citizens plays a really important role and so does teacher training. The partners have come to the common analysis: they need to invest in teachers as transformers and awakeners. They can contribute to the empowerment of the new generation of citizens in using digital technology effectively and in a responsible manner.
EU-RATE project wishes also to include other educational actors (youth leaders, volunteers) as these actors are complementary to school education.

A ROBOTIC TEACHING KIT ACCESSIBLE TO ALL

October 2020 > July 2023
The consortium has the ambition to build a robotic teaching kit accessible to all. It is important, for the consortium, to adapt intellectual outputs as closely with teachers' students needs, capacities and skills targeted. So, it's decided to propose the robotic kit to be used by teachers with students between 8-10 and 11-14 years old.
This choice allows to take in consideration the specific curricula of each country and recommendations from experts and educational policies on-going.

OBJECTIVES

The implementation of 3 intellectual outputs (Robotic kit):

- IO1 Learning sequences,
- IO2 Hardware,
- IO3 Software,

including 2 trainings for 14+ students :

- one on prototyping,
- and the other one on finalisation of prototypes and pedagogy

and 6 multiplier events.
Every production will be open source and accessible to all during and after Erasmus+ funding.

TARGETS

To reach these ambitious objectives, the EU-RATE project target a direct and indirect public:

- The direct public: primary and secondary school teachers, especially those who do not have access to robotics for reasons of funding, knowledge, distance, etc. but also the educational community at large (educators, parents, youth leaders) that will have access to the training online; Students of 14+ as co-developers of the project (participating in trainings, testing, experimenting, giving feedback).
- The indirect public: youngsters from 8 to 10 and from 11 to 14 years old that will take part in extracurricular and/or in-school activities.

This publication summarises the work carried out by the consortium during the first year of the EU-RATE project. It wishes to give guidelines for the building of a quality, accessible and open source robotic kit.
This document will evolve throughout the project duration and the feedback of experts and the testing by teachers but also by other educational actors and the children and youth involved. Therefore, it will be updated as the project progresses.

LIGUE DE L'ENSEIGNEMENT NOUVELLE-AQUITAINE (BORDEAUX, FRANCE)

As a regional organisation of Ligue de l'enseignement, it offers diversified actions in the field of youth, education, culture, vocational training, digital education, leisure, sustainable development and community life. Through its activities, it works to strengthen social ties and promote its secular values for a more cohesive society. Ligue de l'enseignement Nouvelle-Aquitaine represents the 12 departemental federations (3500 associations) of its territory in regional networks and public authorities.
https://liguenouvelleaquitaine.org/

SCUOLA DI ROBOTICA (GENOVA, ITALY)

Scuola di Robotica is a non-profit association founded in 2000 by a group of robotics and human science scholars. The main objective of Scuola di Robotica is the promotion of culture through education, training and dissemination of arts and sciences involved in the process of development of robotics and new technologies.
Scuola di Robotica works with teachers and students from kindergarten to university in offering design courses and also creating designs of robotics kits. They coordinate networks and events as for example the FIRST LEGO league, the Nao Challenge or the Olympics game that gathered thousands of students on the previous editions.
https://www.scuoladirobotica.it/

ELEKTRONS LIBRES (PAU, FRANCE)

EleKtrons Libres is an association that brings together young people, parents, teachers and trainers. Created in September 2019, its vocation is to facilitate access to science for all young people, boys and girls, to promote their international mobility, to strengthen their european identity, while allowing them to participate in competitions and supporting them in their professional orientation.
https://elektronslibres.fr/

GYMNASIUM LANGENHOVEN & GOETHESCHULE (HANNOVER, GERMANY)

