



The Art of Science Learning

WP4 Assessment Analysis of Goal 3

Barcelona Case Study

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BARCELONA CASE STUDY

GOAL 3: TRANSVERSAL SKILLS

General Framework of the Analysis

As a way to explore how the workshops approached GOAL 3 (i.e., promoting the acquisition of transversal skills amongst students), we specifically focused on three different types of transversal competences: i) learning to learn skills, ii) civic and social skills, iii) sense of initiative and entrepreneurship. More specifically, our analysis has been oriented towards exploring to which extent PERFORM workshops have facilitated learning spaces to train and put in practice students' transversal competences, and what aspects facilitated or hindered such practice. Therefore, **our aim is to characterize the process according to its capacity to foster transversal competences, and not to assess students' individual achievement.**

Learning to learn skills refer to students' ability to pursue and organize their own learning in accordance with their needs, and to the awareness of learning methods and opportunities. They include: understanding the value of learning, as students' awareness of their learning process; learning autonomy, as students' ability to pursue and persist in science learning (e.g. organising their learning, effective management of time and information, both individually and in groups); and reflective thinking, as the ability to gain, process and assimilate new scientific learning and related life experiences through reasoned thinking and/or discussion, in order to use and apply them in a variety of contexts.

Civic and Social competences generally refer to those personal, interpersonal and intercultural skills and forms of behaviour that equip individuals to participate in an effective and constructive way in social and working life. Among them, we have identified two broad groups: i) collaborative skills, referring to behaviours that help two or more students work together in the science learning process, including respect for others' opinions and the ability to approach conflict within the group in a constructive manner; and ii) communication skills, associated to students' ability to communicate ideas effectively by using verbal, visual and written tools as well as body language.

Sense of initiative and entrepreneurship globally refer to the ability to turn ideas into action. This cluster of skills includes students' leadership, their sense of responsibility towards and ownership of the outcomes, their ability to plan and manage projects in order to achieve objectives, and their creativity and innovation. From an emotional dimension, we also included students' self-confidence and esteem, approached as students' perceived capability to effectively accomplish a certain level of performance in science learning.

Methodological Approach

These three groups of transversal competences **have been explored through** students' inputs provided in the surveys (as a first quantitative approach) and researchers observations of the workshops complemented by students, teachers and ECRs inputs (as a qualitative in-depth approach). Results are presented providing examples from both groups in each school (4^º A and 4^º B). We named Group 1 to 4^ºB in both schools, while Group 2 corresponds to 4^ºA (further explanation below in observations).

Quantitative data

We first explored **students' perceptions in relation to such transversal competences** through a **questionnaire implemented twice**: 1) **before the implementation of the workshops** (Pre-PERSEIA survey) and 2) **after the workshops** (Post-PERSEIA survey). In order to evaluate whether students' answers were specific to the PERFORM group, we also conducted these questionnaires (pre- and post-PERSEIA) among a group of students who did not attend to the workshops: the control group. In total, the **PERFORM group was composed by 54 students who answered both questionnaires** (33 students in Terrassa and in 21 students in Castellbisbal) and the **control group by 34 students** (16 students in Terrassa and in 18 students in Castellbisbal).

We first analyzed students' answers for both questionnaires (Pre- and Post-PERSEIA) separately by looking at **the percentage of answers reported by students**. In this case, since we were not comparing pre- and post-survey answers, we included the whole PERFORM group (n=63 students, 41 from Terrassa and 22 from Castellbisbal). We then compared answers from PERFORM group with answers from the control group by running Wilcoxon Ranking Tests. For PERFORM students, we used the same test to analyze whether there were differences between boys and girls, and between groups of students (as students were divided into two groups in each school). In order to see **whether students' answers changed between the pre and the post surveys, we calculated the variation for every individual answers for each question**. As most of the questions were answered with a scale of agreement (from 1: totally disagree with the statement to 7: totally agree with it, and 4: neutral or indifferent), variation was calculated as follows: "Post Survey Answer – Pre Survey Answer". In that sense, a negative individual variation indicates that students' degree of agreement lower after the performance of the workshops. Similarly, a positive variation indicates that students agreed more with the statement after the development of the workshops. Finally, we analyzed whether such variations were associated to gender and groups when controlling by the control group by using ordinal logistic regressions. For the sake of clarity, **only statistically significant differences have been reported in this document**¹. It also implies that specific highlights are present only when the variation of PERFORM students' answers did not follow the same pattern as the control groups. However, results from statistical analysis showing significant associations should be taken with caution due to the limited sample of the case study.

¹This means that if no specific interpretation related to group or to sex of the students is included in the text, the trends described were not different according either to the group or the sex of the students.

Qualitative data

Also, during the workshops we delivered a learning chart to each student as an individual formative evaluation tool to increase participants' self-awareness and appropriation of their own learning process, which encouraged their reflection about their learning through the PERFORM workshops. Students filled-in the charts in sessions 1, 3 and 6. Four questions were included in the chart, which students answered progressively through the workshops: i) what do I know right now about the topic? (PW1); ii) what is my motivation to learn about it? (PW1, PW3); iii) what have I learnt? (PW3 and PW6); and iv) how am I learning it? What do I like about it? (PW3; PW6). Forty-five students answered the charts (23 from Group 1 and 22 from Group 2).

Then, we analysed researchers' observations of the workshops to explore in-depth the pedagogical context and learning approach and to which extent and how it fostered the *mise-en-place* of skills and competences implied in the creation of the PERSEIAs. We observed Group 1 through the 6 sessions, while Group 2 was observed in three alternative sessions (PW1, PW3 and PW6).

These observations have been complemented with further students' inputs - collected through a focus group with a reduced but representative group of students who participated in the project (n=10, 6 girls and 4 boys); together with the analysis of teachers' (n= 10) and ECR's (n= 7) perceptions about the fostering of students' transversal skills through the process.

Specific Methodological Approaches

Learning to learn skills were first approached in the survey by exploring students' perceptions of the value of science and their perceived capacity to formulate research questions, a key aspect of doing research that was emphasised during the workshops. Researchers' observations of the workshops explored to which extent and how the different sessions fostered the *mise-en-place* of learning to learn skills. Our observations focused mostly on aspects related to reflective thinking and learning autonomy, such as: their capacity to ask questions, reason and argue, their ability to reframe scientific concepts and develop ideas, their capacity to assess or reflect about their peers' performance and their ability to autonomously organise their time during the sessions to do the tasks. Students' focus group approached several transversal competences but it did not provide specific data related to learning to learn skills². The teachers' group interview included a question on their perceptions about the impact of the project on students and their evolution through the workshops, including transversal competences in general. ECR's interview did not approach specifically students' transversal competences (the focus was on their interaction and whether this was affecting students' motivations and interest towards science), but we looked for emerging related data.

²The focus group did provide complementary data to learning to learn skills, but in order to avoid repetition this has been included in the sections Social and Civic Competences and Sense of Initiative and Entrepreneurship.

Finally, the learning charts provided during the workshops were devised to foster students' reflection about their learning process through the PERSEIA creation, and students' answers about i) their motivation to learn, ii) what they have learnt and iii) how they have learnt it. These charts have been analysed to identify insights related to learning to learn skills.

Students' social and civic competences were approached in the post-PERSEIA survey through two items exploring students' perceptions of: i) their active participation in the workshops, and ii) the sharing of tasks within their groups. Our observations focused both on collaborative and social skills and on communication skills. Collaborative skills were approached by observing the following aspects: i) students' sharing of tasks and roles during the activity, ii) students' willingness to ask for help and to help others, iii) students' respect towards others' ideas and iv) students' ability to manage difficulties within the group (if any). Communication skills were approached by observing: i) students' ability to elaborate and share ideas verbally and written and ii) students' use of the body to express ideas and convey meanings. Students' focus group approached social and civic competences by further exploring their perceptions on work organisation, students' participation and decision-making within the groups. As mentioned above, the teachers group interview included a question on their perceptions about the impact of the project on students and their evolution through the workshops, including transversal competences, and ECR's interview did not approach specifically students' transversal competences, but we looked for emerging related data.

Students sense of initiative and entrepreneurship were approached in the survey through two items related to: i) students' feelings of self-confidence along the workshops, and ii) students feeling prepared for performing. Thus, survey items focus on students' self-perceptions related to the emotional dimension, while we expand our focus through the other data collection tools. Researchers' observations approached students' sense of initiative and entrepreneurship by focusing on students' behaviors during the workshops and whether they suggested initiative and ownership of the process. Most specifically, we observed the following aspects: i) students' leadership and/or responsibility over the group activity and final outcomes, and ii) students' affective responses related to self-confidence and personal initiative. Some aspects observed in the sections above also complement these observations (e.g., students' ability to resolve conflicts, students' autonomy). Students' focus group approached sense of initiative by further exploring their perceptions on their individual involvement and their participation and role in group work oriented towards creating the PERSEIA. As mentioned above, the teachers' group interview included a question on their perceptions about the impact of the project on students and their evolution through the workshops, including transversal competences. No-inputs related to students' sense of initiative were reported by the ECR in Terrassa.

OVERALL HIGHLIGHTS

Learning to learn skills

- Students in both schools did not seem to generally value science learning as important for their future success as less than half of them agreed with the statement. In both cases, the workshops did not seem to provoke significant changes on such perceptions, (although they agreed more with the statement afterwards). Similarly, students in both schools reported motivations to learn that related more to interest towards the topics and curiosity about the project than to a personal value (e.g. professional value or applicable in their daily life).
- Around half of students perceived themselves able to formulate research questions both before and after the workshops. In Terrassa such perception significantly increased in a 20% after the project.
- Regarding reflective thinking, in the two schools we observed differences in students' capacity to make questions, elaborate and reframe concepts and discuss, but students in Castellbisbal did it more often. However, in both cases, students' difficulties to engage with reflective thinking through the process were observed, mostly related to specific aspects of the workshops' design and the contents approached (e.g. students' lack of knowledge about some of the topics, technical vocabulary, lack of an in-depth approach to research topics).
- Workshops fostering more reframing and discussion amongst students were PW2 and PW4 in Castellbisbal and PW3 in Terrassa. In both schools, students seemed to engage more in discussion when a space facilitated by an adult was provided, as questions digging deeper on the scientific contents or in specific reasoning were less often raised spontaneously by the students.
- Teachers highlighted learning autonomy as a skill clearly put in practice by students in Terrassa, through their capacity to improvise and manage to have their monologues ready for the performance. Students in this school also reported learning outcomes related to skill. This was not highlighted in the same way in Castellbisbal.

Social and civic competences:

- In both schools, students seemed to be satisfied with their participation, as most of them considered that they actively participated in the workshops, especially girls who did not report any negative answer and shared tasks.
- Students also highly appreciated the collaborative approach of the workshops and the conviviality fostered by the facilitators. In this regard, peers were supportive and respectful to each other and no major difficulties among them were observed during the sessions. When conflict occurred the last day of the performance (Terrassa, group 2) students were resilient and managed it by collaborating among them.
- However, such collaborative approach did not seem to permeate when sharing the PERSEIA working tasks (specially homework): there were some students concentrating the work and performing the main roles, mostly girls in the case of Terrassa. Some

students in both groups expressed their upset about it. This dynamic was more emphasised in Terrassa, where in most subgroups leadership was assumed by 1 or 2 students. In Castellbisbal this was mostly observed in one of the groups.

