EUROPEAN FOCUS GROUP REPORT

Contents

Introduction

This Consolidated, European level report is based on the national focus group reports.

This document gathers all the information and suggestions on how existing schools can be restructured for STEAME activities and how future schools should be designed to run STEAME activities. These information and suggestions are collected and reported in this document, from all the focus groups done by each partner organisation.

> *The challenge and consequently the innovation of this project is to provide guidelines for changes in existing school organizational structures that can be realized according to the flexibility of current structures. We will also define how future schools should be designed to run STEAME activities.*

Definitions:

TYPE A Schools (how to modify structures in existing schools)
TYPE B Schools (how new schools should be structured)

The focus groups were conducted to to discuss with the expert participants the elements in existing schools' structure that are subject to change to support STEAME activities and guide the structure of new STEAME schools.

In total 5 focus groups were implemented from 5 partner Countries, Italy, Greece, Cyprus, Bulgaria, and Poland. The consortium took a hybrid approach when conducting the Focus Groups, having 53 participants online and 18 physical participants. The total number of focus group participants was 71. Lastly, the participants background varied from schoolteachers, school principals, HE teachers, students, teacher trainers, architects, education policy makers to IT experts.

Discussion topics in relation to the STEAME project survey

1. Do you agree with the opinion of 75% of our respondents that the STEAME program should shape the education process of the school and the classroom design, not the other way around? What are your thoughts, ideas and experience?

All participants agreed that the STEAME programme should shape the entire educational process in the school. This would ensure that teaching by separate disciplines and standardized curricula, which is still carried out in schools, could be finally surpassed or modified. A part of the participating teachers mentioned some scepticism reported by many of their colleagues to these changes. Difficulties in finding the acceptance to implement every process of change to STEAME schools and dynamic school curriculum were observed. For this reason, they expressed that the main challenge will be the implementation of STEAME schools and activities and the cooperation of teachers, rather than the design of the classrooms and the school itself. Also, some of the participants argue that

this process should be also further supported by the school principals or school heads who are capable of making a change.

Furthermore, the importance of interaction was highlighted by participants in Greece. Schools should be open to cooperation and collaboration, by linking the local and the international community. Therefore, internationalization is considered an important element for future schools. It was also suggested that the schools' timetable could be more flexible, for example, except of the basics, each student could choose how to create his/her own timetable according to his/her interests, thus the timetable itself can also be adapted to the STEAME philosophy.

A participant in the Cyprus Focus Group stated the following important statement:
"I consider that the goal is for students to love basic research and this can be done through STEAME activities"

2. What is your opinion regarding the <u>classroom layout</u>:

2.1. it should be aligned with the outcomes that school principals and teachers aim to achieve when implementing STEAME and blended learning.

Most of the participants agreed with this statement. First, it is the overall aim of the school and the team and most importantly – students' motivation. Thus, the new methodologies and approaches should be combined and aligned with the design of the school – i.e., if they will learn by project-based learning then students need space for teamwork and equipment to support the work on projects and experimentations. Moreover, some Italian teachers described schools visited outside Italy, where the environments are certainly more in line with a STEAME teaching and learning: *schools equipped with laboratories and 'working spaces' where students realise 'products' and provide services directly to the publi*c. An Italian Vice-Principal of a high school mentioned the innovation of his school structure, where even just colouring the walls has substantially changed the environment, making it more comfortable for adolescents to work and study in.

2.2. Most of our respondents (60%) to the survey think that to achieve blended learning the STEAME classroom should be a large room, with open space interior design and all this part of a flexible infrastructure. What are your thoughts, ideas, experience?

All participants agreed on the fact that open spaces are more creative and represent open minds, which helps students to be more innovative. Some of the major skills that students should build in the 21st century, are flexibility and critical thinking. Classroom's flexibility contributes to build these skills. Moreover, getting students to work in groups, requires large flexible spaces to allow freedom of movement so as not to hinder their interaction, which in confined classrooms with fixed furniture and layout, often creates confusion. All participants think that to achieve blended learning, STEAME classroom should be a large room with open space interior design.

