**DESCRIPTION OF THE PROJECT**

The aim of the project is to develop children's STEM (STEM is an acronym for science, technology, engineering and mathematics) skills by introducing them to LEGO Robotics.

LEGO ROBOTICS fits all ages and all learning types. By working with LEGO Education, our students can experience that they actually have a greater talent for science and engineering than they expect. This is a unique Robotics for STEM Erasmus+ project, because it allows us to teach science and technology/robotics in a very rewarding way. It also allows our children to investigate, plan, test and implement their ideas. You see them enjoying themselves, getting results that they are happy with and answering problems we have set them.

Robotics has established itself in recent years as a very useful educational tool for the following reasons: educational robotics enables attractive challenges for students; scientific thinking is stimulated because the student will have to create the hypothesis, draw experience and testing experience;use of new technological tools, software and new learning environments. This project will have great importance for schools as it may serve as an example and encourage other teachers to develop similar projects.

The project works primarily directly with 7-12 year old girls studying to pursue a career in STEM. The project also works indirectly with other organisations working in the field of gender diversity and STEM. With women currently making up almost half the labour market, (46% of the workforce in the UK), the partnership expects to see a range of benefits by encouraging more girls into STEM subjects after compulsory education. It also aims to address an ongoing skills gap in the STEM sector at European level, a shortfall in women and increasing drop-out rates of girls in STEM.

Two interesting findings:

\* In the UK, only 27% of female STEM graduates went into a science, engineering or technology career, vs. 54% of males (ETB, 2008)

\* Science interest consistently declines between the ages of 8 and 13, across a sample of member states (SECURE project, 2013), both in boys and girls

Project objectives

\* To increase students’ interest in STEM education and careers and introduced them to all available new trends in technology.

\* To provide tools and methodologies to facilitate the acquisition of STEM skills.

\* To develop collaborative partnership between schools and the wider community in formal, non-formal and informal learning.

\* To tackle the shortfall in women in the STEM sector at European level and increasing drop out rates of girls in STEM.

The need for this project is identified by the specific objectives of the ERASMUS+ Programme and namely to [improve the level of key competences and skills with particular regard to their relevance for the labour market..] and [foster quality improvements, innovation excellence and internationalization at the level of education (...) through enhanced transnational cooperation..]. The first, and long term, rationale behind this proposal is in fact that one of enhancing the attractiveness of STEM (Science, Technology, Engineering, and Maths) disciplines by means of using robotics and automation, which have been proven to be a successful leverage mean. The proposed partnership aims to respond to the high expectations coming from a labor market that values not only their academic background but also their broader competencies and skills developed during the learning path.

Current challenges STEM teaching in schools face:

- There is a big gender difference of 15%; more boys are interested in STEM subjects.

- Region differences; Southern EU countries are more interested in STEM subjects.

- Outside curriculum: numbers go significantly down, although boys do more even outside classroom than girls.

Education is therefore called to respond to the urgent need of highly skilled engineers and technologists and labour supply must match demand as recognised in the Flagship initiative “An Agenda for new skills and jobs” in the EUROPE 2020 strategy of the EC.

One of the cornerstones of the European project is transnational co-operation: working together with various actors in other Member States to develop and improve methods and systems to promote STEM in schools. Not only does transnational cooperation generate added value in the form of better and more sustainable project results, it also contributes towards shaping a European perspective and way of thinking a true European mindset.

As a result of our ongoing evaluation it is observable that the willingness among the project partner schools to continue with transnational cooperation after project completion is high.

**SHARED RESPONSIBILITIES:**

The background of schools, profiles of families and students in each country are suitable to run this project. The project teams are experienced in seminars and presentations. There are dedicated, creative, innovative, cooperative, friendly teachers who have high digital and communicative skills and fluent in English in every team. The partners can contribute to success of this project by exchanging experience, bringing new ideas and cooperation.

The Italian school will be responsible for;

– providing its experience on the field of study "Games in Extracurricular Activities"

– providing its experience on the field of study "Business Studies from Early Age"

– arranging an educational seminar given by professionals for parents and students

– hosting a transnational project meeting

– producing a manual about the good practice

The Turkish school will be responsible for;

– providing its experience on the field of study "Robotics for the Future"

– setting-up more global dissemination activities

– arranging an educational seminar given by professionals for parents and students

– hosting a transnational project meeting

– create and manage our Facebook/Twitter account

– producing a manual about the good practice

– setting- up and looking after a project website

The UK/Northern Ireland school will be responsible for;

– providing its experience on the field of study "ICT for Life "

– providing its experience on the field of study "Websites R for Us!"

– arranging an educational seminar given by professionals for school principals and local decision makers

– hosting a training event and a transnational project meeting

– producing a manual about the good practice

The Lead School will take responsibility for the delegation of appropriate tasks to each of the partner schools. A designated co-ordinator will be assigned for each partner school to ensure that tasks are undertaken and deadlines kept to within each of the schools. They will report back to the lead school on a regular basis using email, twinspace and skype as well as reporting at the TPM events as scheduled per application. The Lead School is also responsible for the ongoing evaluation on an international/transnational scale of each module/activity we propose to deliver each year.

