Developing future-scaffolding skills:

Pilot-study on a teaching/learning module about Climate Change and Project Cycle Management

"I SEE Kick-off meeting"

Context of the teaching experiment

- **School:** Scientific Lyceum "A. Einstein" in Rimini (our partner)

- **Class:** IV B (grade 12th)

- **Teacher:** Professor Paola Fantini

- **Position in the curriculum:** at the end of thermodynamics path

- **Kind of meetings:** 7 extra-curricula, after-school time, only for volunteers

- **Students involved:** 24/25 (15 females and 9 males)

- **Research group:** Laura Branchetti, Paola Fantini, Olivia Levrini, Monica Russo, Giulia Tasquier, Ilaria Venturelli

Aims (1/3)
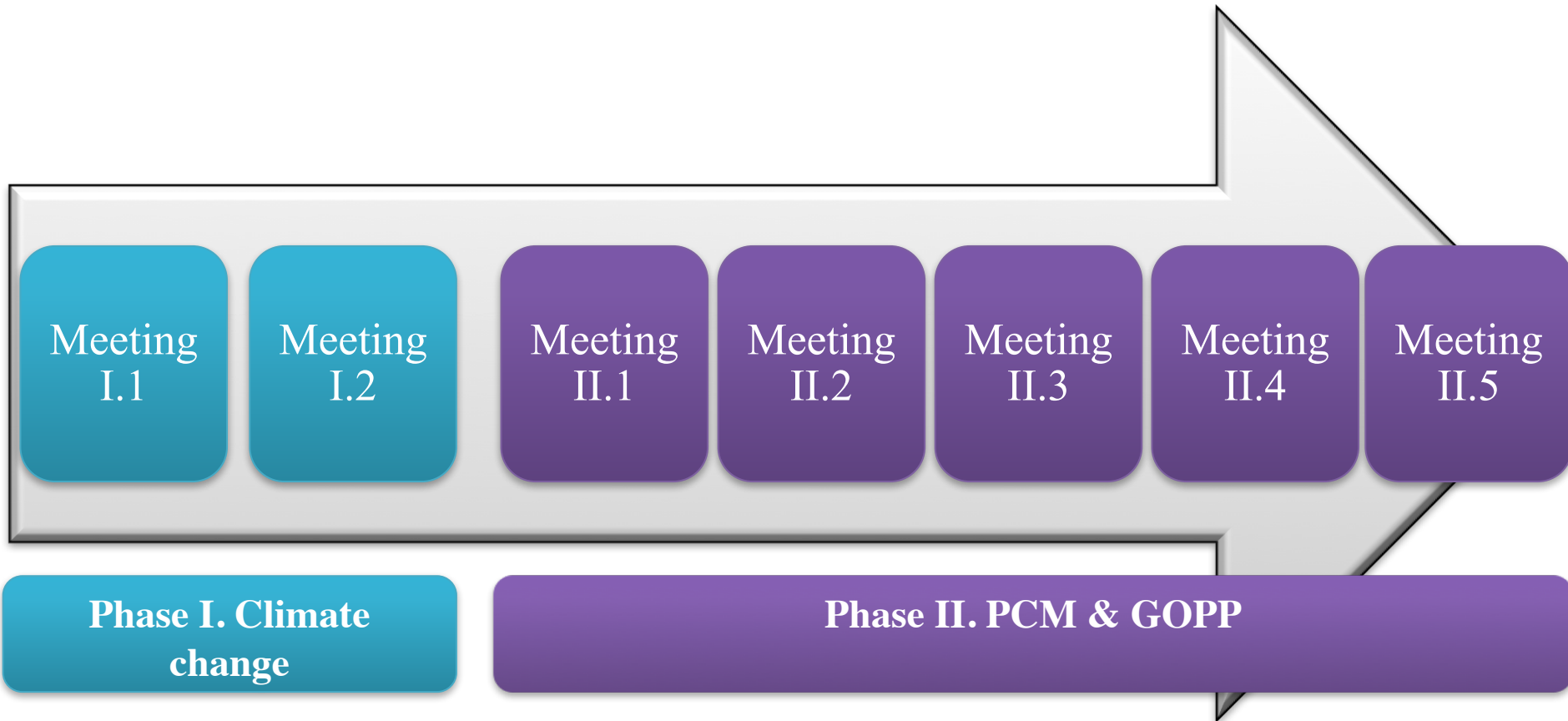
- To enhance students' knowledge on climate change and develop a critical and rational attitude about the debate on the topic

