

Scientify short-term joint staff training event: “International Teachers' Room 1 - Guidelines for Project-based Learning”

Minutes

Sobreda, Portugal, 8th – 12th November 2021

1. Introduction

The first joint staff training event of the ERASMUS+ K229 project **Scientify** was held in Sobreda, Portugal between 8th and 12th of November 2021. Educational and social programs were conducted as planned in the application and detailed in the plan of activities (see Annex 1). Sixteen teachers from the 4 schools of the partnership participated in the event (see Annex 1) whose topic was **international teacher's room 1 – Guidelines for project-based learning**.

2. Summary of educational and professional activities and workshops

- 8th November:

After the opening welcome speech by the hosting school's headmistress, Ms Sara Moura, all the participants introduced themselves and shared their expectations towards the project in general and the meeting in particular.

This introduction to the meeting was followed by a Lecture on *People and Teams – secrets for a successful project* by Ms. Adelaide Franco, an expert on management and Mindset, teacher of several universities and consultant of 15 schools in Almada, including the hosting school. The aim of this lecture was to help the group to build up an efficient team. It started with an introduction game called “Faces”: participants should pick a human face from hundreds of picks and randomly pick a card with an adjective. Then they should gather in pairs to answer several questions which would lead to getting to know each other by answering the questions: What is helpful to know your colleague better? Do you have anything in common? What is your biggest challenge as a teacher?

Then after collecting the answers and reacting to them, the lecturer recalled that “The right team for a project is the one that brings together necessary skills for the good implementation of the work and the diversity of ideas and opinions and creating an environment in which each can apply their potential”. 5 principles of successful teams were listed: clarity and shared objectives, clarity in responsibilities, collaboration and communication rules, respect and trust and effective leadership. The distinct phases in building teams were also addressed: forming, storming, norming and performing. Several profiles were defined within the frame of “team role”, which defines a tendency of each member of the team towards a certain type of behaviour which contributes as a meaningful part to the effectiveness of the whole.

In the second part of the lecture Ms Adelaide Franco addressed the approach of Carol Dweck's “Mindset” theory on management of teams and projects: “the results of the success at school, work, relational dimensions are strongly influenced by the beliefs we have about abilities and talents”. Whereas a “Fixed Mindset” believes that people are born with a fixed amount of intelligence and capabilities, i.e., they are immutable over the time, a “Growth Mindset” believes that through practice, perseverance and effort, people have no limits on their potential for growth and learning, i.e., Continuous Development and Learning”. According to this approach, this last type of Mindset is the key for success in dealing with the several dimensions of life mentioned above.

- 9th November:

The training session of the day was opened with the presentation, by Mr. Fernando Rebelo, of the hosting school project “Reading Science”. This pilot-project was a warming-up experience of the school in the frame of **Scientify**. Secondary school students of Sciences were challenged to make a review on a book they chose, according to one of the 2 options: Science in books (they would pick a fictional book and would find potential plot events to be addressed in the frame of science, assessing its plausibility) or

Books on Science (they would pick a Scientific Outreach book and would make a review based on the science frames of the curricula).

The project was a success in the school, and it was open enough to be held in different contexts: oral reports in languages, interdisciplinary projects between language and sciences, etc. The school's library collaborated in the project through advertising it and holding a physical and virtual book fair on science and fiction books for those students hesitating on their choices.

After this introduction, 4 students presented their book reviews. Marta Vasconcelos (12th grade) made a review on a science-fiction book called "The Player of Games", by Ian Banks, from which plot she picked the possibility of travelling at the speed of light, addressing Einstein theory of Relativity (physics) and analysed the chemistry behind the addition to the game that drove the society depicted in the book, as well as the gaming methodology that today is used for several fields of life, including education. Beatriz Santos (11th grade) made a review on science book called "The mystery of the Identity Card and other stories", by Jorge Buescu, about which she addressed issues on the frame of Math, namely where does the final code number which appears on ID came from, and chemistry-physics, teaching the audience why hot water would freeze faster than cold. João Neto (11th grade) talked about "Three lock door", by Sonia Fernandez-Vidal, where he addressed issues on the frame of quantum physics. Finally, Ana Francisca Pardal (11th grade) made a review on "The Matrix", demystifying some of the events in its plot, namely the violation of the 1st and 2nd law of thermodynamics.

The participants started the Workshop 1: presentations from each country, where each partner had been asked to answer some introductory questions: being this phase of the project analysing science on fiction movies, where do usually the video resources come from, how would teachers get access to those materials? And what is the role of each school library in providing or facilitating access to these resources? It was also asked that each country provide a short list of useful movies to teach science, followed by a short synopsis and the scientific themes they would be suitable for. Finally, it was also in the task that each school/country would present a short project, based on an excerpt (or a clip with several excerpts) from a fiction movie of their choice and show the colleagues how it could be used as teaching material.

Ms. Alheid Szellinski on behalf of German participants explained that unfortunately their school library wasn't working for quite some time and so teachers were somehow on their own concerning access to resources. The German team presented a brief list of movies, which will be shared in a common drive of the project. On the list it was mentioned *Gattaca* (to be further developed as a project), *The Martian* with teaching possibilities in the fields of physics (gravity, space flight etc.), chemistry (water, explosions), biology; *Biohackers* - biology (a different topic with each series/episode, obviously genetics, but also for example fluorescent mice, appeals to young people as it mirrors their "real" life) and *I, Robot* - physics (robotics, nanotechnology), chemistry, biology. They choose *Gattaca* for their short-project plan, with main emphasis in biology, but with interdisciplinary possibilities with physics, computing and languages. This project will be structured and carried out by the German school as it will be mentioned further on.