**IMPORTANT!**

\*St Brigid`s Primary School as the leading school creates the programme plan for the entire 3-year based on our shared eTwinning project experience and after many consultations between the participating schools. There will be added modules schools can voluntarily choose, also task delegation plays an important role to make sure everyone has the opportunity to fulfil its potential.

\*As this Erasmus+ project consists one children mobility, six transnational project meeting and one training, our logistical arrangements focus on to make arrangements of flights, accommodation and local commuting. Other than that, St Brigid`s PS arranges LEGO Mindstorms sets, Resource Kits, training materials for children and teachers as and when needed. This will be done in a timely manner.

\*St Brigid`s PS also organises teacher training event.

\*Each participating school selects the desired age group (as previously agreed) for the project and allocates a control group before the programme starts which we use for future evaluation purpose.

\*We all create a list of local schools who agree to help us by using our teaching materials for their own children so that we can increase the number of children involved, while to keep the costs and need for further funding minimum.

\*As most of the children speak other languages than English as their first, all participating schools agreed to provide extra English lessons before and during the programme to make sure all children can equally participate and cooperate with others.

\*Schools are asked to work out a fair system how they select the participating teachers for the mobility part of the project to comply with E+ rules. To ensure that all mobility projects run smoothly we aim to get the names of participating teachers 1 months before the event takes place as well as all schools must name an extra person should we need someone to join with short notice.

\*Each participating school notifies the local council/decision makers about this project to seek for their help and support, also to make sure that we get the highest publicity and attention locally.

\*Thorough research has been carried out to establish the needs of this project by the participating countries so that we have a better understanding on what are each of our needs and wants therefore we can tailor and delegate our forthcoming activities to specifically fulfil these needs.

\*In order to guarantee that AWOL or sickness doesn't have an unfavourable effect on our programme as a whole, we ask everyone to present a list of teachers and students who can join as and when we need.

\*As of our risk management and approach to ensure safety of participants of this programme we make sure that each school names any children with special needs so that we all can prepare to accommodate their needs as well as any special request a teacher might have (ie.: visa needs for mobility). We must safeguard our children's physical and mental well-being therefore an enhanced child protection plan has to be agreed by all members before the programme starts.

\*One of the challenge will be to hold the group together and to make sure that the coordination of different activities is done perfectly. It requires a clear set of rules how we delegate duties and must have a controlling element that guarantees that we all are notified shall we be off-track from the plans on time. Also, we must be sure that our enthusiasm lasts to the end and all our members are committed to this project and all its tasks fully.

\*As each school has its own strength they bring to this project and to capitalise on it allocation of tasks amongst partners including lead on specific tasks are crucial.

**EXPECTED RESULTS**

Contemporary pupils of primary schools represent a low level of basic mathematical and scientific literacy competences. Innovative technologies give a wide scope of possibility to solve the problem of low competences by implementing them into the subjects’ curricula.

The aim of LEGO ROBOTICS is promoting project work approach and independence on each step of experimentation (from conception, to design, modelling and execution), with the final effect being an improvement of competencies and increased interest in STEM subjects among pupils.

The mission of LEGO ROBOTICS is to promote the synergy of these areas of learning in an educational context, with the development of resources, concepts of pedagogical practice, reviews and evaluations set within a research-informed and research-driven framework.

The motivation of making the STEM disciplines more attractive to students in schools is to contribute to the headline education target of the Europe 2020 Strategy, namely to reduce the school-drop-out rates. Related to this, as a more specific approach, the present project is focused on the fact that the level of employability, competitiveness and wealth of our society will depend on the ideas and skills of its population. These have always been the EU’s most important assets.

Expected results

1 Enable teachers to lead and facilitate more progressive approaches to STEM lessons to allow for more playful, creative and hands-on learning

2 Embed opportunities for hands-on learning throughout the curriculum to ensure that students of all abilities have the chance to learn by doing

3 Creativity should not be regarded as a ‘nice to have’ and restricted to arts subjects, but as fundamental to successful teaching and learning in STEM and other subjects

4 Ensure that non-subject-specific skills for the future such as communication, problem solving and critical thinking are integrated throughout the curriculum

5 Creative approaches towards teaching and learning should be given more credit than they are given now when inspecting and evaluating school performance.

6 We expect to double the number of girls being involved with STEM related projects in our schools each year, therefore we forecast a total number of 600 girls by the end of the 3 years.

By introducing LEGO to improve STEM and ICT subjects in our schools, we hope to inspire and engage others to transform traditional learning and teaching, so that it becomes a more relevant, engaging and successful experience for every student as we prepare them for their future.

Several researches show that there is a strong correlation between learning through games and better academic achievements in schools. Therefore, throughout the span of the programme, we have activities to increase students` knowledge and abilities in STEM subjects and business studies with the most popular being in a group environment and teaching STEM creatively. Our own pre-research (Pieron-test) shows an average of 12% increase Quality of Attention in only 10 weeks structured study of STEM and ICT through game-based learning in schools. We would like to carry on with testing and monitoring our children`s academic progress and eventually be able to measure by how many points our children can do better on different tests done in schools compare to other children who is not involved with our project at all.

**PROJECT MANAGEMENT**

**ACTIVITIES EXPLAINED**

**Transnational Project Meeting:**

**IMPACT**