- To develop skills in "European Project Planning" consistent with the methodologies of Project Cycle Management (PCM) and Goal Oriented Project Planning (GOPP) requested from the labor market

- To transform "Project Planning" skills in tools for structuring thought in order to let students imagine their future

Aims (2/3)

- To enhance students' knowledge on climate change and develop a critical and rational attitude about the debate on the topic

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The "module"

| Meeting I.1 | Meeting I.2 | Meeting II.1 | Meeting II.2 | Meeting II.3 | Meeting II.4 | Meeting II.5 |

Phase I. Climate change

Phase II. PCM & GOPP

(*) Extra-school meetings of 3 hours each

The "module"

Meeting I.1
- Introduzione scienza del clima e cambiamenti climatici
- Esperimenti sul fenomeno dell'interazione radiazione materia

Meeting I.2
- Esperimenti sul fenomeno dell'effetto serra
- Discussione collettiva sul report IPCC

Phase II

Meeting II.1
- Introduzione metodologia PCM e GOPP
- Esercitazioni

Meeting II.2
- Applicazione delle metodologie nell'analisi di una scheda sui CC (lavori di gruppo)

Meeting II.3
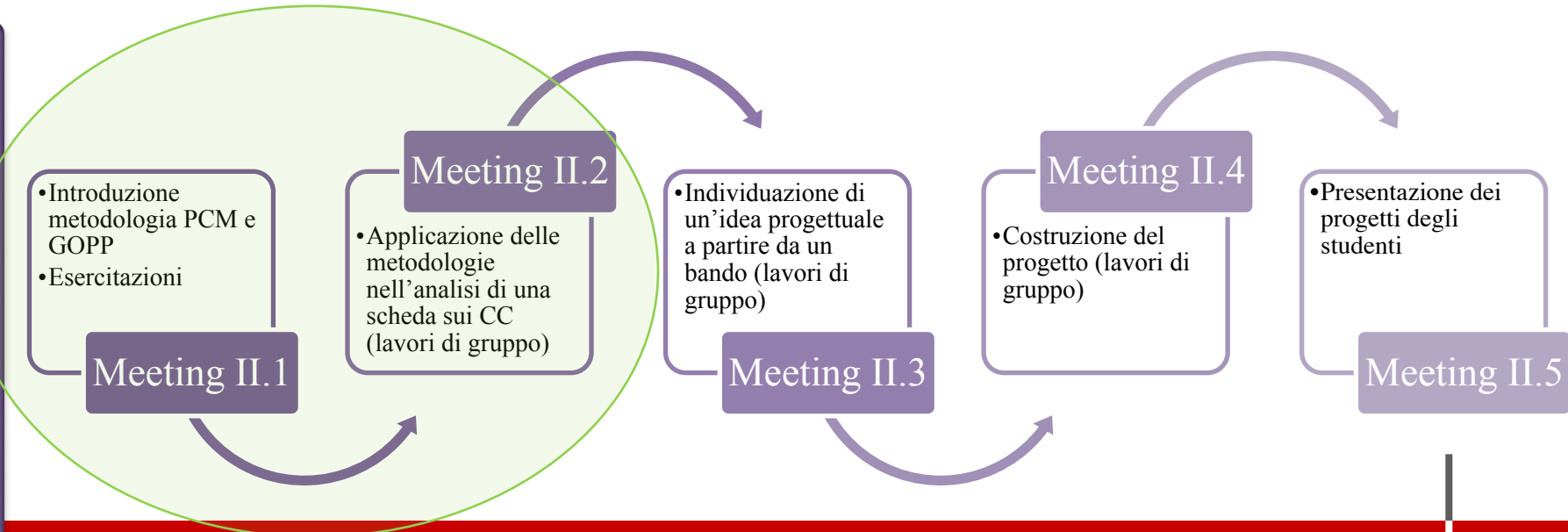- Individuazione di un'idea progettuale a partire da un bando (lavori di gruppo)