From the Hungarian team, Ms. Andrea Nagy explained that due to changes in buildings, unfortunately the access to their school library is restrained, and the main beam supporting the floor is not strong enough to hold all the library holdings, so four hundred boxes of books remained in the old school. Nevertheless, the library of the school district proves to be a perfect alternative as it develops an electronic catalogue of the whole library holdings and is in the centre of the school district within easy reach. School teachers received full membership with the following possibilities: access to unlimited number of books/DVDs and magazines, databases of different universities and the documents issued by the Hungarian Science Academy and sources from the reference library. Continuing their presentation, Ms. Gabriella Brutovsky, Ms. Enikő Zaha and Ms. Eszter Kard shared a small database on movies with potential for science teaching, with a synopsis for each, together with the subject, grade, and theme they were suitable for. That list included *The Martian*, *Apollo 13*, *Sherlock Holmes 1.*, *The Core* and *Hidden Figures* – that list will be shared and put together with other countries' lists as a database of movies for teaching science. From that list, the Hungarian team picked *The Martian*, in the shape of an invitation to a Mars expedition through science. In their proposal, students should form groups according to their preference: biologists, physicists, chemists, and engineers. Each of these groups would work on their science. Being so, biologists would answer questions like how to survive in Mars, what to eat; chemists would support them working on how to produce water, how to make starch out of potatoes; physicists would work on the connection between Mars and the Earth, as well as, features about gravity and travelling to Mars; engineers how find out how to communicate with the Earth through special codes, using the knowledge of ASCII code table and hexadecimal and other number systems, how to build a robot like Pathfinder. The project was already in a well-structured stage, and the Hungarian team stated they would be very keen on putting it into practice.

To start the Portuguese presentation, Mr. Fernando Rebelo explained that in his school implementing interdisciplinary projects was favored by the system, since they benefit with flexible curricula and some transcurricular space for class projects. On getting resources they rely on the school library but acquiring licenses for online materials is restricted by administrative rules on forms of payment. Then, the school librarian, Ms. Ana Noválio, explained what the role of the library was in supporting teachers on this kind

of projects and tasks. The school librarian addressed the role of school libraries in schools, namely on the education of students as citizens, the role of the teacher librarian on cooperating with his/her peers on supporting teaching, school activities and projects, and to fulfil that social and technical competences were needed. On the role played by the librarian in Scientificy, she named advertising the project at school and in social media; organising a science book fair at the library; inviting the school community to visit the fair. So far, the results of these actions were positive, with an increased number of science books lent to students, as well as the number of teachers working interdisciplinary.

On the use of fiction movies for teaching Science, Ms. Carla Vaz, Cristina Santos and Paula Paiva, shared with the group a list of movies using the Padlet Tool, which can be useful to add remarks and ideas in a graphic way. Some of these movies were already suggested by the other schools and they will be gathered in a common database. The Portuguese team also picked *The Martian* for their project, nevertheless choosing a different approach from the Hungarian team. The project would answer the question "Can we live on Mars?" and would involve biology, physics, chemistry, and math, through methodologies of research work, practical activities, and debates. It was structured in 5 steps: 1) Research work on the physical and chemical characteristics of habitability on Mars; 2) Practical activity: Relate the eccentricity of Mars orbit with its thermal amplitude and deduce the equation that defines the planet's orbit, orbital and escape velocity; 3) Discussion activity: "Why would it be difficult for man to survive on Mars?"; 4) Final Product: preparation of a collaborative work, using the [Padlet Tool](#), in which each group shares the results of the researched topics; 5) Evaluation. The Portuguese team also stated they would like to develop this project, since it was already structured too.

On behalf of the Lithuanian team, Ms. Rima Leimontiene explained that on the movies chosen for the small database and for the example of the short project, they had decided to involve students in the task and so the movies and the ideas came mainly from them. Two excerpts of movies were given as an example how they could be used to address science themes. They handed to the audience a paper with the synopsis of each movie and the sciences engaged. *Home alone* scene, for instance, where one of the thieves grabs the heated door handle as it glows and burns him, reveals to be quite unrealistic as it would be needed at least 399,4°C to make the metal door handle glow like in the movie, which would make the thief hand to ignite. From *Up*, they picked an episode where inflated balloons tear a house off the ground and lift it into the air, which could be used to answer science questions like: what gas were the balloons filled with? What volume and how many balloons filled with this gas would be needed to lift a certain weight? How long can the gas stay in the balloon?

For the short project they had picked a scene from *Spider Man*: The episode is about the sudden appearance of the Spider-Man, who shoots silk threads and creates a spider web of incredibly solid material that stops an unstopably flying train. "But what if?". So, the goal would be to prove that a web of a certain thickness and size can stop a moving train. Students would have to analyse the structure and the elements of the spider web, making a model of it with [Jmol](#) software, to find out how long it would take for a spider or how many spiders should produce protein for the spider web that could stop a moving train. The project would engage chemistry, physics, biology, and maths, would have the duration of one month, and would be put into practice via work groups which would be formed according to students' preferences on sciences. The Lithuanian team also stated their willingness to put this *Spider Man* project into practice.

- 10th November:

The activities of this day started with the participants visiting Portuguese teachers' lessons on their subjects, where they could have the chance to exchange experiences and watch how lessons were held. At the same time coordinators gathered for a meeting with several points on the agenda: prolongation of the project; preparing the agenda for workshop 2, where decisions would be made on the tasks and deadlines to be carried out till next meeting; dates for next meeting and informal evaluation of the meeting. The German coordinator stated that they predicted the date for the next meeting would be after 15th March 2022, but they would need more time to come up with a definitive date. She also stated that the prolongation of the project should be formally asked by April next year. All the coordinators agreed on having two short projects made by the next meeting, although the Portuguese coordinator claimed it should be an open issue as he would have to assess with their science colleagues the amount of work they could handle. Finally, an agenda (which will be mentioned further on) was decided for the coming workshop and the coordinators from Hungary and Germany prepared the scheme for the informal evaluation, based on a word cloud suggested by all the participants.