- Regarding students' communication skills, students generally showed an easiness to share their ideas and thoughts (although these were not much elaborated), which was more emphasised in Terrassa. In this school, they also seemed more keen to and comfortable with sharing ideas verbally than in a written format.
- The body as expressive means was not generally applied throughout the sessions and it was more consciously used in Castellbisbal, in which three groups used small sketches to set the context, share ideas or introduce concepts.

Sense of initiative and entrepreneurship:

- Each group in each school showed different aspects of leadership and sense of initiative. While in Terrassa leadership was commonly assumed by 1 or 2 students in each group (again, mostly girls) in Castellbisbal the pattern was more variable. In group 1 students showed a generally shared sense of initiative and rotational leadership, while in Group 2 several students seemed to lead the creation process, but these students were not necessarily the same who took the lead at the end of the process.
- In both schools, many students showed a sense of responsibility towards the work conducted and the final outcome, and particularly those students leading the process within their groups. In Terrassa teachers emphasised students' capacity to take ownership of the process towards the end and to improvise as some tense situations were emerging, through their capacity to creatively adapt to new situations and be innovative.
- Regarding feelings of self-confidence, students in Terrassa felt globally more prepared to perform than students in Castellbisbal (where 68% didn't feel ready). Coherently, in Terrassa they generally appreciated more the final performance, as suggested by students' answers highlighting "the monologues" and "the acting" as the most enjoyable aspects of the workshop, and some students reported overcoming shyness and gaining self-confidence as a learning outcome from the project.

LEARNING TO LEARN SKILLS

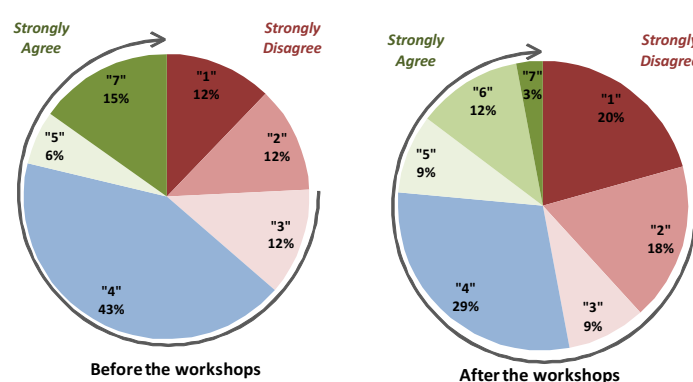
Main highlights

- Students did not seem to generally value science learning as important as less than half considered it important for their future success or helpful to get a job. The workshops did not seem to provoke significant changes on such perceptions, although after the project students agreed more with the value of science learning for their future success.
- Similarly, most of the students did not identify a personal value (e.g. professional value or applicable in their daily life) as a motivation to learn in the learning charts.
- Students' **perception of their ability to formulate research questions increased** after the workshops from 41% of initial agreement to 59% afterwards (although it also increased among the control group).
- **Regarding reflective thinking, it seems that the workshops did not foster much this dimension. Observed students' involvement in reasoning and discussion was generally low**, except in PW2 and PW3 that prompted more discussions. When it happened, **students' reasoning was mostly based on their daily experiences**, rather than on specific knowledge about the issue (for instance knowledge from the school curricula). **Some reframing or development of topics was also observed in PW2 and PW3** (Critical Thinking and Gender, respectively), while it was generally absent in the other workshops.
- **In the same line, students commonly asked for clarification questions** to the facilitator and ECR, related to doubts about the activities and the monologues while more elaborated **questions digging deeper on the scientific contents or the discussion were less often observed**.
- **In this regard, ECRs identified the need to connect more the reflections generated in the activities to the creation of the PERSEIAs**, so as to foster **reflective thinking**.
- **Teachers highlighted learning autonomy as a skill clearly put in practice by students**, through their capacity to improvise and manage to have their monologues ready for the performance. Such a progress was also observed through the workshops when working on the monologues: **while students initially showed difficulties to keep focused on small group tasks from PW4 on students dedicated more time to work and many groups remained focused on their tasks without much dispersion**.
- Similarly, in the learning charts **students reported learning outcomes related to learning autonomy**, such as improving their capacity for coordinating the tasks, do some research and be able to be critical while searching for information.

Description of main results

Students' general perception of the value of science was approached through one item in the surveys, revolving around their perceived importance of science for their future development.

Before the workshops **7 students (21%) agreed with the statement “Learning science is not important for my future success”, while 12 did not agree**, that is, 36% of the students valued science as important. Interestingly, a slightly higher proportion of students (43%, 14) provided a neutral answer to this item, suggesting indifference among almost half of the group. After the workshops, interestingly, **the percentage of students considering science important for their future increased to 47%**, while students agreeing with the statement (and thus not considering it important) also slightly increased to 24% and those providing neutral answers decreased to 29%. However, these differences were not statistically significant. No significant differences were found either between boys and girls, group 1 and group 2 and between PERFORM students and the control group.



“Learning science is not important for my future success”

When asked in the learning charts about their **motivations to learn, curiosity and interest** towards the chosen topic were frequently reported motivations (n=16). Moreover, a number of students (n= 13) also associated learning science with **contributing to solve problems**, suggesting they perceived the social value of science and the social relevance of the topics approached. As these quotes show, some of their answers seemed to be related to the scientific topic chosen in the cards-game (PW1), which was contextualised within societal challenges:

“To know more about the ways we can cure the diabetes”

Girl 1122

“To know that I can help people, myself or even my family”

Girl 1206

“Because I think it’s an important topic that is useful in our daily life (about racism)”

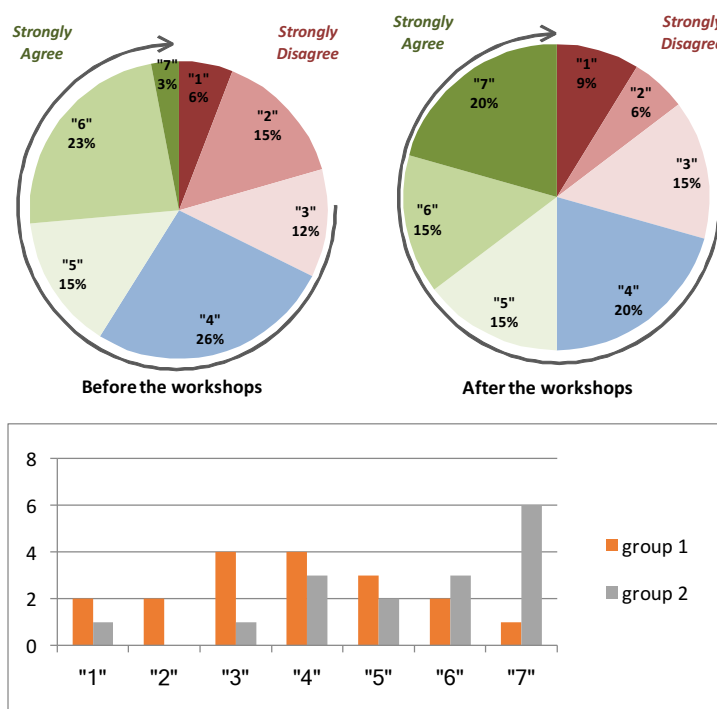
Girl 1112

However, most of the students did not identify a personal value (e.g. professional value or applicable in their daily life) as a motivation to learn. Only three students did provide answers related to this (e.g. being useful to them) and four reported their willingness to learn more for the sake of learning, of discovery. See for instance:

"It motivates me really a lot to get to know more ways of thinking and how they affect us as people, because my future job is related to this: psychology".

Girl 1216

On the other hand, when asked for their ability to formulate research questions, **41% of the students** (14 out of 33) **considered they were able to do so** before the workshops, a **percentage that slightly increased to 50%** (17 students) after the workshops. Conversely, negative and neutral answers slightly decreased after the workshops, from 33% to 30% and from 26% to 20%, respectively. These changes were not statistically significant. Significant differences were found only between Group 1 (G1) and Group 2 (G2), with a higher proportion of agreement within Group 2 ($z=-2.554$, $\text{Prob} > |z| = 0.0107$). No significant differences were found between boys and girls and between PERFORM's and the control group.



"I am able to formulate research question"

Students supported this trend during the focus group and all except one (from G1) agreed that they felt now more able to formulate research questions. In this regard, when asked in the learning charts, five students explicitly reported that they learnt *through doing research*, connecting the PERSEIA creation process with the research dimension of the project. Interestingly, 3 of these students belonged to the two subgroups in G1 that explored the topic of one of the ECRs, suggesting that in these cases they might have had more direct opportunities to engage with the research process through the ECR's experience and work on research.

Regarding students' capacity to process scientific learning (i.e. reflective thinking), **students' involvement in reasoning and discussion** (understood as building upon and arguing about each other's comments) **was recorded as generally low, except in PW2 and PW3**. Similarly, **students**

commonly asked for clarification questions to the facilitator and ECRs, related to doubts about the activities and the monologues, while more elaborated questions digging deeper on the contents or the discussion were less often observed. For instance, during the first session in both groups **students asked few questions about scientific contents and they generally showed low levels of involvement in reasoning and discussing about the cards**, probably because of the lack of guidance (in G2 there were 5 subgroups and only 1 facilitator and 1 ECR; the teacher was there but not interacting) or time for group discussion (in G1 students did not discuss the cards in small groups). In G1, during the plenary discussion students mostly answered to the questions made by the facilitator providing short and non-elaborated answers and some of them briefly commented about what the facilitator and ECR said. There were no further questions, nor discussion of the contents of the narratives or elaboration of conclusions from the students, being the facilitator the one processing their comments. Similarly, in G2 during the last session, questions were related to doubts about the development of the monologue, rather than about scientific contents and there was no discussion (except one subgroup discussing about their artistic development).

Also related to reasoning and argumentation, in PW2 (observed for G1) there was more space for students' engagement in reasoning and argumentation due to the stations' exercise about critical thinking in which students had to reflect about and answer to different questions. However, during small group exercises, it seemed hard for them to really engage in a reasoned discussion about the questions (could be because they lacked background knowledge and concepts). In contrast, the guided plenary discussion afterwards seemed to engage them more in debate, especially the question on reproducibility of results. **Students' reasoning was mostly based on their daily experiences (rather than on specific knowledge about the issue, for instance knowledge from the school curricula).** Interestingly, a couple of students also provided some arguments previously shared by facilitators in the stations, showing that some were integrating the reasoning as well.