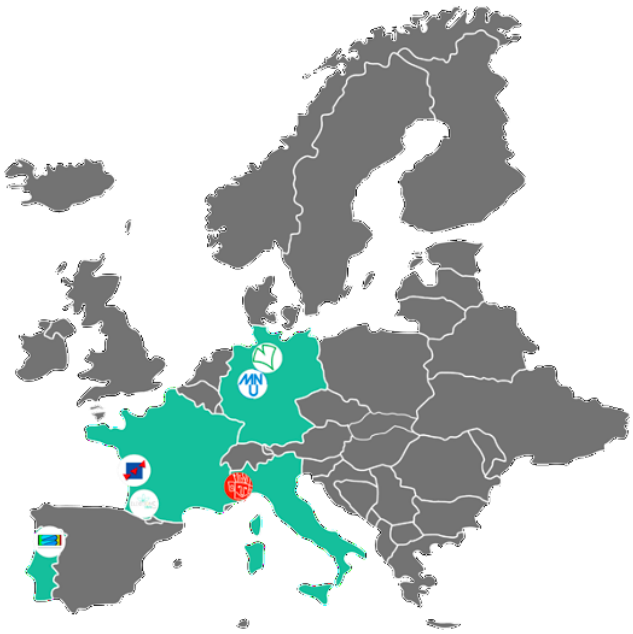
Goetheschule is a grammar school specialised in music, languages, mathematics, natural sciences and computer science. Participation in the Erasmus+ programme is a worthwhile addition and is perfectly in line with the values of the school. Goetheschule offers an international education with a European focus.
In computer science, students learn the basics of data processing, algorithms and robot programming. The students regularly participate successfully in RoboCup. In 2013, a group of Goetheschule students won the world championship title.
https://goetheschule.de/

ESCOLA SECUNDÁRIA DE BARCELINHOS (BARCELOS, PORTUGAL)

Escola secundária de Barcelinhos is a public school that includes courses in robotics and science and technology in the 3rd cycle curriculum. It integrates in its different extra-curricular activities a variety of subjects such as citizenship, health and sexuality education, cyber-security or entrepreneurship and consumer education.
The Robotics Club of Escola secundária de Barcelinhos participated and won the RoboCupJunior competition in 2016.
https://esbarcelinhos.pt/

MNU (KASSEL, GERMANY)

MNU is a German association founded in 1891 for the promotion of STEM teaching (math, biology, chemistry, physics, IT and engineering). Its main objective consists in the further training of the teachers, the optimization of teaching materials and their use in class, and the incorporation of technical and scientific progress into teaching.
MNU works with schools and universities, takes part in teacher seminars, advises regional and state education authorities.
MNU carries out publications and conferences to educate and support members. Each year, two main conferences gather 100 to 200 participants, in addition to local conferences and training courses.
https://www.mnu.de/



DIAGNOSIS OF PRACTICES AND AUDIENCES : COUNTRIES' CONTEXT AND SURYVEYS ANALYSIS

CONTEXT

The objective of this study was to, in each country :

- Define general approach of robotics,
- Identify experts and stakeholders in educational robotics to know,
- Obtain datas about robotics in education,
- Define global education context.

Through this analysis, we saw that each Country involved in EU-RATE project is very committed to the issue of robotics. The dynamic between research, industry, training and education has been created for several years now, even if public opinion remains mistrustful.
There is a general dynamic around digital learning (and critical thinking) and robotics, and this is primarily reflected in school time.

Integrated or not into the school curricula, its study depends on the goodwill of teachers and their own skills, but also on the material equipment available in the school.
This analysis allowed us to understand there are both similarities and discrepancies that need to be known for the development of the robotic kit and the teacher's support. There are significant differences in student levels in robotics depending on the country, for example, but the methods used are all student centered. The above general recommendations are deduced from the information provided throughout this document.

FRAMEWORK NOTE FOR SURVEYS

In order to provide and carry out a project in suitability with the pedagogical and sociological contexts (knowledge, practices, uses, human means, financial means, etc.), the consortium decided to create surveys to understand the specificities (social, economic, structural, political) inherent to each country.

Overall goals :

- Collect the general practices related to the fields of digital technology and educational robotics in all the countries involved in the project ;
- To know practices and digital uses of teachers, children, stakeholders, parents, and other educational actors in the 4 countries where the partner are located ;
- To know the specificities of each country (robots/software used and acquired in education, leisure activities, etc.).
- To take inventory of prior knowledge and mastery of digital and robotic tools, as well as existing equipment in each country;
- Identify the age of the public and its specificities and associated pedagogical objectives, competences to be acquired by country and audience.