The training went on with a lecture on Science in science-fiction movies, by Rui Agostinho, an university teacher of physics with a large experience on disseminating science, especially through non-science movies. For 90 minutes the lecturer browsed several science-fiction movies (*2001. Elysium*, *Star Wars*, *Star Trek*, among others) accessing within scientific frames of physics and maths what was plausible or possible and what was pure entertainment. Without diminishing the importance of entertainment, the lecturer emphasized how deeper pleasure and more meaningful it was watching those movies with a bit of background knowledge about science. The group of participants found this lecture interesting and well-integrated in the theme of the training.

- 11th November:

The session started with Ms. Andrea Nagy sharing the conclusions of the Preference Questionnaire. A week before starting the project meeting, a *preference form* was carried out to reveal the requirements, feelings and attitude of the participants concerning the first Erasmus Scientify project week. The summary of the survey shows that 66% of the participants have gained solid experience in the Erasmus project. The majority of them would intend to meet new colleagues, strengthen partnership, improve their communication skills in English, broaden their horizon by learning new approaches to teaching sciences, and get to know the educational program of other schools. The contributors would be satisfied with getting new stimulus, exploring new differences about the educational processes of each country and great teamwork.

The opportunities the partakers gain would help them improve teaching, communication and language skills that would make them better teachers. They also wanted to take part in lectures, training, get a support group to feel more at ease and have a smoother way of communication. It would lead to a personally rewarding experience.

To achieve their aims they would contribute their coordination skill, experienced background, cooperation, resilience, and open-mindedness to the project. However, they would need cooperation, commitment, dedication, good atmosphere, patience, and empathy to overcome their language and IT barriers in addition to support both from their school and family. It would help them carry out successful project management in an intercultural environment with different school types, culture, rhythm of work and way of communication.

Following this evaluation, Ms. Rima Leimontiene recalled the general guidelines of the project and the principles all the planning ahead should take into account: short-term project methodology, interdisciplinarity, transnational work and exchange of practices.

After fulfilling the already mentioned points of workshop 2 agenda, the group sat together to discuss the 3rd point: planning activities and deadlines. First, it was suggested each school would carry out two projects, its own and another one designed by another school, but due to the amount of work involved, the group agreed to reduce it to 1 project and 3 activities picked either from another project, or from the common pool of movies, or from the activity which would be carried out as the last point of the agenda. So, Germany will work on *Gattaca*, Lithuania on *Spider Man* and Hungary and Portugal on *The Martian*, then all will have to pick 3 activities to try out with students and give feedback about its implementation. All the agreements on this issue will be registered on a specific item of these minutes.

Addressing the 4th point of the agenda - deciding on cooperation and communication tools – it was agreed to create a drive to store, share and edit documents and materials. It was suggested by Ms. Eszter Kard to use One drive, instead of a regular G-drive, because of its storage capacity and also the be more user friendly on editing. It was also decided she would be the manager of the space. This drive would function as a working space, whereas the project website would show outcomes, and document activities of the partnership. The group agreed on using common forms/templates for presenting the projects/activities and giving feedback of its implementation. It was also agreed to use a WhatsApp group for informal communication, and a mailing list for a more formal one. It was decided that mails should be answered within the period of three working days.

Finally, as 5th and last point in the workshop 2 agenda, the group was divided into two teams to carry out the activity of creating a mini-project out of a movie together. The aim of this activity was to use the chance of working transnationally while together, finding out advantages and difficulties in the experience. After one hour of work, the groups got together again and presented their projects – one group picked “The day after tomorrow”, whereas the other picked “Up”. Both groups had no difficulty in working together, nor finding science themes in the movie they picked, it was overall an enjoyable experience, which only lacked more time to be carried out. It was decided that both projects would be put in the template and would be part of the pool of movies/activities to be used by the group.

- 12th November

The training session started with the workshop 3: evaluation, and participants were invited to fill in an online form to evaluate the meeting. Ms. Andrea Nagy did the report of this evaluation which is addressed in Annex 2.

An informal evaluation was conducted by Ms. Judit Kohut and Ms. Alheid Szellinski – they asked all the participants to pick a noun, a verb and an adjective which would describe the meeting in their perspective. A word cloud was built then and each participant should pick a word and make a remark about it. This activity led to an informal discussion where everybody had the chance to share with others their feelings and impressions about the meeting.

Finally, the training week ended with Mr. Fernando Rebelo handing the certificates of attendance to the participants on behalf of his headmistress, absent for personal reasons, and Ms. Alheid Szellinski, as the project coordinator, handing the certificates to the Portuguese team.

3. Conclusions and Agreements

In this meeting it was agreed:

- Each school would carry out its own project as before mentioned, as well as 3 activities designed by another school (see workshop 3)
- Till the end of December, the full description of the project in the common template should be uploaded to the drive
- Till the end of February, projects should be finished as well as the 3 activities picked from the pool, and feedbacks should be uploaded
- All working mails should be answered within 3 days except during weekends
- The partnership would use a One-drive managed by Ms. Eszter Kard as a working space
- Next meeting will occur on the second half of March, and the final dates will be suggested by the hosting school as soon as possible

4. Annexes

Annex 1 - List of participants and Plan of activities

Annex 2 – Evaluation report

Fernando Rebelo

Sobreda 20.11.2021

AGRUPAMENTO DE ESCOLAS DANIEL SAMPAIO

SCIENTIFY MEETING

Sobreda, Portugal, 8th – 12th November 2021

Short-term joint staff training event: “International Teachers' Room 1 - Guidelines for Project-based Learning”

Project

Erasmus+ School Exchange Partnership Project (KA229):

“Engaging ways to science: empowering project-based learning for interdisciplinary science education”

Participants

Partner institution 1 (coordinator) – Johann-Heinrich-Voss-Schule

Ms. Alheid SZELLINSK (coordinator, teacher of English and German), Ms. Birgit SETJE-EILERS (teacher of Biology and German), Ms. Sylvia BLUNCK (teacher of Biology and English).