PW3 on gender was, by far, the workshop generating more discussion in both groups. During group discussion, several students engaged in argumentation and reasoning when answering and discussing about gender, and some elaborated conclusions with the support of the facilitator and ECRs whose questions helped them go further. The main topic –gender discrimination- was clearly close enough for students to have an idea of the experience or a discourse and to be able to argue. For instance, in G1, when the facilitator asked about women discrimination, several girls reasoned why women were discriminated in their jobs; and when asked about male leadership, one boy reasoned why for him his football trainer -a woman- embodied more leadership characteristics than the male trainer. In this group, students' reasoning was more oriented towards reinforcing other peer's comments, like a brainstorming of complementary arguments (for instance, the three interventions on the impact of societal pressures). In the case of G2, **during the discussion about gender** there was a group of about 10 **students that articulated their answers and were quite incisive in their reasoning and arguing.** This core group was very engaged and even if sometimes the discussion got quite intense, the argument grew richer during the PW.

However, discussion and reflections generated during the workshop activities on science, gender and ethics did not seem to permeate much on students' creation process of their scientific monologues (see also GOAL 2 on the final PERSEIA). In this regard, **one of the ECRs mentioned a missed opportunity in fostering students' reflection about the scientific topics of their monologues**, in order to think about the ways they were communicating sensitive issues and be reflective about that:

"I think it could be interesting maybe to reflect in the social issues of the monologues, with time, and maybe not before the monologue, maybe after doing the monologue. Just to talk about these things, sexism, gender (...). Because when writing the monologue you can have examples to discuss with them and to improve later, because it's true that we were talking about gender and we didn't have more time to talk about other social issues, or even gender, when they were developing the monologues".

Female ECR, Terrassa

Apart from PW3 on gender and PW2 on critical thinking, students practicing their thinking skills to reframe or develop scientific topics was not generally observed in the subgroups in G1. For instance, during the elaboration of the narrative from the scientific cards in PW1, 3 out of the 5 small groups read the cards without adding anything. Two groups added a bit of their own, but their comments were not an elaboration of ideas.

Opportunities to reflect about other peers' performance and argumentation skills were scarce as they only happened in PW3 (both groups) and in PW5 and PW6 (G1). In PW3, students qualified the interviewees' performances during the interviews. In G2 some qualifications were not based on students' argumentation skills when performing their roles, but on their real personality, so the last qualified student was a girl that performed a lot better than the boy but she was in 3rd place. There was, thus, a biased classification that students did not pick up on and the facilitator did not exploit either. Similarly, in G1 some girls made comments about the deficient performance of some of the students (rather than about their role). In contrast, during PW5 and 6, students were provided with guidelines on how to share constructive feedback with their mates. They first read them to make sure all the evaluation items were clear and then the facilitator asked them to provide feedback after each monologue. At the beginning, some students reacted quite hard on their mates, with negative comments even before the monologue was ended, prompting the reaction of other students (girls) that tried to neutralize their comments (see section Collaborative Skills). Negative comments were mostly addressed to girls, while comments to boys were more relaxed. During the last session, students were more constructive in their feedback, and 3 students especially engaged in the task, making comments beyond "it was good/bad" and sometimes using suggestions made by the facilitator in previous workshops.

Regarding students' learning autonomy, we observed how they behaved when doing small group work, in terms of using their time to work and needing or not the facilitators' intervention to focus on the task. **Students initially showed difficulties to keep focused on small group tasks** during the first two sessions, switching often to talks about personal issues or chatting through their cell-phones. **However, from PW4 on, a change was observed and students dedicated more time to work and many subgroups remained focused on their tasks** without much dispersion. This might be explained because activities in the last PW were more focused on the creation of the monologue, so students could be more interested in following the guidelines and working on the final product. At the same time, students' ability to focus on the work and progress with the tasks was more frequently observed in those students leading the group (1 or 2 students per group), while some students connected and disconnected (see also data on collaborative skills and leadership in the sections below).

In this regard, a few students (n=6) reported learning outcomes related to their learning autonomy in the learning charts. These related to their **capacity of coordinating the tasks, do some research and be able to be critical while searching for information** (connected to critical thinking). See for instance:

"I've learnt by looking for information in internet and with the guys that come (ECRs). I'm learning how to search (information), to ask if I don't understand something and to keep searching".

Girl SP1206

Teachers' interventions also highlighted students' autonomy. The tutor of G2 noticed students' capacity to improvise and manage tasks to have their monologues ready for the performance, despite a *"rather chaotic learning environment"* (see "Sense of initiative and Entrepreneurship for further insights). This was reinforced by the studies' coordinator, who mentioned that students in Terrassa were not trained, nor commonly used to do learning activities in which they had freedom to create and the fact that they were able to achieve a satisfactory output clearly showed they practiced certain learning skills. Some students' inputs related to social and civic competences and sense of initiative also support this perception (see sections below).

Finally, students were invited to reflect about PERFORM's learning approach in the learning charts. When asked how they were learning and what they liked about it, a big group of answers referred to **a different way of learning through enjoyment and fun, which in turn, fostered their motivation to engage in learning:**

"It's more fun, we escape from the routine of being always in the classroom"

Girl SP1102

"(I liked) that we learn and have fun at the same time. I've learnt things about science, even me, that I don't like science and I normally do not pay much attention"

Girl SP1112

"I'm learning games and activities that motivate us and make things much less dense than in class"

Girl SP1226

Some students emphasised as well the collaborative dimension of the approach (based on dialogue and group work, see next section), the role of humour (both in communicating and learning about science) and the applied and practical nature of the approach (based on research and dynamic activities).

SOCIAL AND CIVIC COMPETENCES

Main highlights

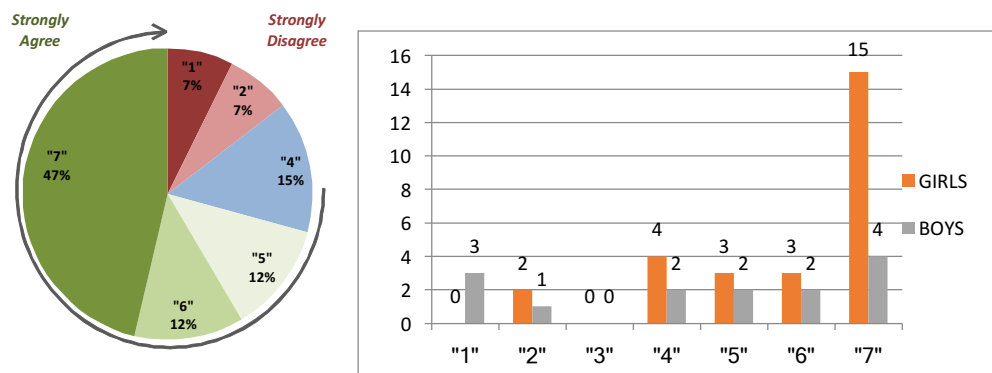
- **Almost 3/4 of the students reported they had actively participated in the workshops, especially girls** (most of them reported positive answers, while negative answers were only provided by boys). Similarly, around 3/4 of the students perceived they shared the project tasks within their groups and only around ¼ considered this was not the case.
- **There was a general collaborative attitude and ‘good vibes’ among students** through the workshops, and many of them helped each other. In this regard, teachers appreciated that the process was able to foster a deep sense of conviviality among students. They also reflected about **students’ capacity in G2 to manage the conflicts** within the group emerging at the end of the process, putting in practice collaborative skills.
- Similarly, some students also **reported they learnt to work in groups and collaboration skills** were referred as a learning outcome.
- Despite this general collaborative approach, observations and other inputs from students also showed that **specific working tasks were generally not shared among students in subgroups**. In this regard, there were some students **recurrently concentrating the tasks and performing the main roles** and in most subgroups leadership was assumed by 1 or 2 students which were girls (only one exception).
- Such **unequal sharing of tasks** was especially evident for the case of **doing homework** and seemed to be a cause of upset for some students, especially those who had assumed the work (i.e. girls). This trend is also reflected in the rehearsed monologues, in which some students had clearly more text and weight than others. Except for one group, boys had less responsibility in the rehearsed monologues (e.g. girls’ interventions were longer and had more content).
- Regarding students’ communication skills, students generally showed an **easiness to share their ideas and thoughts** (although these were not much elaborated) and seemed more keen to and comfortable with sharing ideas verbally than in a written format.
- Students also reported in the learning charts **learning outcomes related to their verbal communication and performance skills**, which were supported by teachers who emphasized the capacity of some students to perform their monologue and clearly communicate their message
- However, the **body was not generally applied** by the students as expressive means during the sessions, beyond the warm-up and slightly in the rehearsal of the monologues (PW5 and PW6).

Description of main results

Collaborative skills

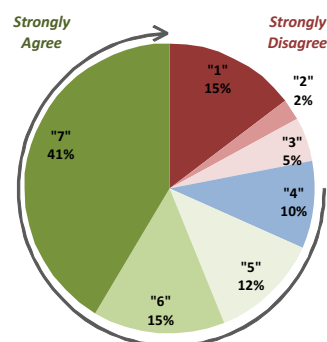
Students' social and civic competences were approached in the post-PERSEIA survey through three Likert items exploring students' perceptions of: i) their active participation in the workshops, and ii) the sharing of tasks within their groups.

Regarding general participation, **71% of the students** (29 out of the 41 students answering it) **considered that they had actively participated in the workshops**. However, **statistically significant differences were found between girls and boys**, as **only boys** (4 out of 14) **reported strong agreement with the statement** versus 15 girls out of 27 ($z= 1.920$, $\text{Prob} > |z| = 0.0549$).



"I actively participated in the workshops"

Regarding collaborative skills, and when asked about the sharing of the project tasks, **68% of the students** (28 out of the 41 that answered this item) **considered that they shared different tasks within their group during the workshops**. Nine of the students (22%) considered that tasks were not shared (interestingly, 6 of them were in the extreme of disagreement and among them, 4 were girls) and 4 students provided neutral answers. There were no significant differences between boys and girls and between PERFORM groups.



"I shared different tasks within their group during the workshops"

Interestingly, students' broad agreement to the sharing of tasks within small groups reported in the surveys (68%) is not supported by any of the other data collected (including students' focus group). As observed through the workshops by the researchers, **tasks were generally not shared among students in subgroups and there were some students recurrently concentrating the tasks and performing the main roles** (see also next section for further data on leadership). For instance, in G2, during PW1 group work one or two of the students often took the lead in each subgroup whereas the other 2-3 remained silent/passive. Similarly, in PW6, when preparing their monologue, in the 3 observed subgroups (more than 2 students), there was one student who did not participate or collaborate in the tasks. Similarly, in G1 only in two subgroups tasks and roles were quite shared by participants (at least 3 out of 4 students commonly participating and sharing tasks), but boys had a more passive role than girls, who led them.

Students also reflected about this issue in the focus group. **Students' general perception** about the distribution of tasks within the group was that, although they had the feeling that everyone could participate as they wanted to (see Inclusiveness in GOAL 4), **work was unevenly shared within the group. This was a cause of upset for some students**, especially those who had assumed the work, which were **mostly girls**, coherently with the other actors' inputs.