In order to :

- Determine a development strategy for the project within each partner country,
- Make productions (pedagogical and material) valid and relevant for all 4 countries concerned by the project

TARGETS

In order to analyse digital and robotic practices in the countries concerned by the project, the consortium has chosen 4 targets:

- Teachers
- Parents
- Stakeholders
- Young people of 11 years old and more

DISSEMINATION OF THE QUESTIONNAIRES

For each target, partners sent questionnaires to lists of partners, teacher's academic addresses, national professional network, teacher's and trainer's networks, facebook's group, relationships, friends, ...

Concerning stakeholders, data was collected differently:

- German, Portuguese and Italian partners have digitally disseminated surveys
- French and Italian partners used semi-directive interviews

The objectives were to:

- Gather informations about local policies, operating projects;
- Discover good practices in educational robotics;
- Collect recommendations and opinions;
- Assess the strengths and weaknesses of the eu-rate project;
- Have a strategic view on the objectives of the project and its implementation;
- Add a scientific guarantee to the project.

The panel is composed of scientific experts, research engineers, educational experts, employees of structures dedicated to digital technology and robotics, educational advisors in schools, employees of the university research community, etc.

TEACHERS

830 respondents

SUMMARY

Subjects taught

The subjects taught with the highest percentages are those that best match the skills required for learning robotics, namely science, mathematics and technology (those that best match the skills required for learning robotics).

Use of digital tools

Two thirds are basic users (use digital tools without being aware of programming), the last third does some programming.

Approach to educational robotics

- 72% are familiar with this notion against 28% (French and German teachers surveyed are the ones less familiar)
- Concerning the prerequisites in the fields of programming and robotics, the answers are varied: 34% have no prerequisites, 24% have basic notions, 27% have sufficient notions and 15% have advanced notions.
- The majority of teachers have prerequisites (from basic to advanced) that can facilitate the development of robotics projects (66%).

The objective is to ensure that the 34% of teachers that have no prerequisites achieve the basic level, to enable them to understand and develop the EU-RATE project in their schools.

Pupils

The respondents mainly address pupils aged 15-20 (39%), followed by the 8-10 age group (22%). In France and Italy, teachers' respondents have pupils in primary school (8-11 years) and are therefore with them every day of the school week. For Germany and Portugal, where the majority of pupils are older (11-20 years), this is due to the subject taught by the teachers, which is science and technology.
It will therefore be necessary to adapt to the maturity of the children for a good understanding of the proposed robotics workshops.

Workshop format

- The duration of a teaching sequence is mostly 45 minutes (33%), then 60 minutes (24%).
- The most suitable format for robotics workshops should be for an average of 15-25 students.

Opinion on robotics in schools

- Overall, the responses indicate a generally positive opinion. 53% of the respondents said that it was an extremely important motivational tool and 30% said that it was a very important motivational tool.
- Robotics is said to be useful in science subjects but with a big potential of transversality.
- Teachers respondents see robotics as an opportunity to develop their students' soft skills (problem solving, thinking creatively, working on a team, active learning...)

Italian and German respondents seem more involved in robotics projects than French and Portuguese respondents. Italians and Germans would therefore be better trained and more comfortable with the subject.

Robotics education activities

- Responses reflect a majority of activities organised by respondents (72%) involving robotics and programming, either in school or extracurricular time. The number of respondents in the extracurricular field is interesting (19%) and invites us to propose contents adapted to school and extracurricular time.
- Participation in competitions is seen as a motivating factor.

It could be interesting to further promote the competition axis by facilitating the transmission of information and participation through the EU-RATE project.

Materials used

- The respondents state that the majority of the schools in which they work are equipped with computers (95%), tablets (47%), robotics kits (36%) and 3D printers (27%).
- The most used programming interface is Arduino (21%), followed by Lego (20%), Mbot (10%) and Microbit (9%).

Expectations

- The respondents are primarily interested in turnkey educational solutions, whereas the pedagogical, software and hardware issues are fairly similar in the other countries. EU-RATE will have to respond to these 3 issues.
- The respondents' expectations of hardware and software solutions are primarily ease of use (39%), followed by low cost (29%). The open source aspect is important for teachers even if it does not go beyond the prerequisites of ease of use and low cost.
- In connection with the ethical issue, it is necessary, for teachers, to be careful about the origin of materials and security of personal data..