Partner institution 2 - Jedlik Ányos Secondary School, Hungary

Ms Judit KOHUT (coordinator, teacher of English), Mrs. Enikő ZAHA (teacher of Chemistry-Physics), Gabriella BRUTOVSKY (teacher of Literature, German and Biology), Ms. Andrea NAGY (teacher of English), Ms. Eszter KARD (teacher of Maths).

Partner institution 3 – Pakruojis “Atžalynas” Gymnasium, Lithuania

Ms. Rima LEIMONTIENĖ (coordinator, teacher of English), Mrs. Vita GUDONIENĖ (teacher of Chemistry), Ms Danutė STOČKŪNIENĖ (teacher of Chemistry and Biology).

Partner institution 4 (host) – Agrupamento de Escolas Daniel Sampaio, Portugal

Ms. Cristina SANTOS (Maths Teacher), Ms. Carla VAZ (Biology Teacher), Ms. Paula PAIVA (Physics and Chemistry teacher), Ms. Ana NOVÁLIO (librarian, teacher of Portuguese), Mr. Fernando REBELO (coordinator, teacher of Portuguese).

Plan of Activities

Sunday 7/11/2021 20:00	Arrival of participants Dinner at the hotel
Monday 8/11/2021 9.00 -10.00 10.00-10.30 10.30 – 12:00 12:00-12:30 12:30 – 13:30 13:45 – 19:30 20:00	Opening session with the host school headmistress and all participants (all participants are asked to introduce themselves) Coffee break Lecture/training on Team building, Educational Challenges and Mindset by Ms. Adelaide Franco Visiting school Lunch at school Trip to Lisbon Dinner
Tuesday 9/11/2021 9.00 -10:00 10:00 – 10:30 10:30 – 12:30 12:30 -13:30 14:00 – 16:00 16:00 – 19:30 20:00	<i>Reading Science</i> – presentation of the project and 4 outcomes (by students) Coffee break Workshop 1 - presentations from Germany and Hungary Lunch at school Workshop 1 - presentations from Portugal and Lithuania Free time Dinner
Wednesday 10/11/2021 8.30 -10:00 10:00 – 10:30 10:30 – 11:00 11:10 – 12:30 14:00 – 17:00 13:45 – 18:30 20:00	Visiting lessons according to the subject of each teacher/coordinators meeting Coffee break Free time Lecture on Science on Movies by Mr. Rui Agostinho Lunch at school Trip to Sintra Dinner
Thursday 11/11/2021 9.00 -10:30 10:30 – 11:00 11:30 – 12:30 12:30 – 13:30 14:00 – 16:00 16:00	Workshop 2 – designing and planning project activities; means of communication and sharing materials, and dates for next meeting. Coffee break Workshop 2 – designing and planning project activities; means of communication and sharing materials, and dates for next meeting. Lunch at school Workshop 2 – designing and planning project activities; means of communication and sharing Free time (dinner is not scheduled for the group)
Friday 12/11/2021 9.00 -10:00 10:00 – 10:30 10:30 – 12:00 12:00-19:30 20:00	Workshop 3: evaluation of the meeting (led by the coordinators) Coffee break Workshop 3: Presenting the results of the evaluation Receiving the certificates of attendance Free time till dinner Farewell dinner
Saturday 13/11/2021	Departure of participants

The Portuguese team

Evaluation of the Project Week.

This evaluation is based on the Preference and the Feedback Forms that were conducted to show quantitative and qualitative results of the participants' skills, activities, approach, attitude and opinion.

The Preference Form

A week earlier before starting the project a **preference form** was carried out to reveal the requirements, feelings and attitude of the participants concerning the first Erasmus Scientific project week.

The summary of the survey shows that 66% of the participants have gained solid experience in the Erasmus project. The majority of them would intend to meet new colleagues, strengthen partnership, improve their communication skills in English, broaden their horizon by learning new approaches to teaching sciences, and get to know the educational program of other schools.

The contributors would be satisfied with getting new stimulus, exploring new differences about the educational processes of each country and great teamwork.

The opportunities the partakers gain would help them improve teaching, communication and language skills that would make them better teachers. They also wanted to take part in lectures, trainings, get a support group to feel more at ease and have a smoother way of communication. It would lead to personally rewarding experience.

To achieve their aims they would contribute their coordination skill, experienced background, cooperation, resilience and open-mindedness to the project. However, they would need cooperation, commitment, dedication, good atmosphere, patience and empathy to overcome their language and IT barriers in addition to support both from their school and family. It would help them carry out successful project management in intercultural environment with different school types, culture, rhythm of work and way of communication.