This was also reflected in the rehearsal of the PERSEIAs in G1, in which some students had clearly more text and also more weight than others. For instance, in one of the subgroups only one girl (the leader in the group) had the text on her mobile phone and she could not upload it. They all had to remember their part by heart and one of the boys did not know at all what he had to say, suggesting that he had not created his piece of text nor read it since the last day of workshop. In this regard, except for one group, **boys were the ones having less responsibility in the rehearsed monologue** (e.g. girls' interventions were longer and had more content).

During the ECRs interview, they also mentioned the lack of collaboration when working in small groups, despite the guidelines provided by facilitators. ECRs comments echoed what was observed during the workshops:

*"I don't know how they made the groups, but in all the groups **there was at least one, in general a girl, that was just doing the work.** (...) But I think that is also a problem, I think I don't really like it from this kind of doing the monologues, is that I realised that at least in my groups there were just one working. And you were trying to create, like, "ok this is a group so you are working in group..."", but it was not working like that".*

Female ECR, Group 2, Terrassa

In that sense, teachers mentioned in the interview that groups had been done as balanced as possible, but always ensuring at least one "hard-working" student within the group that could push forward the work. This is the strategy commonly followed when assigning group work:

"Always in these groups if there isn't someone pushing forward, it is hard to get results... There are kids that can structure their work and do it very well, that react positively when assigned a creative activity, but there are other kids that cannot do a creative activity without following guide, and then, of course..."

Male teacher, Terrassa

This seemed to guaranty that the monologues were developed in most of the cases, but also generated some asymmetries in the distribution of work and responsibilities within the groups (i.e. unequal sharing of tasks).

Students further expressed that such unequal sharing of tasks was **especially evident for the case of doing homework**:

“Girl SP1108: (...) My group at the beginning was fine, cause everyone did something. What happened? That then, when they started with the homework, the surveys and everything... no one wanted to do anything and I had to do it. I had to upload everything myself. And with the monologue the same.

BOY SP1113: We did it ourselves.

GIRL SP1108: And I was like... “And then, why are you in the group?”

MARÍA: So, in your group, it was mostly in the tasks outside the sessions that they were not participating?

GIRL SP1108: Yeah, cause then when we were all together (in the sesión), yes, then we did something”

When asked whether choosing their own group would have fostered the sharing of tasks, they agreed that it would have been easier to work with a group of their choice, but mostly because they could have been similarly engaged, rather than alleging working with peers they get on well with:

“Girl SP1218: It is because they did not come... and when they did, they complaint. If that’s the case... just go. If I had chosen my group, I would have done it better and I would have been more at ease”.

Similarly, when asked about **choosing the topic, some students reported that this had not being a group decision**, suggesting some dominant voices within their small group, especially in G2 in which there were some group conflicts which were not present in G1. In G2 the decision about who would perform was also conflictive in some cases, in which some students decided the last day (and unilaterally) that they would not perform, provoking the breaking of the group. This was a **source of conflict, which exploded before the performance, with almost no time to react. Interestingly, the situation was quickly managed by some motivated students** who decided to redistribute the groups and perform in new configurations, to support each other (only in one case the monologue could not be performed). Some students showed, thus, their capacity to react and handle the situation (those supporting each other were close friends). Sources of conflict seemed to be related to some students’ absenteeism³ and their lack of engagement (both also affecting negatively those who were actually working) and some previous conflicts among peers:

³Students identified as a reason for absenteeism the recurrent use of students expulsions in the school (although they also acknowledged that teachers allowed expelled students to be present in the day of the performance).

“MARÍA: And in your group?”

GIRL SP1104: We couldn't, because we needed Boy 1117.

Girl SP1102: That's the same, it could be a boy or a girl...

BOY SP1113: No, because, for instance Boy SP1109 y Boy SP1101 are very shy, but we decided that they were going to say only one sentences and I, since, I'm not shy, I would say everything else.

GIRL SP1108: But your group didn't have a problem with that and mine did. In my group I said “if you want, I can do it all, but I'm not going up (on stage)”. I told already the facilitator, that I didn't wanna perform. And I made myself the whole monologue.

BOY SP1113: Yes, I saw that... (...)

KARLA: (...) But in the end, what happenned to you?

GIRL SP1108: That Boy 1103 was expelled, Boy 1104 did not want to perform and Girl SP1118 asked me in the last minute the monologue and I was like, mmmmmm. Because Girl 1118 had being missing many days.

BOY SP1113: So who did you perform with?

GIRL SP1108: With GIRL 1102 and Girl SP1118. And we had not learnt the monologue because I told them to meet one afternoon at least to rehearse, but...

BOY SP1113: The monologue about the alcoholics, amazing [they laugh]

GIRL SP1104: Yeah, amazing... I also was left alone the very same day.

MARÍA: The same day? In the morning?

GIRL SP1104: Yes.

GIRL SP1108: Ay, people...

GIRL SP1104: So I had to go to a different group”

Teachers also reflected about students' capacity in G2 to **manage the conflicts within the group emerging at the end of the process, putting in practice collaborative skills**. According to their tutor, **students were able to reorganize themselves and create new group configurations in what he referred to as “an extreme situation” to help each other** and be able to perform their monologues, despite some students did not perform (see also below in Sense of Initiative and Entrepreneurship). Furthermore, teachers appreciated that **the process was able to foster a deep sense of conviviality** that is sometimes hard to see among them:

“(Students) cohesion, good vibes when they were participating at the sessions and doing the rehearsals. I was at the general rehearsal and then the day of the performance... And I was seeing (students') associations that outside of this context you could not even imagine. I could see how girl 1222 and Girl 1230 presented the monologues together in an organic way and I was thinking ‘in any other context these two girls would never stick together and here they are, the speakers (...)’. I saw associations that would have been difficult otherwise”.

Informatics teacher, Terrassa

Indeed, despite the generalised unequal sharing of tasks, researchers' observations also suggest **a collaborative attitude among some students through the workshops**, especially in G1. **In this group, students generally helped each other in the small groups and during the rehearsal of monologues, in a quite autonomous and organic way.** For instance, during PW1 two boys with reading difficulties in different subgroups were helped respectively by two girls, in one case by helping him reading the card and in the other asking their mates to be patient and not laugh at him. One of these boys was also supported by his group peers (all girls) in PW4 when he expressed problems in developing the monologue in Catalan. Her mates said no one would be left behind in the group and translated the text for him. Also during the performance of monologues in the rehearsal, students generally supported each other (e.g. if one student did not remember the text, another student would intervene).

Fourteen students also reflected about group work and collaboration in the learning charts. They reported they learnt to work in groups so collaboration skills were referred as a learning outcome. They also referred to acquiring such skills as part of the learning approach, since they specially emphasised group dialogue and collaboration as key for learning. See for instance the following quotes:

"We talk about it as a group. We all collaborate. Because we all collaborate and we help each other if we need it"

Girl SP1204

"Because we talk about it in group and is much easier to learn. I like it to do it in groups"

Girl SP1222

"That it can be very interesting and if we work as a group, we can achieve a good result"

Girl SP1228

In the focus group, several girls from Group 1 further reflected about collaboration within the group and pointed to the sense of responsibility towards the project to overcome conflicts and cooperate with each other:

"Girl SP1210: In my group, yes, everything went fine. I mean, we did not get on well with one girl, but when working with her (...) it has nothing to do whether you get on well or not, it's work you have to do in group and you do it. (...)"

Girl SP1206: In my group it was the same, there were a few which I did not get on well with (before), I mean, I had not talked to them normally, just once or twice... I mean, generally with all in my group, we never talked to each other, and we started doing it in the group. But because of the work, that we wanted to learn and do it. That's why we got together".

Similarly, **students generally respected each other's opinions and we observed only few moments of tension within the sessions that students managed differently depending on the group** (G1 managed it without external intervention while G2 required the facilitator's

intervention⁴). In G1, these moments happened mostly during the feedback in PW5, in which some students provided very critical feedback at the beginning. At this moment, there was a group of girls that spontaneously reacted in a very conciliating way, calming down the situation. After this, one boy approached one of the girls to apologise for his comment. These tensions were also punctually related to reactions to one girl during PW3 (laughing at her when she was performing the interview or making a joke about her as a reaction to her intervention in the discussion). The girl showed her bother to her mates, but also managed it without making a big deal (she was one of the leaders in the class). Because of their tone and reactions, it seemed that some of these tensions came from specific relationships among some students, rather than prompted from the workshop activities. In G2, **students generally respected each other's interventions in the small group work, while in the plenary discussions it was sometimes hard** for them to keep silence and listen to each other. For instance, students interjected and interrupted each other during the gender debate, often replaying to each other's comments in a passionate way, with a few students ganging on another if they considered what he or she said was not ok. In this regard, **students needed the facilitator to interject when the ambiance got a bit heated**, rather than managing the situation themselves.

Communication skills

Regarding students' communication skills, students generally showed an easiness to share their ideas and thoughts, although these were not much elaborated. For instance, during plenary discussions in G1, conversation flew without problem and there was a group of around 10-12 students (out of 24) that expressed fluently their opinions and ideas. With a few exceptions, their interventions were, however, short and commented ideas were not much elaborated. This was also observed in G2 (see for instance, comments above on the cards game during PW1), except in the gender debate.

During small group work in G1, the 3 groups observed showed a high ability to share their ideas and listen to each other, contributing to each other's comments. Students (mostly girls) also wrote down the result of their small group work, either in the form of brainstorming or as text for the monologue. This kind of observations were not recorded in the case of G2 (because it was not observed in the sessions attended).

Students in general also showed different abilities during the rehearsal of the PERSEIAS (PW5). In G1, around 11 students were able to share their message in clear way (longer or shorter, though), while around 7 had too short interventions or did not remember the text and therefore they did not really elaborate or communicate an idea. **Generally, in this group girls showed more ability to communicate their monologue and its content than boys**, except for one boy (who ended up performing the monologue with another girl the last day).

Students also reported in the learning charts learning outcomes related to their verbal communication and performance skills (n=9). Most specifically, they identified the ability to create a monologue to communicate (including some communicative resources when performing, like vocalisation) and enhancing their expressive skills, through group discussions

⁴This observation does not refer to the conflict occurred in G2 right before the performance, as this was expressed outside workshop sessions.

and dialogue. Generally, students' responses were also associated to gaining self-confidence and to collaborative skills:

"I've learnt to express myself, to better explain things and to communicate things in a less boring and heavy way. And also to gain confidence."

Girl SP1110

"I learn through dialogue and presenting (the monologue)"

Girl SP1202

During the interview, teachers also emphasised the **capacity of some students to perform their monologue and clearly communicate their message**:

"There were some students that have surprised me in a very positive way, because they have a quite low profile and when they spoke on the stage they did it very well and that made me think that there might be a certain profile of students that could be engaged in Catalan if I diversify the kind of activities proposed. (...) (Making reference to a boy) And watching him... I don't know how it worked through the process, but seeing him there (on the stage) with the easiness and peace of mind with which he talked... I don't know how you see it, but I was surprised".