Meeting II.4
- Costruzione del progetto (lavori di gruppo)

Meeting II.5
- Presentazione dei progetti degli studenti

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Aims (3/3)

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Data collection

MAIN DATA SOURCES	MOMENT OF SUBMISSION			CHECKED ISSUE/DIMENSION		
	B	**D**	**E**	**CC**	**Imaginary**	**Creativity**
Written essay (about future in 2030)	X	X		X	X	X
Projects made by group of students (5)		X	X			X
Audio-recorded of groups' work		X				X
Audio and video recorded of the meetings		X				
Researchers notes		X				
Individual semi-structured interviews			X	X	X	X

Legend of the table: **B:** *beginning of the path;* **D:** *during the path;* **E:** *at the end of the path*

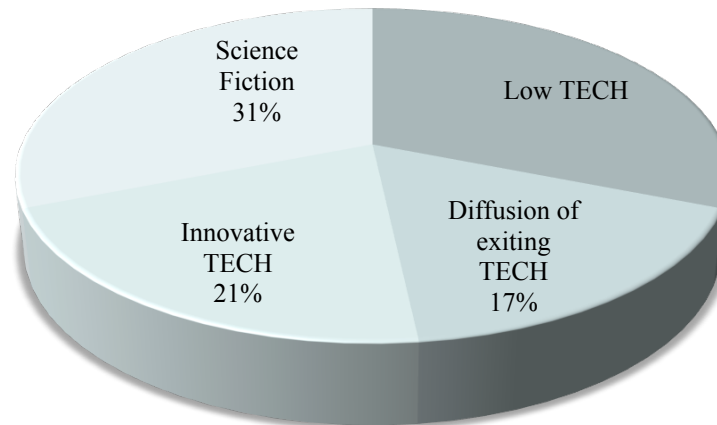# Students' imagine of *future* - BEFORE

... relation with changes

DIMENSION OF CHANGE

Political 6%

Social 22%

Technological 38%

Environmetal/Climatic 34%

NO CHANGES 32%

YES CHANGES 68%
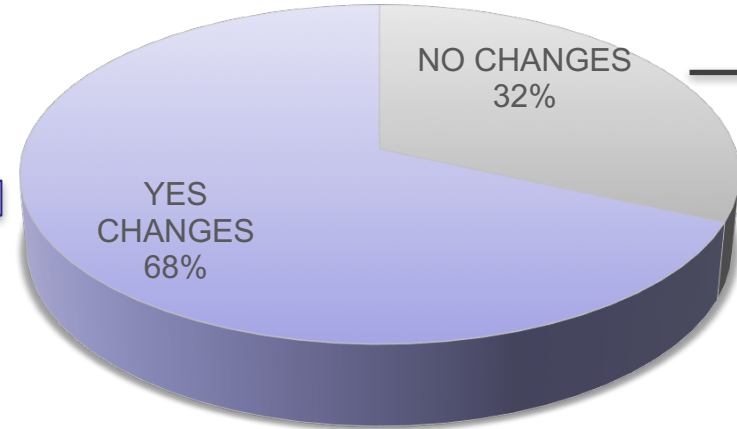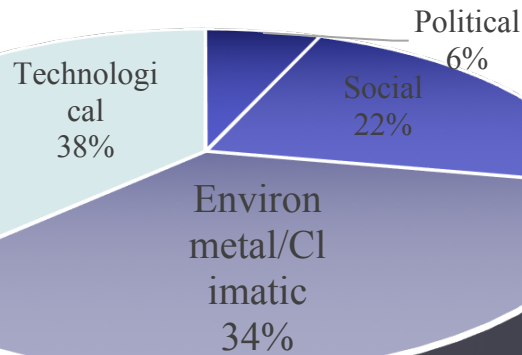
· To far or to close futrue
· Resistance in imaging the future