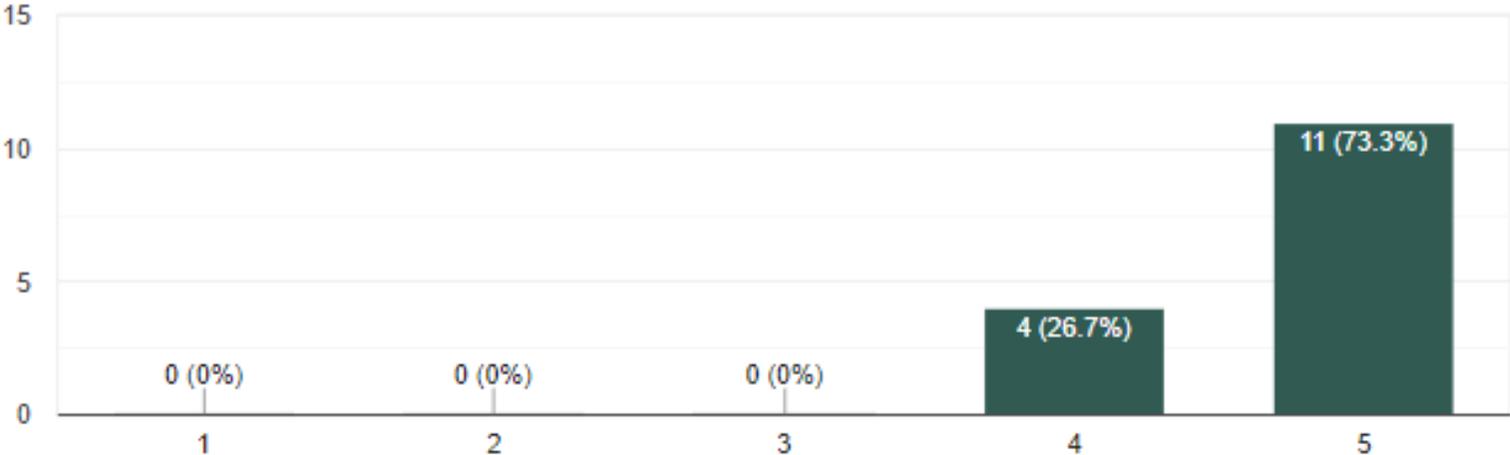
Feedback Form

At the end of the project week a **feedback form** was conducted based on the findings of the preference form to reveal how responders reached their goals.

The **Overall Rating** was as follows:

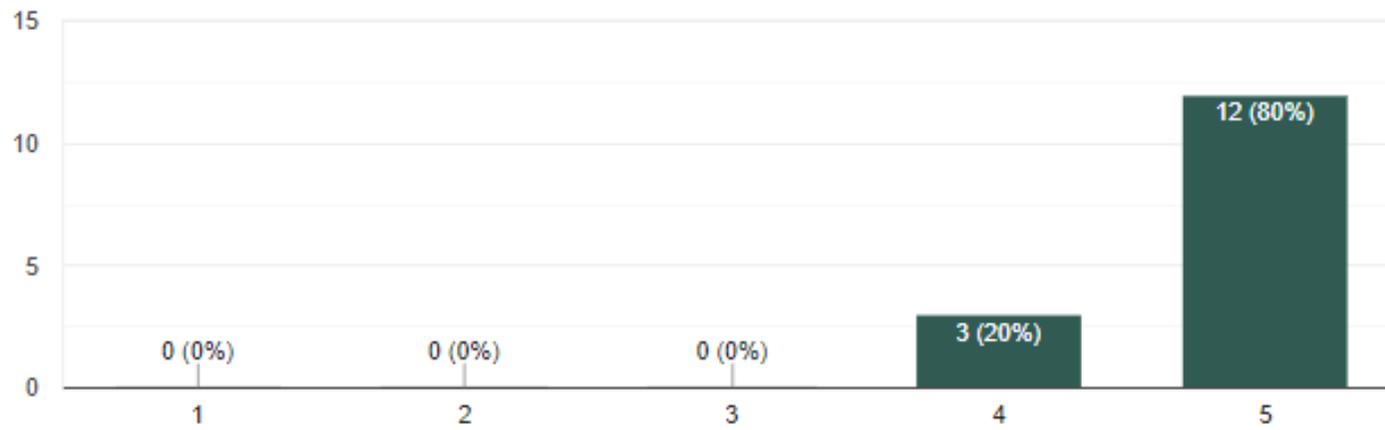
How would you rate the project week?

15 responses



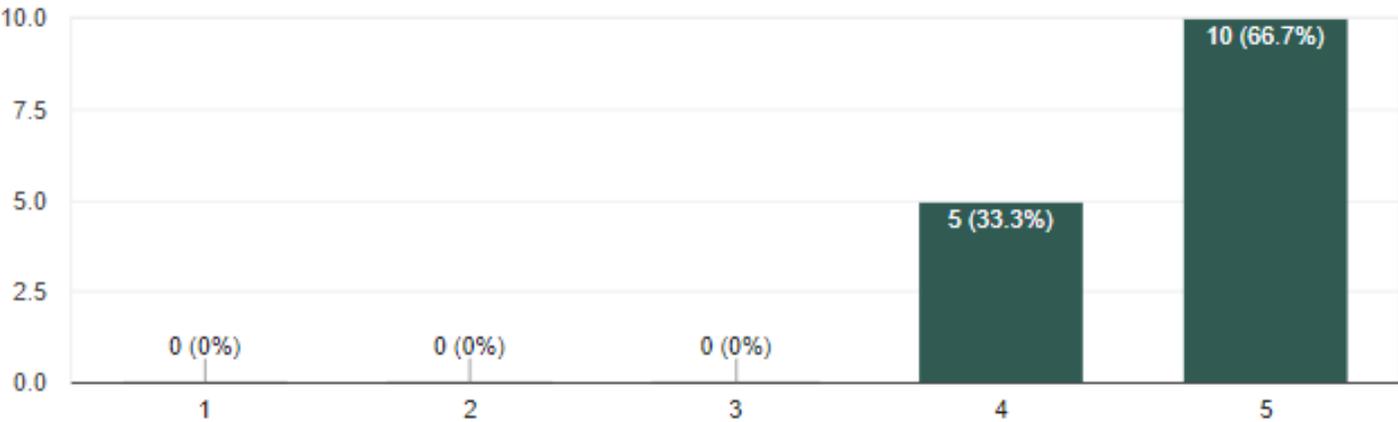
How would you rate the organization of the week?