Catalan teacher, Group 1, Terrassa

Another teacher also considered that **the fact that students could rehearse the monologue at the place where they were going to perform** (with their tutor), **contributed to this easiness**, as it allowed students to rehearse in the same conditions of the final performance.

Furthermore, **students seemed more keen to share verbally their monologues than written**, since in several cases they talked more than what they wrote in the paper. In G2, only 6 students (out of 24) performed, but only 4 of them seemed at easy and were able to communicate their ideas. There was no written activity during the workshops observed in G2, except from the learning charts in the first workshop, which were not much elaborated. Students' answers in the focus group supported this, **as students expressed that oral and direct communication generally works better for them than written communication**. (We did not have access to the written monologues so we cannot include here any other evaluation on this aspect). Related to this, the Catalan teacher mentioned a miss opportunity of reinforcing students' written expression in his class, by approaching the writing of monologues during his subject. He suggested that sharing the contents of the workshops with enough time in advance could help enhance this kind of synergies with other subjects.

Regarding embodied communication, the body was not generally applied by the students during the sessions, beyond the warm-up and in the rehearsal of the monologues (PW5 and PW6). In G1, there was also one explicit exercise observed in PW4 using the body (creating images) but students did not really engage on it and only few students performed. The same was observed in G1 during the last rehearsal of the monologues in which most of the students stood up still, without moving much or performing (presentation-like manner). Only one girl

adopted an attitude of stand-up comedy and seemed more comfortable with performing. In G2 the few students that performed seemed more comfortable (they were performing on a voluntary basis) and applied the body to their communication.

Finally, it is worthy to notice that ECRs highlighted some of the rehearsed monologues included **offensive content** (see GOAL 2). One teacher also referred to this in the interview mentioning that he found some racist and sexist messages that could have been more explicitly neutralised. In this regard, although students generally showed respect to each other during the workshops, a few small groups in Group 2 also reproduced some disrespectful messages in their monologues, like the following quote suggests:

“Female ECR: But I think was hard for them to integrate scientific information in the monologues and sometimes the first version of the monologues was quite offensive, and even the final draft.

Sarah: Really? What do you mean offensive?

Female ECR: Offensive to one type of social group, like for example, in the group about racism they were just doing offensive jokes to people who is more or less rich, this kind of things. And we were trying to discuss that, but we didn't have time and I had to... I didn't have that with the time and skills just to try to say "ok do the monologue in another way". And the final monologue was like that".

SENSE OF INITIATIVE AND ENTREPRENEURSHIP

Main highlights:

- **In both groups leadership was commonly assumed by 1 or 2 students in each group.** Those who were not natural leaders didn't seem willing to take that role. Furthermore, in the case of G1, it was **mostly girls** assuming the leading role.
- Many students in G1 showed clearly a responsibility towards the work conducted, an attitude that was not recorded at all in G2. Students' interventions in the focus group suggested that such **sense of initiative and responsibility was mostly on those students leading the process within their group.**
- **Only 4 students** (out of 41, 9% of the sample) **did not feel confident** during the workshops. However, 34% of them (14 students) provided neutral answers, showing also an intermediate position in the group. Nonetheless, **students perceptions about feeling ready to perform were polarised** between feeling prepared (42%; 17 students) and not feeling prepared (36%, 15 students). Generally, girls felt more prepared to perform, but this difference was not significant.
- **Students feelings during the workshops related to self-confidence were also polarised** and students reported both feeling confident and feeling doubtful and/or insecure.
- Students' interventions in the focus group explained such polarised results about self-confidence and performance, by pointing to **shyness as a factor hindering self-confidence and consequently their willingness to perform the monologues in front of a bigger audience.** Despite this, they also identified **"overcoming shyness" as one of the aims of performing the monologues.**
- Similarly, when asked in the learning charts about what had they learn and how, some reported overcoming shyness and gaining self-confidence as a learning outcome from the project.
- Furthermore, teachers emphasised students' **capacity to take ownership of the process towards the end and to improvise as some tense situations were emerging,** through their **capacity to creatively adapt to new situations and be innovative.**

Description of main results

Regarding students' behaviours during the workshops and similarly to what was observed for the sharing of tasks, in both groups leadership was commonly assumed by 1 or 2 students in each group. Those who were not natural leaders didn't seem willing to take that role.

In the case of G1, it was **mostly girls assuming the leading role** (e.g. leading the conversations in the group and distributing tasks, writing down the notes, reading to others). For 3 out of the 5 subgroups **leadership was assumed by 1 or 2 students, while** in the two other groups leadership was more shared among the different participants. In those groups, students seemed all to enjoy and be interested about the topic chosen. **Such leadership was commonly assumed by girls**, except for one boy who led his group (group working on proteins)

Furthermore, many students in G1 (especially those leading in their groups) showed clearly a responsibility towards the work conducted, both during the activities oriented towards reflection and those focused on the creation of the PERSEIA, an attitude that was not recorded at all in the sessions attended in G2. For instance, in G1, during small group work in PW2, observed students controlled among themselves the focus of the conversation being able to come back again to the subject without the intervention of the facilitators. Another example in PW4, a girl who was absent for two sessions, asked questions to their mates in her group to get to know the content approached so she could be able to work with them, and two girls explained her the work done so far. Also, **during the last session that devoted to rehearsal, some students showed an especial commitment**. For instance: one girl knew the whole text by heart in case somebody was missing the day of the performance; a boy that had learning difficulties knew his intervention perfectly and did not even need to read; and many students knew perfectly their text. Also in another group students seemed to take the monologue task seriously and with responsibility: they met outside the class and prepared a text for each of them (one of the girls even asked María if she could rehearse a couple of sentences in front of her).

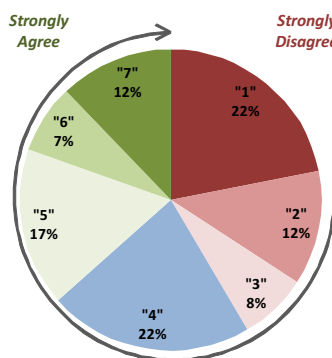
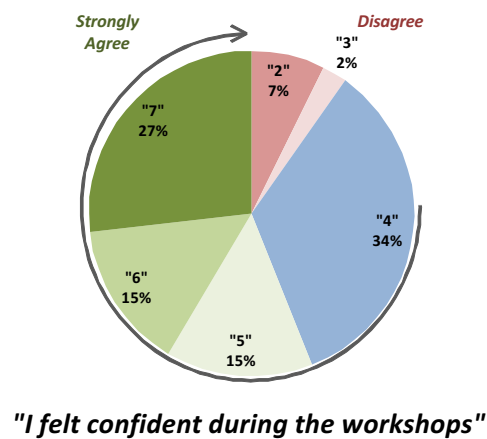
Besides, there were as well **around 5 to 7 students in G1 more disconnected to the process and its outcomes** (e.g. showing less interest and not participating much in the activities and the creation of the monologue, not knowing their text or just what they had to say during the rehearsal last day). These were **mostly boys**, which is insightful since this group was dominated by girls.

Students' interventions during the focus group backed-up our observations, suggesting that **sense of initiative and responsibility towards the outcome was mostly on those students leading the process within their group**. They reported the **lack of engagement of some students which were not interested and the lack of self-confidence to perform in front of others (e.g. shy students) as possible causes for this**.

Regarding this latter aspect, **students' feelings of confidence during the workshops, only 4 students (out of 41, 9% of the sample) reported they did not feel confident at all**, while 23 reported self-confidence (57%). However, 14 of them (34% of the sample) provided neutral answers (see Figure below), showing as well that an important group of students had an intermediate position in this respect, which could respond to some of the shier students mentioned by their peers in the focus group. No significant differences were found between

boys and girls or between groups. However, when asked about their feelings during the workshops through a multiple-answer question providing several feelings (see GOAL 4, Emotional Engagement for the answers and figures), the number of students reporting feeling confident decreased to 14 students, while feeling doubtful was reported 12 times and feeling insecure 9 times. These answers suggest, thus, a polarity in students' feeling of confidence during the workshops that is not reflected in the previous item. Methodological aspects can be the cause of such a difference, since the Likert item was focused on students positioning in respect to a single aspect, while in the multiple-choice item students had a broader variety of options. Furthermore, students might have limitations in reporting their feelings through a survey (see GOAL 4, Emotional Engagement).

Similarly, **students' answers regarding their perception of readiness to perform** (see Figure below) **were polarised** between feeling prepared (42%; 17 students out of 41) and not feeling prepared (36%, 15 students). Generally, girls felt more prepared to perform, but this difference was not significant. Also, 22% of the students (9) provided a neutral answer, showing an intermediate position in this regard.



Some students' interventions in the focus group explained such polarised results about self-confidence and performance, by pointing to shyness as a factor hindering self-confidence and consequently their willingness to perform the monologues in front of a bigger audience. Several girls mentioned that due to this reason, they generally did not enjoy oral communications (and

not only in PERFORM). In contrast, other students mentioned not being shy and enjoying the act of performing:

"MARÍA: And why didn't you like it?"

Girl SP1122: I don't know, I feel embarrassed.

MARÍA: You felt embarrassed.

Girl (not identified): Of course.

MARÍA: Is anyone here who did not feel embarrassed? [Several of them raise their hands, among them Girl SP1218] (...)

Girl SP1218: I mean, being embarrassed, no. The only thing is being a bit nervous about doing it well or wrong but not being embarrassed (...). And if you look ridicule, well, you did it, that's all... [they all laugh]

Boy SP1201: When we went up (on stage) to perform the monologue in front of 3º and the TV, that was the moment in which we improvised the most and more words were coming out of our mouths"

Despite the different positions, they **generally identified "overcoming shyness" as one of the aims of performing the monologues**. However, there were different reactions to shyness, some of them showing students' responsibility towards the outcome of the process and towards their group. The following quote illustrates some of students' arguments:

"Boy SP1201: One did not come because of that (an expulsion) and then Boy SP1203, because he was shy.

Girl SP1210: But he did really well, I mean in the rehearsal (...).

Girl SP1218: But it was because he said "I don't do it well" and with the joking... you know? That's why he didn't...

Boy SP1201: It was not because of that.

Girl SP1210, Girl SP1206, Girl SP1218: Yes, it was because of that.

Girl SP1210: It's just sometimes you are up there (the scene) and the fact that people laugh at...

Girl SP1206: At something you are saying

Girl SP1210: That's it, at something you are saying... It blocks you.

Boy SP1201: It's because he is very shy, very shy.

Girl SP1210: Me too.

Girl SP1206: Me too and I went up (on stage).

Girl SP1122: I'm also very shy.

Girl SP1206: I made a mistake, I shut up, turned over and then... Went up like an asshole and said (my part) anyway.

Boy SP1201: Ok, but he didn't want to.

Girl SP1206: Me neither, but I was not going to let the group down... With all the work done”.