> "The classroom infrastructure should be flexible, but we should certainly include smart and flexible desks where students can work. This cannot change". – Cyprus, focus group participant.
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> In addition, some participants mentioned that open space should be combined with labs and IT equipment and space could be further divided for different tasks/activities in a creative environment.
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> Furthermore, many Italian participants even though they strongly agreed that flexibility in school structure would be the ideal environment for STEAME schools, they expressed their concern in implementing STEAME activities in Type A schools[1]; schools' structures are old as they were built years ago and have undergone little maintenance. The current size of the Italian classrooms certainly does not allow for large open spaces.
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> Lastly, some participants from Greece mentioned that forming their experience in both open and close spaces is always necessary to create the corresponding mentality to both students and teachers. Thus, a suggestion was made for having a combination of spaces (large open spaces and small close classrooms) that are shaped in a way that inspire students to be creative.
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> A Cyprus participant suggested that in existing old school structures, a dual model learning system can be applied, standard system in the morning, and STEAME learning in the afternoon, formalizing the whole learning concept through a new operation of all-day schools.

2.3. 93,4% of the respondents think that the classroom furniture has to be moveable in order to enhance layout flexibility. What do you think?

> ● All the participants agreed that furniture must be moveable.
> ● The chairs should be colourful with the ability to spin around so that children can interact with one another.
> ● Light and individual desks so that they can be moved and re-arranged easily. Also, the desks of students should have such a shape so that when we put them together, they will create polygons enabling teamwork. Lastly, they should have wheels.
> ● Mobile whiteboards or replace completely the traditional black or white boards by a set of digital boards and displays well visible from any place in the classroom, where the teacher or students should come with their own tablets.
> ● Moving walls to help the division of spaces and the carrying out of different tasks and activities simultaneous. Also, this way rooms can be smaller and/or larger when necessary.
> ● An Italian engineer/teacher set out the idea, launched in his school, of transparent walls that, however, did not meet with much approval by his colleagues.
> ● Separate spaces/zones in the open space.
> ● Proper lighting and air conditioning in every space.
> ● Soundproof spaces.
> ●Teachers should be able to take any seat (if standing is inconvenient) to perform their work.

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[1] TYPE A Schools (how to modify structures in existing schools)

It was noted by some participants that many solutions can be found with a lot of inventions that can be of low cost to implement them in TYPE A schools. Also, students could be involved in this process of creating solutions.

2.4. Do you think that the classroom should be purposefully designed for STEAME or in a classical way?

Almost everyone agreed that classrooms should be designed for STEAME. Participants mentioned that the classroom should be more flexible and more thoughtfully designed. However, the classical way of students sitting by a desk should be in the same context. Other elements mentioned are repeated above in the report. Bulgarian participants mentioned that old and new approaches can be applied, at least for some years.

It depends on how type A schools (existing schools) are willing to adjust to the STEAME design. Most of the schools in Bulgaria are traditional and will need work to adjust. They also highlighted the importance of teachers as key factors who should be open-minded and collaborative, ready to take up new roles and work together with students.

2.5. In terms of type of classrooms, do you think that they should be separated for each grade level, STEAME activities and Humanity sciences; supplemented by two auxiliary classrooms (for STEAME by a computer lab room and for Humanity's by a room for research and brainstorming activities; defined by the furniture, the architecture or space, and the finished elements of the interior?

Many ideas and opinions emerged with this question. Focusing on Italy, most participants believe that STEAME teaching and learning must also be implemented using IT tools so that it can be useful for the humanities. Alongside IT laboratories however, all classrooms should be equipped with mobile computer tools such as tablets or portable computers. On the other hand, when moving our focus to Bulgaria, the participants mentioned that it is better to have the STEAME space/zone/corner separated, as science requires some equipment and technology to be used. However, no matter if the studies are STEM/STEAME/Humanities the attitude is the same – students need motivation and innovative ways of learning to attract their attention. Lastly, participants from Greece agreed that the merge of STEAME activities and Humanity sciences would need classroom reconfiguration, which would require more personnel and higher room density (space per student). The reconfiguration could also be easier than changing the whole class, it might be accomplished with the help of technology, e.g., AR/VR labs. Technology can have a crucial role in this flexibility.