PARENTS

388 respondents

SUMMARY

Digital skills

89% of the respondents use digital tools in their work. As digital tools are used in the professional context of parents, it can be assumed that parents would or could support or encourage educational robotics projects in the extracurricular context.

Use of digital tools at home

- In the families surveyed, children are mostly equipped with their own computer (64%).
- Robotic activities are rather present in the lives of children in all four countries surveyed.

Dedicated budget

The respondents are prepared to spend an average of €50-100 per year (33%)

Other activities

- The amount of time dedicated to accompanying children schooling is more than 2.5 hours (43%) and between 1 and 2.5 hours (33%).
- The majority of the respondents spend more than 2.5 hours a week sharing leisure activities with their children (71%).
- It can thus be assumed that parents may have time to introduce or accompany their children in a robotics activity.
- The majority of children prefer video games (30%), followed by construction games, puzzles and board games (29% and 28%).

YOUNG PEOPLE 11+

485 respondents

SUMMARY

Profile and teaching subjects

- Two-thirds of the respondents (66%) are young men, with the age ranges split between: 11-14 (24%) and 14+ (76%)
- The subjects identified as favourites by the respondents are : mathematics (21%), science (22%), sport (20%). Languages (12%), literature (8%), arts (7%) and other subjects remain in the minority.

Digital / robotic skills

- When asked if they like to play construction games, 77% responded positively. At the same time, 76% of the young people answered that they liked technological and construction games.
- 48% of them think that robots are fascinating, and 35% find them fun.

Interest in robotics

- There is a strong interest in robot construction: 81%. This interest in construction could correspond to the fact that most of them have not yet built a robot (68%).

Notion of programming

- For 55% of them, they have not yet done any programming but they are very interested in learning (81%) and for a majority of them with their teachers (42%).

Learning about robotics

- The respondents want help from someone (69%): a teacher, tutor, trainer (52%), followed by internet tutorials and help from classmates (12%).
- The respondents who have already tried to code have done it with the Scratch platform (25%) and Arduino IDE or Ardublock (20%).

The majority of respondents seem to have the basic skills needed to learn robotic and digital programming. Their interest in construction and logic games, but also the preferred subjects mentioned (such as science or mathematics), are important positive points for developing a robotics education project for and with them.
The preferred learning modalities for robotics are face-to-face and adult or peer support.

In view of the large number of young male respondents, the challenge will also be to motivate and offer training and professional guidance for young women, who are underrepresented in this study.

STAKEHOLDERS

2 methods were chosen for collecting the views of the stakeholders :
- 125 questionnaires completed (Germany, Portugal, Italy)
- 18 stakeholders interviewed in France, 2 in Italy, 1 in Portugal

SUMMARY

Facilitating robotics

The majority of the experts were unanimous about the facilitating effect that robotics can have on complex concepts: 55% gave a score of 5 out of 5, while 32% gave a score of 4 out of 5. They consider that robotics can be "stimulating", "engaging" and "innovative".

Subjects and cross-cutting projects

- Primacy of scientific subjects but also the cross-curricular skills worked on thanks to the practice of robotics : technology 18%, science 14%, mathematics 14%, i.e. 46% of the answers alone. Then, the general pre-primary and primary school curriculum (19%) and then as part of the acquisition of practical and vocational skills (9%) or even art (7%).
- Robotics should be approached as an interdisciplinary tool, with the final objective to enlight citizens.
- Robotics and digital notions must become basic knowledge.

Robotics competitions

Robotics competitions is motivating for young people (44% gave a score of 5/5, 33% ⅘). It develops cross-cutting skills and allows us to work on projects which is a change from the usual school methods.

Robotics and inclusiveness

- The experts interviewed are unanimous on the inclusion lever that robotics can represent: 57% give a score of 5/5 and 25% a score of 4/5.
- It can help to “remove social blocks” for disadvantaged groups.
- It is imperative to work on the field of digital technology from a young age to avoid digital divide and raise awareness to avoid misrepresentation and stereotyping.