RELATION WITH TECHNOLOGY

Science Fiction 31%

Low TECH

Innovative TECH 21%

Diffusion of exiting TECH 17%

... *attitude toward future and climate change*
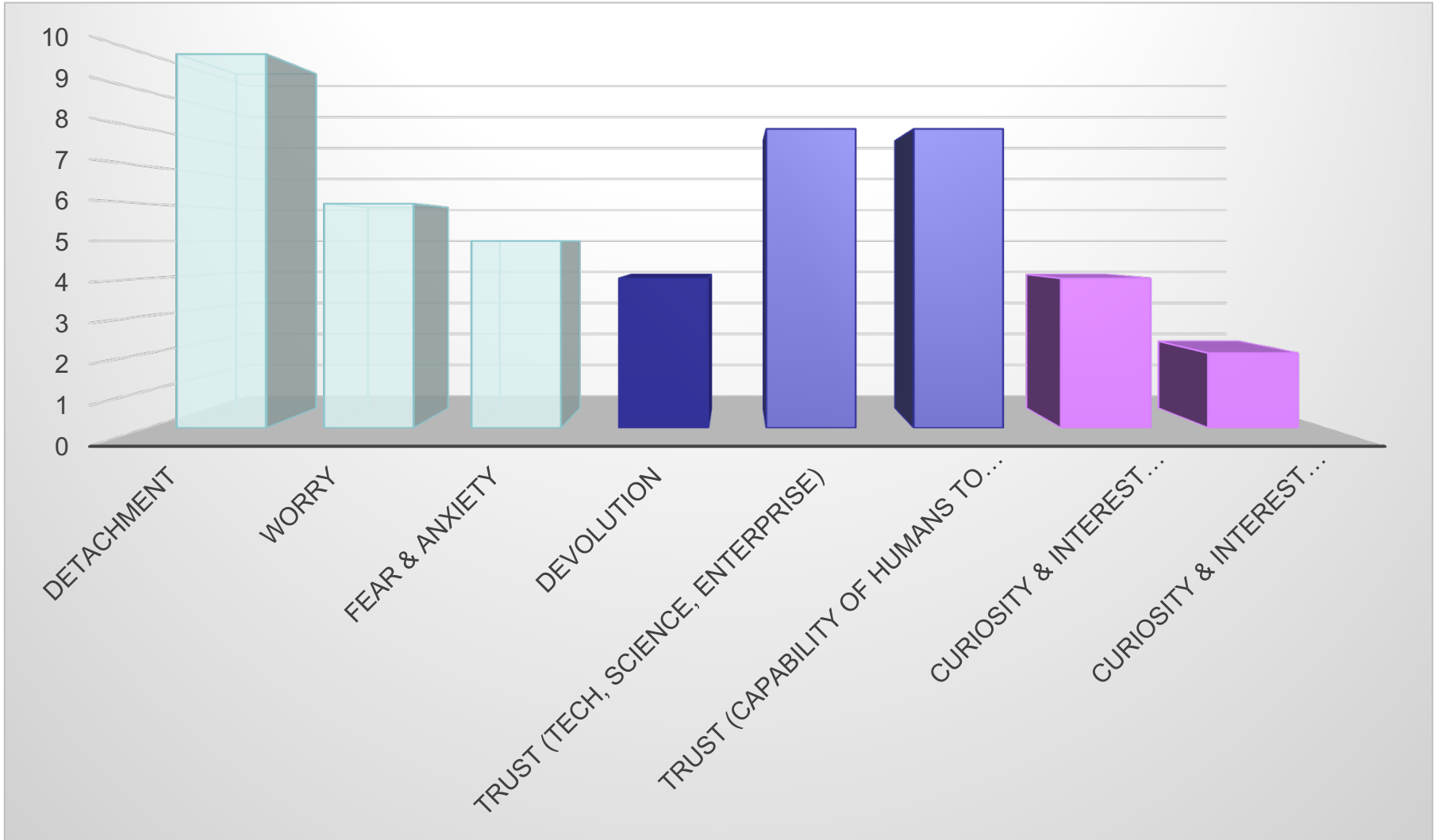
Image of *future* - AFTER