Despite their shyness, some students in Group 1 (like the girls in the quote) engaged in the challenge of performing, encouraged by the facilitator. Indeed, when asked in the learning charts about what had they learn and how, some reported overcoming shyness and gaining self-confidence as a learning outcome from the project:

“(What I like about this way of learning) is being able to overcome my scenic panic, since this has been always an issue for me and little by little I’m reducing it thanks to the rehearsals””

Girl 1216

Such gaining of self-confidence was also observed by researchers in some specific cases. Especially relevant was the case of boy SP1213 in Group 1 (also highlighted by some teachers and students), a very shy student with some learning difficulties (including language). Although his participation was limited in the first workshops, he finally participated in the performance of the monologue (despite being voluntary) and surprisingly, was one of the boys who had more text in the monologue. The support of his peers seemed to be key to achieve this (see Section on Social and Civic Competences), together with the encouraging attitude of the facilitator.

One group also mentioned that supporting each other to perform, by distributing their lines according to their feeling of comfort with the presentation, helped them when performing.

Furthermore, such a learning process seemed to have developed or at least strengthened a sense of responsibility among some students, since they reported that they had already anticipated their peers’ absenteeism and had consequently developed their own strategy to ensure the performance of their monologue:

“Girl SP1218: Also Girl SP1216 did not go up (on stage).

Girl SP1210: Yeah, that was a disadvantage in my group... That we all worked but then, when we had to perform, we did it three of us and one didn’t. And although she let us down... We had all learnt the monologue. That was the positive thing, that we had all learnt each other’s part just in case someone...

Girl SP1206: Did not talk or feel stressed

MARÍA: That’s great, you had a strategy in case someone was missing.

Boy SP1201: We too.

Girl SP1218: Yeah, we also did”.

Such behaviour also showed their ability to manage projects like this. In this regard, some girls also mentioned overcoming personal tensions with other peers to prioritise working together and being able to present the monologue. This was the case as well in G2, and the way in which several students (mostly girls) reconfigured the groups at the end of the process to be able to perform the monologues (see above, section on Collaborative Skills). One boy also reported that despite being expelled the day of the performance, he participated in the presentation of the monologue because he cared about it (this boy was the one leading in his group –the only boy leader in Group 1), in contrast to other students who used it as an excuse not to be present that day at school.

Similarly, teachers emphasised the **capacity students showed to take ownership of the process towards the end and to improvise as some tense situations were emerging**. This was the case mostly in G2, when some students decided the same day of the performance that they would not perform and some students reconfigured the groups to perform their monologues. Such a capacity to improvise and engage in the performance of a different monologue shown by these students suggests their self-confidence. Furthermore, as mentioned in the section above, this was possible, according to their tutor, thanks to **students' capacity to creatively adapt to new situations and be innovative**:

"Despite the initial sessions that were certainly chaotic sometimes, the kids have been able to do something and this is improvising and reconfiguring the situation ad-hoc in order to be able to perform the last day. I mean, initially I was thinking 'get ready cause this is going to be chaotic', but then, everything just went fine. And then, of course, this means there is some background there, that they worked on it. I may had some doubts, some prejudice against some students, and all of a sudden, with this activity there were some specific and interesting qualities that emerged from them... (...). I thus think, honestly, that this was good and they did well (...), (they were able) to go through a difficulty and have a plan B, or without having it, generate an additional option. I think these kids have resources".

Male teacher, tutor Group 2, Terrassa

LEARNING TO LEARN SKILLS

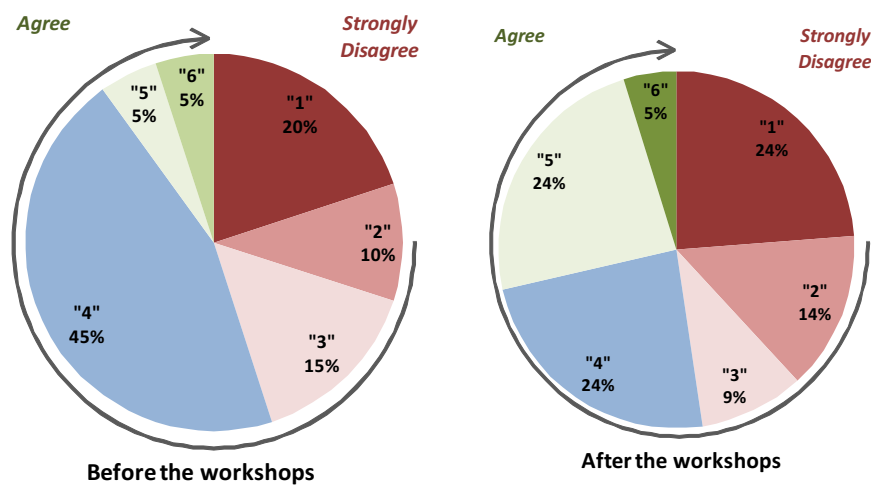
Learning to learn skills:

- Students **did not seem to value science learning as important for their future** as less than half considered it important for their future success or helpful to get a job. The workshops did not seem to provoke significant changes on such perceptions, although after the workshops students agreed more with the value of science learning for their future success.
- **Almost half the students considered they were able to formulate research questions**, without any significant changes after the workshops.
- Regarding reflective thinking, **we observed differences in students' capacity to make questions, discuss and make conclusions in the two groups**. Group 1 students' had trouble to engage in such reflective sharing when in one undivided group and they felt much more at ease when divided into their subgroups. In contrast, in Group 2 students did ask questions and intervened both in plenary conversations and small group work, although those elaborating more their ideas were 4-5 five students who seemed either more extrovert or more motivated.
- In both groups students seemed to **engage more in discussion when a space facilitated by and adult** was provided.
- Some students also showed the **capacity to reframe scientific concepts**, through bringing them to their experience or interests. That was the case in PW4 in Group 1 and PW3 in Group2.
- Some **difficulties to elaborate and reframe concepts** were also observed due to: the difficulty in understanding some technical terms (PW2), the lack of students' engagement in homework and the format of the activity (discussion oriented vs. hands-on oriented). Also reasoning and reframing remained quite unilateral (provided by the facilitator) instead of sparking an engagement in students that could head towards their own reframing or questioning of the scientific contents in their PERSEIAs.

Description of main results

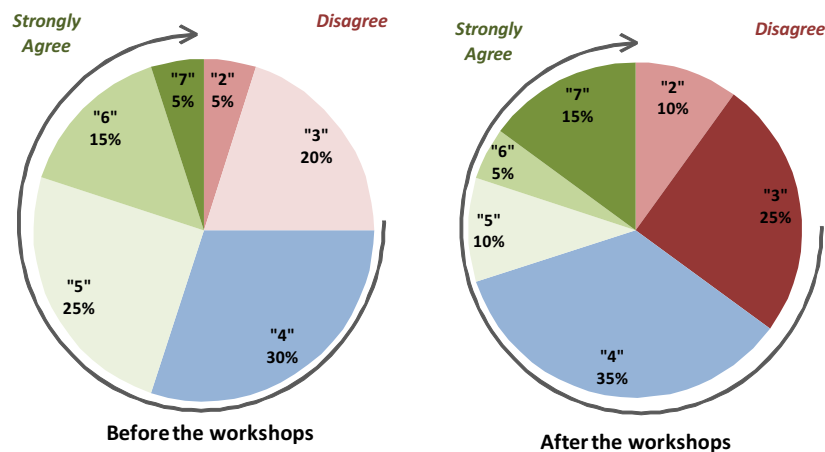
Students' general perception of the value of science was approached through one item in the surveys, revolving around their perceived importance of science for their future development.

Before the workshops **45% of the students valued science as important for their future success (4 were in total agreement) while 2 students (10%) did not (see Figure below)**. Interestingly, **almost half** of the students (45%) provided a neutral answer to this item, suggesting an indifferent position in this regard of an important part of the group. After the workshops, the proportion of students providing neutral answers decreased to 24%, but neutral answers shifted mostly towards considering science not important (which increased to 29%), while the percentage of students considering it important slightly increased to 47%. However, these changes were not significant, so we cannot state that the workshops had a significant impact in students' perceptions in this regard.



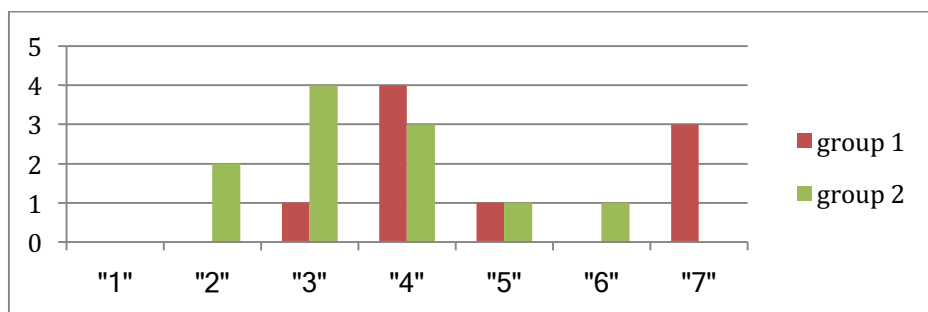
"Learning science is not important for my future success"

In addition, there was no clear trend associated to students' perception of learning science as helpful to get a job in the future. Before the workshops, when asked whether "*What [they] learn in science class will help [them] to get a job*", answers were quite shared between not considering it helpful (25%), providing a neutral answer (30%, 6 students) and considering it helpful (45%). After the workshops, students' opinions were more equally distributed: their agreement to the statement decreased to 30%, while neutral answers increased to 35% and negative answers to 35%. These changes were not significant.



“What I learn in science class will help me to get a job”

Furthermore, this survey item had quite a sharp difference between both groups after the workshops ($z = 2.118$; $\text{Prob} > |z| = 0.0342$). We can see that, while G2 was mostly either in disagreement or feeling neutral, G1 was either neutral or in sharp agreement.



Interestingly, when prompted about their motivations to learn in the learning charts (n=27), **several students referred to their interest towards the specific topic approached, while other answers related to curiosity and learning new things:**

"(the topic) It is very current in the present time and it is curious"

Girl SP2218

"I'm motivated to learn more, the topic analyses feelings on people according to the colour they see and it is interesting"

Girl SP2204

"Learning new things and new knowledge is always motivating."

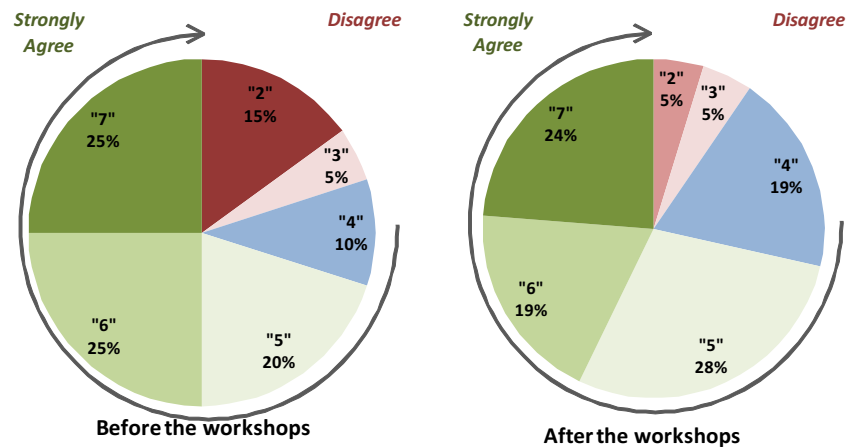
Anonymous

"It is a curious topic that can be important in the future."