3. Regarding the overall <u>STEAME school space</u>

3.1. Most of our respondents (73%) think that it should cover the STEAME Learning and Creativity plans. What do you think?

Participants agree with the survey result by stressing the importance of creativity in learning. Therefore, the school spaces should be designed to adapt to the specific moments and phases of the Learning and Creativity Plans: - space for teachers' meetings and planning; - technology-aided rooms for students' activities (inquiry and discovery- collaborative tasks); - laboratories and workshops for creative productions; - conference rooms for meetings, also with community members and business representatives. Next, it was stressed again that it is more important to have the right attitude and teach in a novel and interesting way. Some participants from Greece were not sure if they can distinguish the first two (project-based learning & inquiry-based learning) with the last one (STEAME Learning & Creativity plans). Participants, also said that there is no clear distinction between these models, for example, project-based learning includes research and exploratory learning along with the concept of project, and in this sense it includes all other forms of learning as presented in the question. Whichever, STEAME Learning & Creativity Plan gives the opportunity to students to choose which path to follow, however all forms of learning will include research procedure or a discovery at the end. As a result, if a class setting covers one of the aforementioned, it covers all others too.

3.2. Almost 70% of the survey respondents think that it is the structured group work within the project-based learning and student groups for idea generation, discussions and networking. What do you think?

All participants in the focus groups agreed that working in groups is beneficial for teachers and students. Group work for generating ideas, discussions and networking should also be the basis of the organization of the STEAME school space. Lastly, Bulgaria has expressed some concerns since newly established schools are very hard to create in Bulgaria. In the big cities there are many private schools who lead the trend and apply innovative design and approaches. The classical schools can be re-arranged and adjusted (Type A schools). In both types, students are the leading party. Therefore, STEAME requires mostly teamwork, creativity and generating ideas.

3.3. What spaces should be available in STEAME schools?

It was mentioned that there is a need for 3 or 4 separate classrooms where students will be able to work and implement research, the participants called them "working classrooms". Such classrooms could also be used by teachers to discuss with their colleagues for other various projects (preferably STEAME projects) to be implemented. Other participants mentioned the importance of having a space where students or teachers can meet in a "relaxed" environment to get to know each other, some even called it a "school pub for students and teachers". This will be especially useful for teachers to meet and discuss their interest or teaching methods to achieve collaboration within the teachers to implement STEAME learning plans to students.

Students should feel welcome in the surrounding space and feel excited to be present there. Even if that includes a small kitchen to cook their own meals etc.

Also suggested was the possibility to have such a space that are all together but work separately [see figure.1]:

Figure 1

Other Ideas for STEAME schools: (see figures below)

Figure 2

Figure 3

Figure 2

Source of figures: Google Images

76% of the respondents support the space for personalized learning, individual research activities, assisted by online or offline content (texts, graphs, pictures, audio and video content).
What do you think?

Some ideas shared:

- Tablets with cases in a box. Routers in classrooms if not wi-fi.
- 3D printers
- Computer lab with Virtual Reality capability

Some participants reported about their experience in visiting schools with huge libraries where there were spaces for both the activities of consulting physical texts and the presence of computers for online searches. Within them there were also spaces for small groups enabling the consultation of for learning offline, a practice that digital natives are not so accustomed to, but allows for blended learning and better responds to the requirements of multiple intelligences and learning styles.

Moreover, many participants agreed that the above should be available but aligned and used for the purposes of STEAME. It is also recommended to use the approaches of some leading universities and give students such tasks and activities to better prepare them for higher education treating them like adults. Group work should be combined with individual tasks especially for some experiments, exercises. This is also in response to the individual learning style to be considered.