Pedagogical support tool

- 21% recommend video tutorials, 15% face-to-face training and 15% interactive resources. Written resources that can be accessed online or printed together received 25% of the votes ("pdf", "offline digital document" and "booklet"). As a first step, it is useful to popularise robotics in order to remove obstacles.
- From the point of view of the experts interviewed, quality training and learning resources - and in their own language (in addition to the materials) - are absolutely essential.

The perfect combo seems to be : material + training + resources + support.

Face to face training

- 15% of the experts think it’s important to offer face-to-face training.
- The teacher (or other educational actor) must be in the act of doing. Successful training is training in which the teacher is an actor, active in handling the robot, discovering what it is, programming, solving a complex task.

Hardware

- Concerning programming device and software, the answers are mainly divided between the computer and the tablet (35% each). The smartphone comes in third place with 26% of the answers.It could be useful to have a software solution and an application for tablets and smartphones even if mostly teachers have computers in class.
- Price - 38% of experts think that the price (for primary school) should be between 50 and 100 euros maximum, 30% that it should cost less than 50 euros and 13% between 100 and 150 euros.
- Ergonomic/ robot component - The challenge is to find the right balance between low cost, intuitive, sustainable, repairable, open source,buildable and manipulable, easy to maintain.

Robotics, a tool for the school, after-school and extracurricular continuum

- The experts confirmed that all the actors in education could and should take up the issue of robotics for the education of children and the public (teachers, parents, youth leaders, volunteers, civic service volunteers, associations, enterprises, public servants/elected people...). It can create a link between the different educational times of the child - between parents, teachers,..
- Extracurricular activities are perfect times for practising robotics, but there are obstacles, such as the turnover of youth leaders.
-

Ligue de l’Enseignement Nouvelle-Aquitaine interviewing Générations Robots and French Robotic Federation

HARDWARE AND SOFTWARE STATE OF PLAY IN ROBOTICS FIELD

In order to develop the robotic kit, it seemed necessary to have an overview of what was proposed in terms of equipment and softwares in the field of robotics. This will help the consortium to fit the expectations defined thanks to the pedagogical analysis done.

There is a really big number of possibilities to classify the different robots. The consortium focused on their type (how it moves : flying, wheels...) and saw the advantages and disadvantages of each. Then, the consortium analysed some sensors and actuators with their main characteristics, some programming platforms and languages that can be used, and compared ready made robots and self made robots.

TYPES OF ROBOTS

- Robots with chains, wheels, arms, drones or crawling robots

SENSORS AND ACTUATORS

ACTUATORS

- Motors : The main actuator used are the motors. Motors make the robot move : rotation of an arm, displacement (rotate wheels), translation (using for example an endless screw).Their speed, their torque, their supply voltage, their size, the way you command them, their precision are different characteristics we'll have to look at to choose them.
- Display : Mainly LCD displays are used to show informations about the robot or to give a message.
- LEDs : Some RGB leds could help the programmer for debugging, for lightening in the dark
- Relay : to activitate motors for example
- Servomotors : some sensors or robotics arms need servomotor to move.

SENSORS

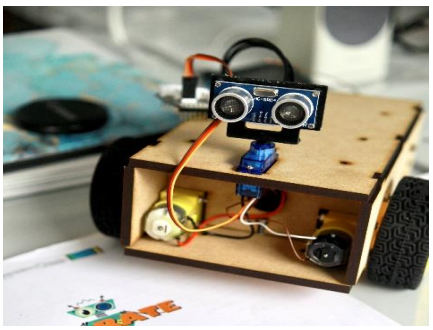
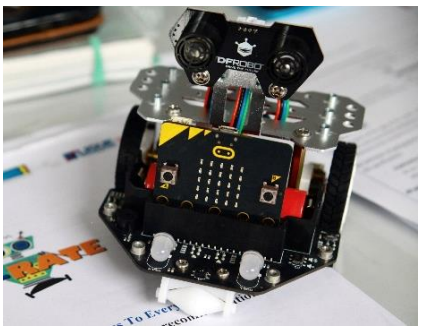
- Line sensor : for tracking lines or detecting the borders from the playground.
- Distance sensor : to avoid obstacles, to detect other robots, or to find an exit in a maze
- Camera : for reading letters or symbols, to detect objects
- Acceleration sensors : to detect shocks, to evaluate robot position in comparaison of the earth gravity.
- Gyroscope : to have a accurate rotation motion