Boy SP2107

Since students answered at the end of the first PW and some of them had not chosen their PERSEIA topic, some of these answers might also refer to the societal challenges presented in the Magic Cards activities in the session.

Regarding students' perception of their ability to formulate research questions, before the workshops, **65% of the students considered they were able to formulate research questions. This proportion slightly increased to 71%** after the workshops. Conversely, negative answers decreased after the workshops, from 20% to 10% and neutral increased from 10% to 19%, respectively. No significant differences were found between boys and girls but boys moved from 22% disagreement to 0% disagreement before and after the workshops respectively.



"I am able to formulate research questions"

Along these lines, and **connected to students' reflective thinking, we observed differences in students' capacity to make questions, discuss and make conclusions in the two groups. G1 students' had trouble asking questions, discussing and making conclusions when in one undivided group. They felt much more at ease when divided into their subgroups (3 or 4 students in each group) and there, were able to engage into lively discussions regarding their PERSEIAs with their peers. In session 1, there were two students (girl SP2218, boy SP2201) that were able to ask questions unprompted when in the big group, which surprised the whole group as often they tended to ask questions to their peers. In contrast, in G2 students did ask questions and intervened both in plenary conversations and small group work, although those elaborating more their ideas were 4-5 students who seemed either more extrovert or more motivated.** For instance, during the group sharing of the cards activity in workshop 1, students did punctual interventions to share their narrative, but it was the facilitator and the teacher who commented them and eventually made further questions. During this sharing, one boy made an intervention to question another group (after the teacher's first intervention which was also questioning), but no discussion was initiated. The presence of the teacher, who made quite critical interventions pointing to students' lack of rigour in their narrative, might have also influenced students, as the few students that were questioned by her, did not discuss and rather changed their framing to incorporate her comments. **As there was no discussion there was no elaboration of conclusions.** However, despite lacking the knowledge needed to do it rigorously, **students elaborated a short narrative with the information they had at hand** (instead of just reading the cards) and some of them made questions to the facilitators to elaborate more.

In this regard, **in both groups students seemed to engage more in discussion when a space facilitated by and adult was provided.** For instance, in G2, although students did participate in debates and share their thoughts, **discussion** (understood as building upon and arguing about each other's' comments) **was only observed during workshop 3** where many of the students provided arguments for their statements and elaborated a bit their answers as the facilitator and the ECR challenged them with their questions and comments, in order to show their position and argue it. Many students elaborated their ideas (especially when there was disagreement) and provided examples from their experience (e.g. what they see at home, or stereotypes about women in TV, experiences of discrimination from some older friends or family members). When they agreed, they also refined each other's comments, showing an ability to elaborate on what was being said and sometimes, add complexity. Connected to this, some of them also provided

arguments that recognised complexity and avoided polarities. This was the case, for instance, when girl SP1112 confronted the facilitator's comment about men being more competitive and women more collaborative, presenting specific contexts in which girls are more competitive than boys and further arguing that competitiveness and cooperation can also go hand by hand. Those students that participated less, made mostly short interventions. In this sense, **the interventions from the facilitator and ECR prompted some re-framing related to women discrimination and gendered social pressures** while facilitating students' reflections about some aspects they had not thought before, as according to them (e.g. subtle messages in commercials, glass ceiling in the professional sector).

Similarly, in G1 some students also showed the **capacity to reframe scientific concepts, through bringing them to their experience or interests**, although this was not generalised. One possible difficulty to engage in the elaboration and reframing of concepts might be found in some **difficulty in understanding some terms**. For instance in session 2 we saw students asked questions to the ECRs, teachers and facilitators in charge of each information station for clarification on some terms. These words made them struggle to understand the content and thus, found it harder to reframe the concepts exposed. **Once the conceptual confusion was clear, they could develop their ideas and the concepts exposed** in all but one new station that had too many words they found difficult. Furthermore, sometimes it did not help that students had not done their homework to then work on their monologue and reframe and develop the concepts that should have been worked at home.

Beyond these aspects, **the format of the activity also seemed to influence students' engagement in reflective discussion and reframing in the case of G1, which had more difficulties to discuss in plenary**. For instance, in contrast with G2, the role play interview did not spark a lively debate in G1 and **the facilitator had to resort to constantly asking questions and just getting really short answers**. By contrast, in PW4 students connected very well with the activity and were able to ask questions, discuss and make conclusions. **They engaged both with the facilitators, ECR and their peers** and, for the first time, the facilitator had to ask for silence from the group in order to listen to the other students. In the small groups, the one observed had a good level of brainstorming and sharing of ideas, they were trying to reframe scientific contexts around colours and relate them to their ideas, they interacted with the facilitator to see whether their scientific base was correct. **Students were able to reframe concepts through relating the scientific method with the artistic one, this hands-on approach seemed to help them better understand the facilitator's guidelines**.

Students' assessment of their own performance (a learning to learn skill) was observed in session 6 in which students were presenting their monologues and there was a special exchange between students. This meant that at the end of the session students could ask their peers questions and comment on some aspects of the monologue. However, although there **was a certain level of reasoning involved in this, it remained quite unilateral instead of sparking an engagement that could head towards the reframing or questioning of scientific content**. Besides two monologues (colour blindness and climate change) the content overall was quite flat, sticking to a sole argument without offering any alternative questioning. Facilitators had to keep reminding students not to be destructive with each other when giving feedback, students were engaging in feedback giving although it was not really constructive feedback but more of a comment about a mistake or something similar.

SOCIAL AND CIVIC COMPETENCES

Main highlights:

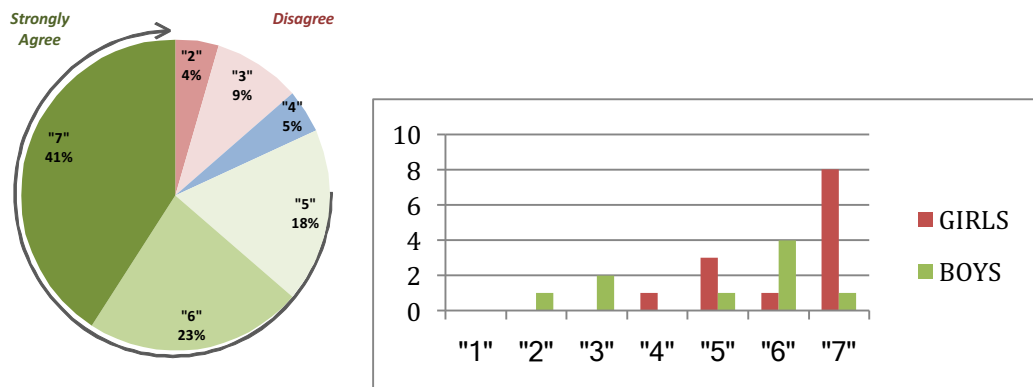
- The majority of the group (82% of the students) considered that they **had actively participated in the workshops**. Statistically significant differences were found between girls and boys, as only **boys (33%) reported not actively participating in the workshops**.
- This said, students' **sharing of tasks was uneven in some groups**, specially in G2 in which there were some students recurrently concentrating the tasks and performing the main roles.
- Students showed **respect towards each other's ideas** during the workshops and no moments of disrespect were observed in the groups. They frequently asked their peers for help, showing a collaborative attitude
- Students in both groups were able **to elaborate and share ideas verbally** during the activity, while they got a bit stuck when writing. Furthermore, this sharing worked better when they were in small groups.
- The **body as expressive means was more consciously used from PW4 onwards** and in the final rehearsed monologue, in which three groups used small sketches to set the context, share ideas or introduce concepts.

Description of main results

Collaborative skills

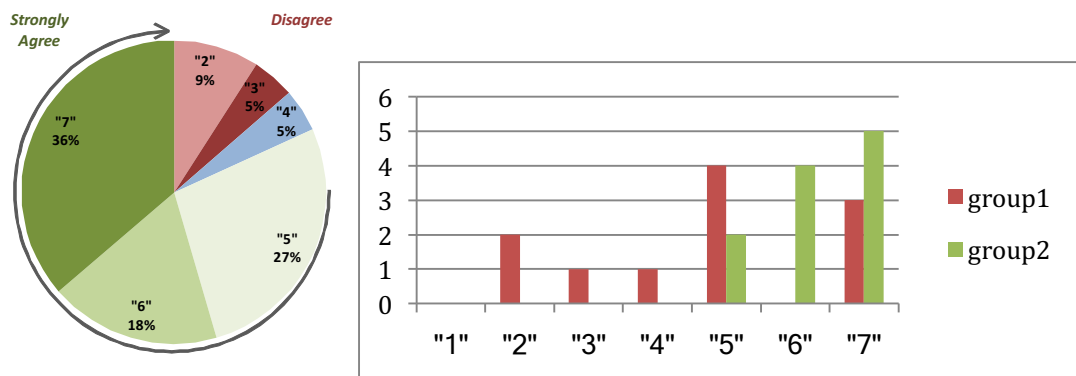
Students' social and civic competences were approached in the post-PERSEIA survey through two Likert items exploring students' perceptions of: i) their active participation in the workshops, and ii) the sharing of tasks within their groups.

Regarding the first item, **82% of the students** (18 out of the 22 students answering it) **considered that they had actively participated in the workshops**. Statistically significant differences were found between girls and boys, as **only boys** (33%) **reported not actively participating in the workshops** ($z= 2.025$, $p< 0.0429$). In contrast, all girls provided positive or neutral answers (92 and 8%, respectively).



"I actively participated in all the group tasks during the workshops"

When asked about the sharing of the project tasks, **81% of the students considered that they had shared different tasks within their group during the workshops**. 14% of the students considered that tasks had not been shared and 5% of students provided neutral answers. There were no significant differences between boys and girls but there were between groups. While group 1 tended to be more balanced in their answers, group 2 was only in agreement with the statement.



"I shared different tasks within their group during the realization of the workshops"

According to our observations, we could see that in G2, students' sharing of tasks was uneven and there were some students recurrently concentrating the tasks and performing the main roles. Opportunities for the sharing of tasks during the workshops observed were provided mostly in the small group work activity in PW1 and in the performance in PW6 (PW3 was entirely devoted to the gender activity). During small group work in PW1, in G2, the work was done mostly by 2 students (one girl, Girl SP1112, and one boy) while the other two girls remained quite passive. This girl was clearly the leader during this activity and concentrated all the tasks: she facilitated discussion, reminded her mates what they had to do and made questions. During group sharing, all of them had to talk so the task was shared among the students, but those answering the facilitator and the teacher's questions were the two students more active. G1 had a similar arrangement in the sharing of tasks though there was a small group where they did share their tasks evenly from inception to representation, the group that worked on subliminal messages.