3.4. *Shared ideas:*

- *The letters in STEAME shouldn't be addressed separately but as a whole, therefore, no different classrooms of different uses will be useful.*
- *A classroom where a student can do all of the activities involved in the project having the research corner, the corner for creation, regardless of the subject that will be used for the creation or the research or other elements of the project.*
- *The process should be faced as a whole, and the classroom should reflect that as well.*
- *Creation laboratories with equipment and materials.*
- *No books and all books should be digital.*
- *Students should come to school without school bags, only with tablets where they can keep everything.*
- *Schools should have internet but NO WIFI.*
- *Schools should be all day's schools 8-5 pm work without homework. After 5 pm students should have play time.*

What do you think?

All the participants agreeed with the shared ideas. Schools should be modern, colourful with flexibility to organize the process and most of all – identify the needs of their students. The process should be faced as a whole, and the classroom should reflect that. Teachers should know their students and be flexible to adjust. However some conserns and suggestions where made:

One participant from Greece indicated from her personal experience that: "The level of success depends on the culture of each country. The student's and the teacher's culture have the most significant role. For this reason, we have to adapt a model deriving from a certain country to successfully implement it in another country". That is why many participants stressed that research on how effective is the model we implement in our own country, is important. Lasty, many participants from Italy mentioned their concerns to the difficulties encountered on a daily basis in Italian schools. Some complained about the lack of cooperation of colleagues who prevent STEAME subjects from being treated as a whole, while others have also expressed the difficulties arising from the organisation of school time in Italian schools. For STEAME teaching and learning it is necessary to have students in attendance for several hours and in Italy only primary schools provide full-time. Secondary schools may be open to students and teachers for extracurricular activities but curricular activities are scheduled in the morning. Therefore to implement STEAME projects on a regular basis, it would be necessary to restructure not only the schools' spaces but also the schools' timetables.

What is your opinion about the design of the space and the classrooms?

- Classrooms should have a corner with small couches and rug. The rug should not be in the whole classroom as it will be difficult for the furniture to be moved around.
- More storage spaces fixed either in one place or with the ability to move around.
- The classrooms should be aired properly, to have the proper lighting and be soundproof to avoid distractions.

- Organization of materials in boxes
- A corner for hands-on activities. It is ok to be messy there.
- Classrooms that can expand.
- Easy movable furniture for re-arranging the working space.
- The classrooms should be as modular and mobile as possible.
- Several building blocks-elements of different kinds and shapes that can be linked together to enable students to achieve the modelling of several artefacts.

78% of our respondents think that the design should support the STEAME teaching mode for providing life-changing opportunities and post-secondary success and support critical thinking collaboration with technology-enabled, teacher's led instruction for each grade.
What do you think?

Participants also shared what emerged from the survey. For example, the experiences that children manage to do with participation in Erasmus projects was discussed. The opportunities that these students have, even at a very young age, are those that help change or rather evolve their lives and enable them to achieve success beyond school. Particularly a student form Cyprus mentioned that along with his teacher he managed to win competitions by doing the work for the competition in "gap hours" during school days. Later he highlighted that if such activities were implemented and adapted into the regular school timetable, we can imagine it could bring exceptional outcomes rather than doing work by trying to find time in in-between gap hours.

On the other hand, some participants point out that some obstacles emerge when these projects are proposed inside their schools, mainly due to the difficulty among the more stable teaching staff of accepting changes, which may destabilise their long-standing practices.

In general, it is extracted that STEAME links the skills students develop with the needs of future professions and it is important to enable them to succeed in their future workplace. In that sense, the STEAME teaching approach can provide life changing opportunities and post-secondary success. Technology may enhance the effectiveness and success of such an approach if used appropriately. It is evident that when talking about STEAME, Technology, the 2nd letter of the acronym would play a major role.