15 responses



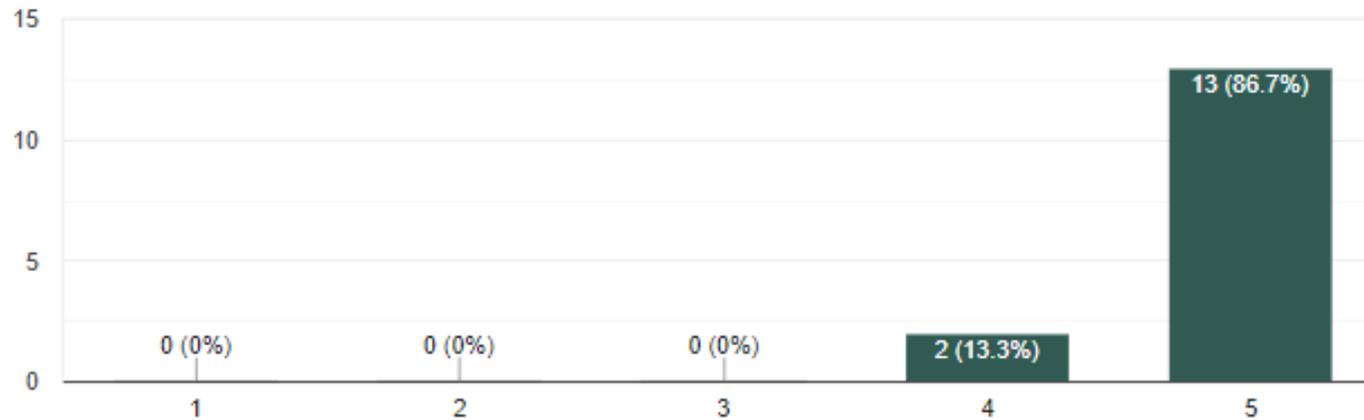
How would you rate the workshops?

15 responses



How would you rate the lecture trainings?

15 responses



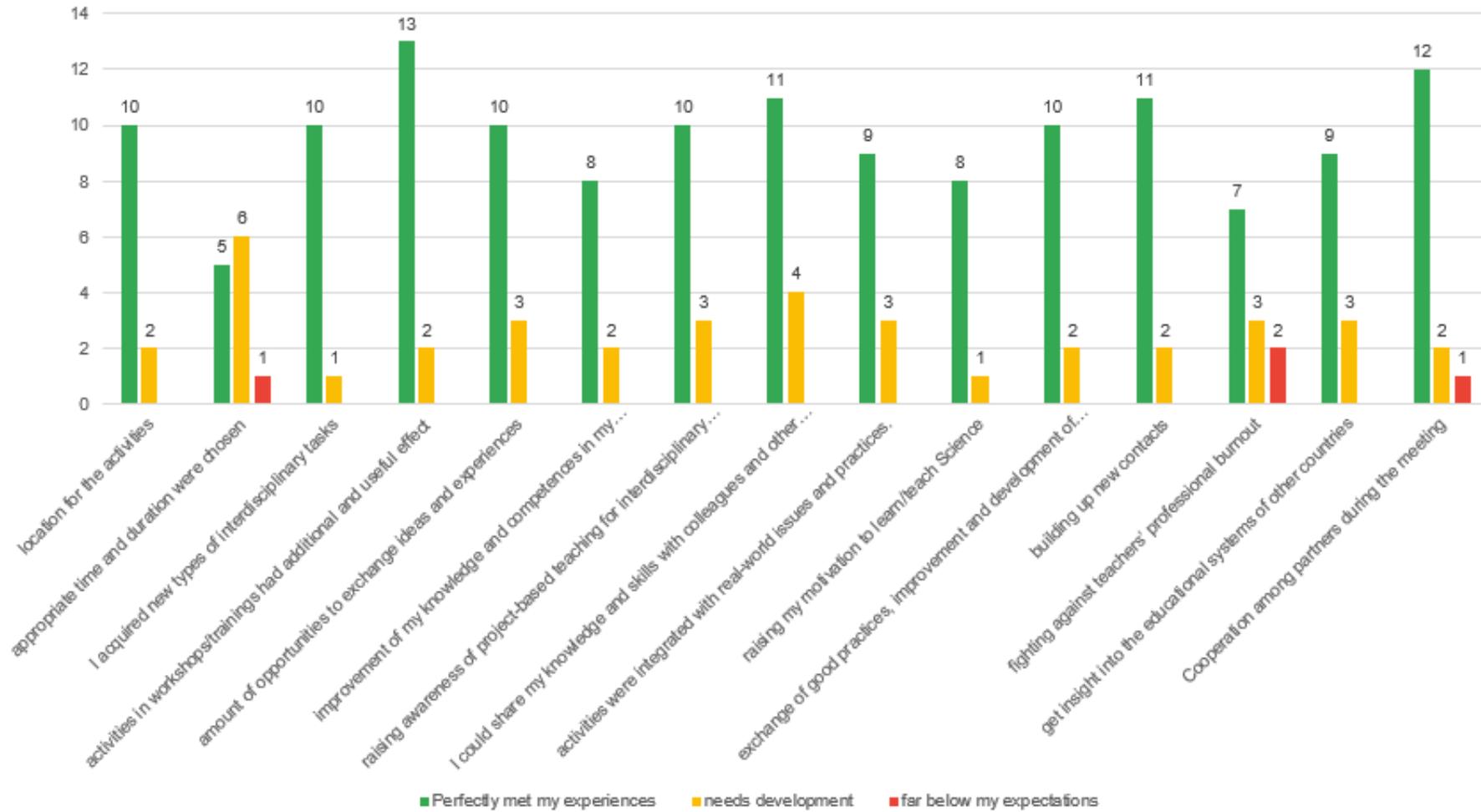
In the general experience field, the survey showed that participants found dynamic team work, time management, communication, encouragement to learn English, relaxed atmosphere, the joy of creating things and working together the most rewarding. Also, they gained ideas how to use films in teaching, learned new perspective of project work, reducing content and the stages of building a team (forming, storming, ruling and performing).