PROGRAMMING PLATFORMS AND LANGUAGES

- Block programming : affordable, translated, no need to reading capacities / not easy to develop blocks for new robot, not open source
- Scratch, lego and Mbot are the software most used by the teachers interviewed, for younger students
- Python : libraries available, open source, used in high schools / syntax learning, only in english
- C : libraries available, faster than python, simplified version for arduino / syntax learning, less affordable than python, only in english
- Arduino is the language used the most for older students

READY MADE VS SELF-MADE

- Ready made : favoured by teachers, more easy to use
- Self-made : cheaper, unless it has a lot of features


Robot proposals by Goetheschule, Elektrons Libres, Scuola di Robotica

RECOMMANDATIONS FOLLOWING THE DIAGNOSIS OF PRACTICES AND AUDIENCES

PEDAGOGICAL

This part deals with the recommendations for the pedagogical pathways created, but also with the recommendations for the support of the educational actors in the handling of this pedagogical pathway, in order to facilitate its handling.

LEARNING SEQUENCE DESIGN

GENERAL REQUIREMENTS

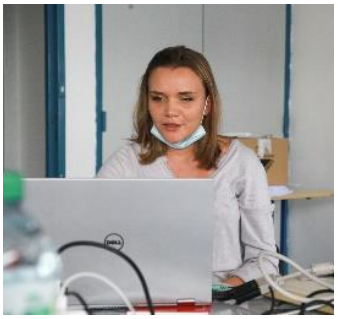
The actors of the EU-RATE project are committed to :

- Quantify and qualify the needs of each audience before the production, and identifying the similarities and differences in the practices and curricula of our 4 countries;
- Define the architecture of the production according to the needs;
- To create one or more turnkey pedagogical pathways that are progressive in terms of knowledge and skills acquisition, usable for the target audience, 8-10 and 11-14 year olds;
- Usable by all categories of educational actors (teachers, extracurricular activity leaders, volunteers, civic service volunteers, parents);
- Involving stakeholders, experts, teachers, youth workers and young people aged 14+ in the design of the pedagogical pathway, for a production that is as close as possible to the needs of young people;
- Providing generic and technical knowledge in robotics, but also dealing with general issues of digital citizenship for a better understanding of the world;
- Translating the pedagogical pathway into English, French, Portuguese, German and Italian.

The objective being, in the long run, to increase young people's interest and success in science, technology, engineering and mathematics, making them actors in their use and promoting innovative methods, through playful robotic teaching kits accessible to all.

RECOMMENDATIONS

- Build a complete and adaptable pedagogical pathway
- Propose 2 different pedagogical pathways, one for each age group
- Populare and allow appropriation by all educational actors
- Encourage interdisciplinarity and a project-based approach



SUPPORT OF EDUCATIONAL ACTORS

GENERAL REQUIREMENTS

The consortium have come to the common analysis that we need to invest in teachers as transformers and awakeners if we want to empower the new generation of citizens in using digital technology effectively and in a responsible manner. But other educational actors also have an important role to play in learning about digital technology and robotics. Animators, volunteers, civic service volunteers but also family members, parents and grandparents feel concerned by this issue and should, if they wish, be able to appropriate the productions made for the EU-RATE project.

In order to enable everyone to take ownership of the project, the project's actors have undertaken to:

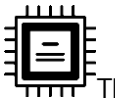
- Create a turnkey pedagogical pathway (see part below)
- set up face-to-face training courses for educational actors in each country, to enable them to test the kit developed, with evaluation at the end of the training (1 per structure, 25 participants maximum, 2 days of training) , do an with evaluation + feedback questionnaire several month after the training
- Create an online course on Moodle platform (example) or other existing platforms (open source and free) of at least 6 hours about robotics and media literacy and the robotic kit for teachers
- Have a transnational approach to create an online training for the teachers, youth leaders, educational actors all over Europe. We will then adapt this training to the culture and needs of each partner country thus providing a European response to a European priority.