Students' interventions in the focus group also suggested that, **for some subgroups, there was an unequal sharing of tasks among the group members.** One student shared that he was carrying most of the weight of his PERSEIA, taking the lead on the making of his group's monologue and when he had to miss a couple of sessions for a medical reason, upon his return there had been nothing more added to the monologue, making it unrehearsable. Students' interventions also showed three very interesting signs of a sense of initiative and engagement from two students (girl SP2104, girl SP2114, boy SP2109), who ended up doing the monologues by themselves, however they seemed to do so also because of a lack of enthusiasm from others:

"I did it all by myself"

Girl SP2104

"You try to motivate people, but sometimes it just doesn't work."

Girl SP2114

In group 1, students did not have many problems to ask for help when in trouble. More specifically, **they first asked their peers, who normally were eager to help,** and if they could not sort it out then they asked indistinctively whichever adult (facilitator, ECR or teacher) there was around, in this group students were very at ease with the three of them. **In group 2 student support to each other was clearly observed during the rehearsal of monologues in the last workshop.** Students generally helped each other (no one was left alone), for instance, remembering each other what they had to say, correcting them if needed, or passing on the paper with the script (if they had). In the other two workshops it was observed punctually in PW1 (PW3 had no self-managed tasks). Girl SP1112 literally asked for help to girl SP1102 during small group work, trying to make her participate and contribute to the narrative (without success); while the same girl helped Girl SP1102 afterwards during the sharing of the narrative, answering on her behalf one question made by the facilitator.

Students showed different views about the aspects that foster collaboration among them. Girl SP2114 remarked that it is easier to collaborate better with a group if they are your friends than somebody that does not bring that to you. Boy SP2107 had a different vision on working with friends, as he thought there would also be less control. Similarly, another boy noted that in his group they worked collaboratively between all of them and they sought being in agreement

regardless of not being friends. On that note, **a girl also said that when you have to collaborate with people you are not friends with, you actually make more of an effort:**

"You get more implicated where there isn't that much trust because it is like, I wanna do it right, just in case"

Girl SP2104

This topic sparked some discussion, since two other girls (SP2202, SP2104) agreed that **it would have been easier to collaborate with friends, in order to be able to be oneself better and have the trust necessary**. Particularly when it comes to making humorous monologues, stating that it is easier to find your humour with friends. Finally, girl SP2114 remarked that at some points it was difficult to collaborate because it appeared to her that some students were only there in order to miss lessons.

In both groups students generally respected each other during the activity, at times there was a certain level of banter but they were supportive and no conflicts were observed. For example in G2 during the gender debate, they showed disagreement in a respectful way, e.g., they did not undermine the other student's intervention but provided arguments about their position instead. In G1 in PW2, when they were doing the information stations, some students noticed a peer not engaging and they brought him into the station and explained whatever was needed to get him back to the activity. However, the last PW had the students talk a bit over each other during the rehearsal of the PERSEIAs and they were reminded by the facilitators to keep quiet. The only two instances were a disagreement in PW2 between two students on how to construct the PERSEIA and in PW4 the group of students told off two students that were not paying any attention. Beside this, it was a group that had no difficulties of conflicts among them. What students did note in the focus group was that in some groups (already mentioned) there was an unequal share of the tasks and in order to avoid any issues some of them (SP2109, SP2104, SP2114) took on the load of the PERSEIA. Finally, in the last session in which they were receiving feedback, despite some initial unconstructive interventions, students reacted generally well and only in a couple of cases there was some defensive reaction (e.g. from the group using black humor), but not disrespecting their peers' interventions.

Communication skills

During the observations throughout the workshops we saw that generally, **students in both groups were able to elaborate and share ideas both verbally and in writing during the activity**. However, the sharing worked better when they were in small groups as they were not so shy/passive and they elaborated their ideas further. In G1, it was also easier for them to share their ideas verbally, when in writing they got a bit stuck and it did not flow in the same way. In both groups, when filling the learning charts (PW1, 4) students tended to write them down quite quickly without putting much effort into developing their ideas.

During the PW1 in G2, there was some elaboration and sharing of ideas at the last plenary, in which students shared their narrative. Although their narrative was constrained by the lack of information and context knowledge, they managed to elaborate a simple logic sequence and to communicate it clearly.

During the last workshop devoted to rehearsal, students had the opportunity to elaborate and share their ideas through the representation of their monologue. **There were two small groups**

that managed to elaborate their ideas and shared some structured scientific content (i.e. the monologue about colour blindness and the one about environmental degradation). The other 4 groups shared specific concepts and ideas, but they were not elaborated or structured. Also, during the group interview, as reported before for Terrassa, the ECRs noted the presence of some offensive content in the PERSEIAS (one monologue had some offensive jokes based on the Holocaust).

With regards to body language we found that the body was consciously more in use from PW4 onwards and in the monologue most intensely. For both groups, the use of body was normally limited to the initial warm-up and as a way to activate students. PW4 as it had the 5 moments activity. Students used bodies, drawings and text to scenify the moments. Overall all scenes were understood. In the next session students were taught skills that appeal to the body and some used them later in their PERSEIAS. For G2, no use of the body to express ideas or convey meanings was observed through the workshops, except in the performance of the monologues (last workshop). However, during this PW, 3 groups used small sketches to set the context, share ideas or introduce concepts (e.g. colour blindness monologue by (shyly) representing the chromosomes with the body, or the use of body exaggeration as a humoristic resource in the monologue about subliminal messages).

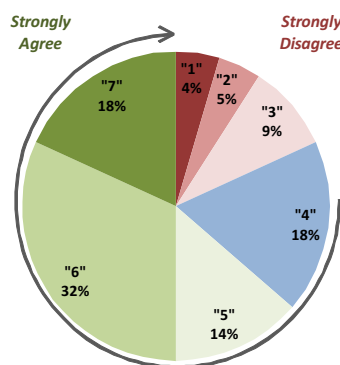
SENSE OF INITIATIVE AND ENTREPRENEURSHIP

Main highlights:

- Students answers to the survey suggest they **generally felt confident during the workshops** (64%). In contrast, when asked about their perception of readiness to perform, showed that **a big part of the group did not feel prepared to perform** (64%, while 6 students, 28% did feel prepared). This matches with the concerns expressed in this group about the final performance. Also, **generally girls felt more prepared to perform than boys**.
- During the participatory workshops we observed contrasting behaviours related to students' **leadership in both groups**. In G1, students did not show a clear individual leadership in the sessions and with one exception it was quite shared, even in the small groups. In G2, some students did show more initiative and leadership than others, and two students ended up creating their own individual monologue.

Description of main results:

Regarding students' feeling of confidence during the workshops, **18% reported not feeling confident during the workshops** and 18% of them provided neutral answers **while 64% reported agreement with the statement**, showing that most of this cohort was feeling confident.

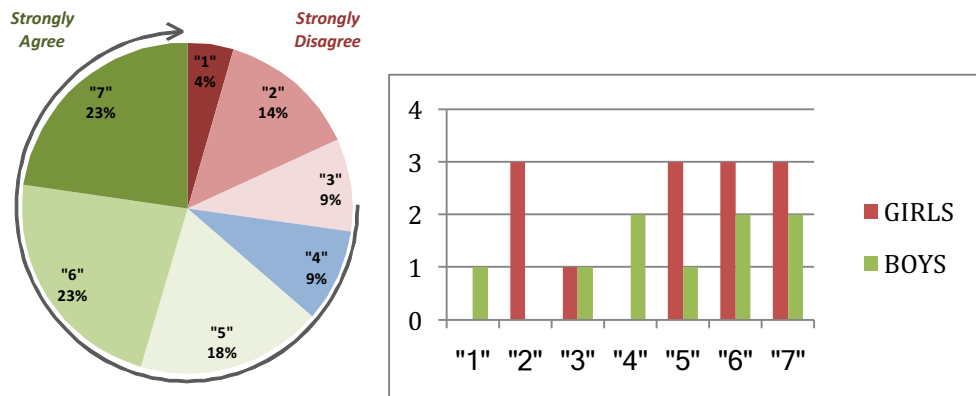


"I felt confident during the workshops"

But when asked about their feelings during the workshops (see GOAL 4, Emotional Engagement for the answers and figures) only **18% of them reported feeling confident**. However, **feeling doubtful was also reported by a 24% and feeling insecure a further 7%**, showing a mix of feelings, probably associated to different moments of the process. Furthermore, as mentioned in Terrassa, students might also have difficulties to reflect about emotions in a written survey.

Students' answers regarding their perception of readiness to perform, showed that **a big part of the group did not feel prepared to perform** (14 students, 64%, while 6 students, 28% did

feel prepared). Generally, girls felt more prepared to perform than boys (9 girls vs 5 boys). Also, 2 students (9%) provided a neutral answer, showing an intermediate position in this regard.



"Despite the rehearsal during the workshops, I did not feel prepared to PERFORM the PERSEIA"

Indeed, during the participatory workshops we observed contrasting behaviours related to these competences. In G1, **students did not show a clear individual leadership in the sessions and it was quite shared**, even in the small groups, it was normally quite even and balanced between the participants, at least during the interactions that happened in the sessions. However, there were a few students (SP2201, SP2203, SP2218, SP2212) who were a lot more participative than others and, in this respect, may be thought of as having been more leaders than others. For instance, in the group doing the PERSEIA on colours there was a clear leadership by two girls and the other two tried and made proposals for the PERSEIA. Furthermore, when they rehearsed the PERSEIA, we could see that a few students that were leading the PERSEIA and in some specific cases this generated a sense of being uncomfortable in the group (i.e., the monologues of doping or criminal minds) because there was an imbalance between participants.

Leadership was clearly observed in G2. For instance Girl SP1112, which also seemed quite confident through the workshop activities (except the last day of rehearsal) was leading her group since the beginning. Also, during the last workshop, Girl SP1104 was the only one from her group attending and she was able to perform the whole monologue. She knew the text, what she wanted to say and had a performer attitude, suggesting that she had been leading the group (the other 2 students were boys). One boy, also decided in the last minute to create his own monologue, as he did not feel identified with the monologue in his group, showing his sense of initiative and motivation.

Besides these elements of a "forced" initiative by some students, that did result in some noticeable work, during the focus group girl SP2202 remarked that she was very surprised in seeing some of her peers got involved in PERFORM and demonstrated a good sense of initiative during the sessions. She remarked the leadership of a PERSEIA group of boy SP2201 in particular that would not have expected to see having the initiative.

The teachers remarked the involvement and entrepreneurship of this same student as well, noting that he has been a difficult student in other areas and they were very pleasantly surprised with his initiative and group leadership. They also mentioned their surprise at another student, boy SP2220, who initially wanted to get out of PERFORM but once in the project, he was involved and during the session had initiative and lead some interventions.

The male teacher commented that he had the impression students in Group 1 had learned better how to work in teams, that to start with, he was a bit apprehensive of some of the mixes there were in this group but that he ended up positively surprised:

“This growth in experience has been significant enough to be able to see a before and an after(..)”

Male Teacher