Nevertheless they think they would need more time to work together and for themselves in the following events.

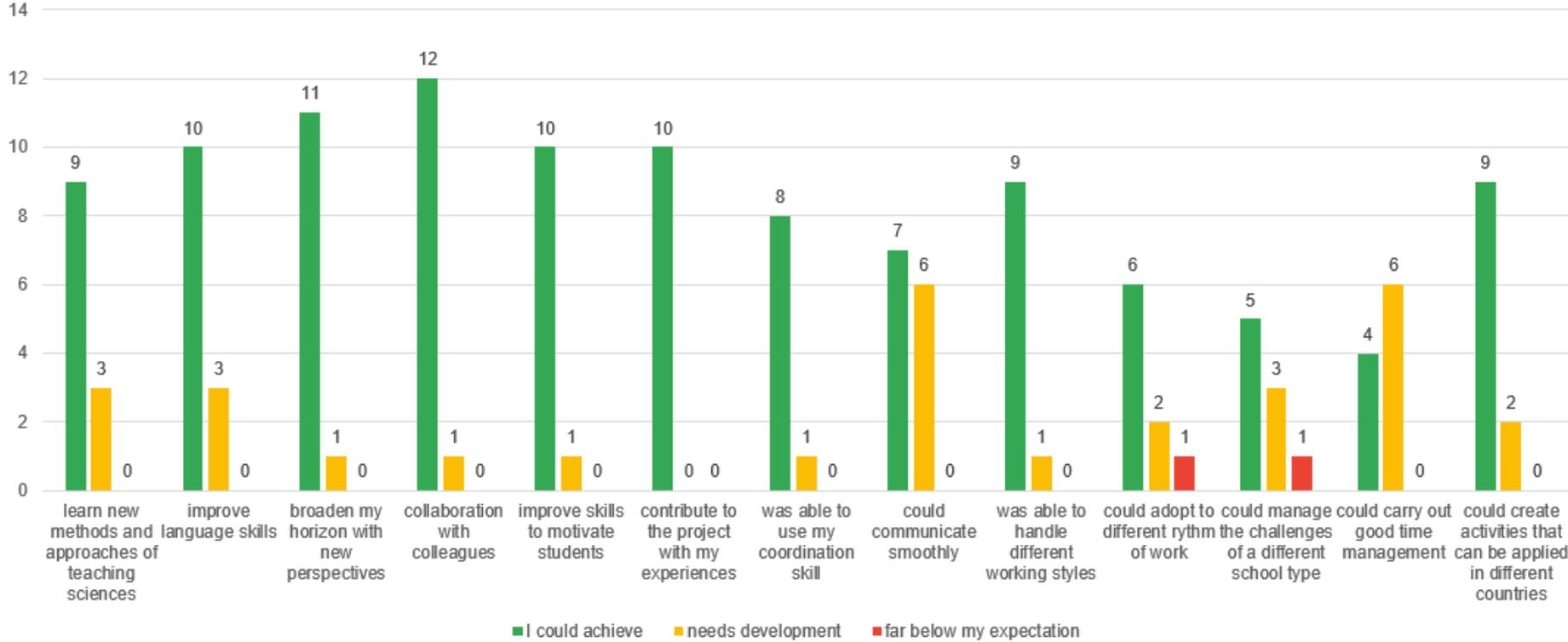
Traffic Lights Assessment

In the followings, traffic lights assessment was conducted to indicate how well **activities and milestones were achieved and how on track the overall project is**. The indication of performance is done using the three colours of the real traffic lights (red, yellow and green). Red refers to activities that were far below the expectation, yellow shows the performance that needs development and green specifies accomplishments that met the requirements of the partakers.