RECOMMENDATIONS

- Immersive and relevant face-to-face training
- Comprehensive distance learning courses
- Diversified and complementary resources
- Network and partnership
- Develop the co-education approach

HARDWARE

GENERAL REQUIREMENTS



The consortium is committed to produce a robotic system with its experimental environment, which should be easily and cheaply reproducible, open source, extensible to different teaching practices, and, as far as possible, with components manufactured in europe.
As the hardware should be adapted to the age of the learners, the consortium decided to create several versions of the robot, one for each age group, 8-10 and 11-14 years.

The choice of components (sensors, controllers, actuators...) and design should be chosen according to the age and content of the school curricula of the different countries, in order to meet the expectations of each.

RECOMMENDATIONS

- Design & components
- Low cost (between 50 and 100 euros),
- Intuitive,
- Sustainable and repairable,
- Open source,
- Buildable and manipulable,
- Robust,
- Easy to maintain.
- For 8-10 year olds, the robust, inexpensive and intuitive aspect should be favoured,
- For 11-14 year olds, the constructible and manipulable aspect should be favoured.
- Technical documentation : complete, totally translated, creative commons
- Provide maintenance support

SOFTWARE

GENERAL REQUIREMENTS

The consortium is committed to use accessible and easy-to-use programming software at the lowest possible cost, in 2 part :

1. Propose a documentation to set up a software platform to program the robots developed. This should correspond to the expectations of the project: use free software, to be easily modifiable and adaptable to the needs of the project, to be easily distributable and installable on free and non-free operating systems, and finally to be easy to use and user-friendly for the end user, children and teenagers.
2. Develop libraries for the chosen software platform to allow the end user to use all the functionalities of the hardware. These libraries in their presentation as well as in their use will have to be easily importable into the robot programming platform and adapted to the robot as well as to the age of the young people who will have to program them.

The whole set will be delivered in the form of packages that can be downloaded on an internet server, the content of which will remain accessible even after the Erasmus project.

RECOMMENDATIONS

- Digital device

For 8-10 years old : Scratch or others programming platform
For 11-14 years old : Arduino or others

- Technical documentation

NEXT STEPS

☑ **Year 1 > October 2020 – September 2021**

- Identification of the skills to be acquired by country and by public (age and specifities of the publics, associated educational objectives)
- Definition of pedagogical constraints (learning sequences, software, hardware)

*Oct. 2020 > Kick-off meeting (France) online
*March 2021> Transnational Partner Meeting – TPM- (Italy) online
*Sept. 2021> Publication version 1 finalised

☐ **Year 2 > October 2021 – September 2022**

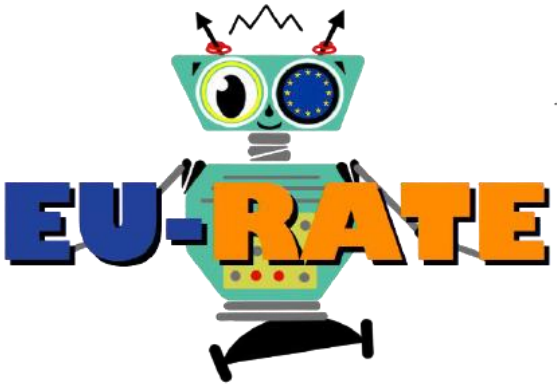
- Design of learning sequences and creation of associated teaching formats
- Hardware and software design
- Prototype production
- Production of technical documentation
- Tests, analysis, evaluations, feedback remarks
- Learning teaching training activities – LTTA- with 14+

* Throughout 2021-2022 > TPM and LLTA

☐ **Year 3 > October 2022 – July 2023**

- Prototype productions
- Tests, analysis, evaluations, feedback remarks
- Production of technical documentation
- Implementation of associated educational formats
- Tests experts

Throughout 2022-2023 > TPM, LLTA, multiplier events in each member consortium country and final conference in France



EU-RATE Robotics Access To Everybody

Complete publication here

Version of september 2021

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