4. *Would you share your experience and/or best practices of STE(A)M(E) model of schools?*
What is their organisational structure and design?

BEST PRACTICES/EXAMPLES you can share:

Some private schools in Bulgaria are ahead – in most of them there are modern science and computer labs, colourful furniture, chairs, students sit in circle and have space for free time, homework, individual and group work. Teachers have their "doors open" attitude to listen to students, give consultations, spend time after classes with them, help and work together on projects. They very often take the role of coaches and the study process is blended – do work in class and then coach/mentor the teams online after classes.
From the focus group in Greece, the following practices were extracted:
The organizational structure of a STEAME school can have multiple aspects.

The first aspect is the timetable. Students except of certain courses, included in the national curriculum, should have the opportunity to choose extra-curricular courses and be able to work in groups independently, either inside or outside their school's space.

The content and topics of these extra-curricular courses should be flexible and always in line with real-world situations, so that they can be able to discuss and study them or even create topics that are related to current affairs.

Ideas:

- Large writing boards
- Easy ways of placing posters, infographics or other artefacts created by students but also there can be digital interactive touchscreens, placed horizontally or vertically that can be used for multiple activities.
- Often change the layout of a classroom just like the four seasons of the year.

Some major concerns came to the surface from the Polish participants about the constraints in implementing STEAME schools:

A typical school cannot afford separate rooms for physics lab, chemistry lab, robotics lab etc., because it needs all available rooms for teachings. Labs are potentially dangerous (e.g., chemical substances) or subject to vandalism, this requires supervision which is not available. There is a general issue with granting access to school spaces for students not supervised by a teacher. Usually, classes are locked during breaks. A solution for this could a VR Laboratory.

Other comments and suggestions:

- "The most important thing for me is to, firstly, set a set of guidelines on how we can implement STEAME schools or activities in existing schools and how to meet the peculiarities that exist in the school environment within each European country."
- The designing of the future STEAME schools should be done carefully.
- STEAME schools are for all students, not only for gifted students.
- One suggestion to start implementing STEAME activities in schools is for each teacher to implement STEAME activities with his/her class and participate with their own will in STEAME projects. "Create the future STEAME schools' step by step."
- Another suggestion is to create an afternoon STEAME school. Or create a half school day implementing STEAME activities.
- Another suggestion was to create a school where students come at 8 in the morning and leave at 5 in the afternoon (an all-day school). The afternoon hours will be to implement only STEAME activities. Also, the kids should have a lunch break at 1-2 where they can eat in a catering kitchen and have a proper lunch. Of course, the implementation of this will require great costs.
- There is much interest in the STEAME model of school because everyone agrees that this would have an absolutely positive impact on both the teachers and the learners.
- existing constrains should be considered, we need realistic, feasible solution.
- More flexibility in the whole education system is urgently required.

Conclusions

The Focus group was a great way for getting meaningful insight on how existing schools can be restructured for STEAME activities and how future schools should be designed to run STEAME activities. Many great suggestions for improvement were made and many ideas were discussed. Certainly, the focus group has helped to clear the next steps to be taken and to improve the quality of the outputs, and the project in general. Especially important was that we got the chance to see the specific features and difficulties faced in schools and education system in each Country of the consortium. Overall, the focus group was successful with a lot of interesting ideas shared.

The main conclusions and recommendations concern the positivity of the project idea. Local authorities must be informed about the results of this project and consider seriously the design of the STEAME school that will be part of the tangible results of the project. Already existing schools should be improved to welcome flexible furnishing and transform spaces into more appropriate learning and teaching environments; future schools should be built according to this new innovative design.

Teachers must be open-minded, flexible, generating ideas and listening to their students. Students should be encouraged to give ideas for the school design, too. Student council should be organized enhancing the collaboration between the staff of the school and the teachers to apply new models, design, methodologies and participate in any experiments and testing of new models.

The project coordinator said: *"The school of the future is the learning home of the students and students have the right to choose their home".*