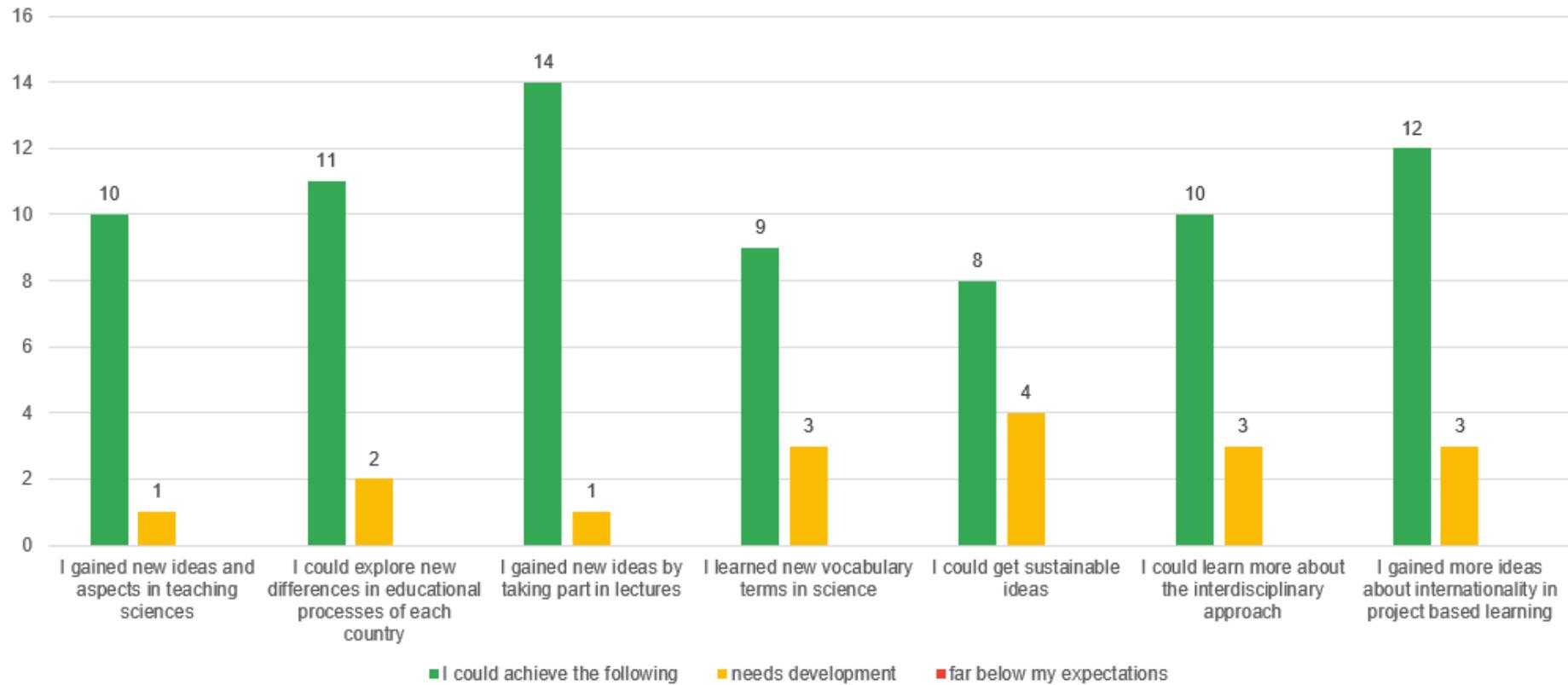
Organizers, Coordinators and Activities



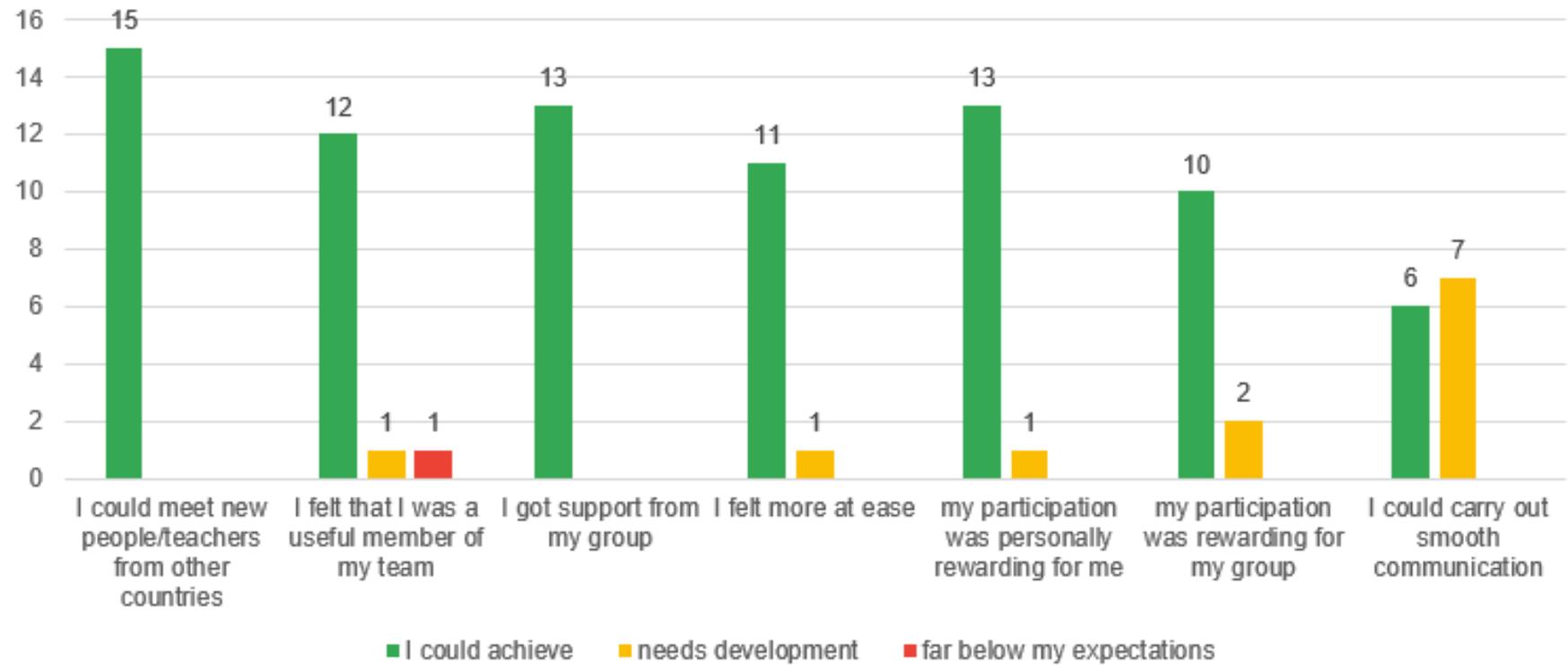
Practical Skills of the Participants



Theoretical Learning



Social Skills



Mindset (behaviour, belief, attitude)