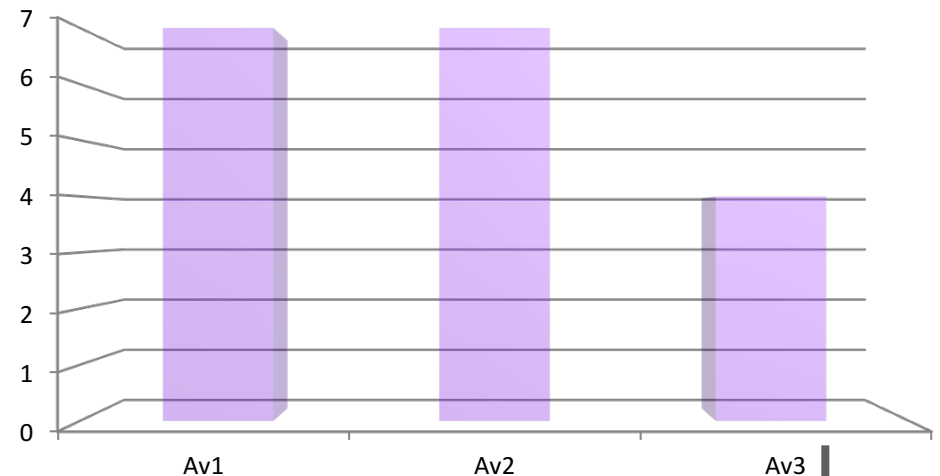**Emerging of a *Scaffolding***

(ENLARGEMENT & APPROACHING)
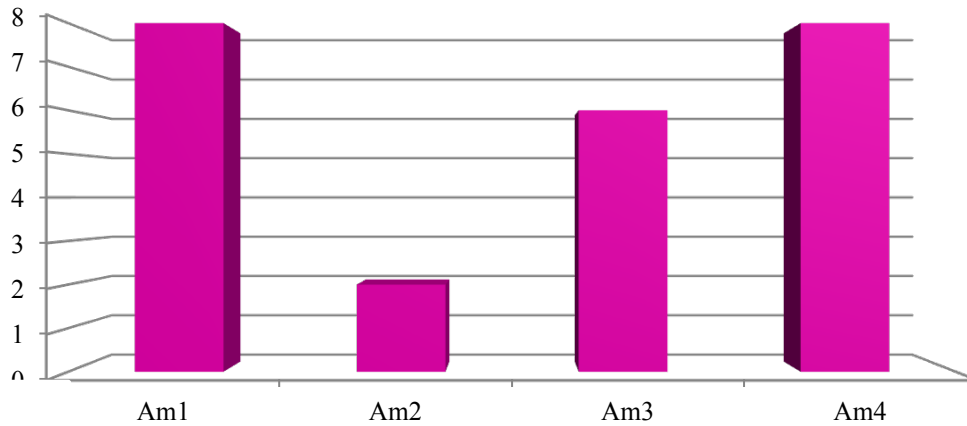
En1: Knowledge of the topic;

En2: framework of possible actions;

En3: acquisition of new ways of thinking and looking at the problem;

En4: acquisition of new awareness and new confidence in their own potential and their role as responsible citizens.
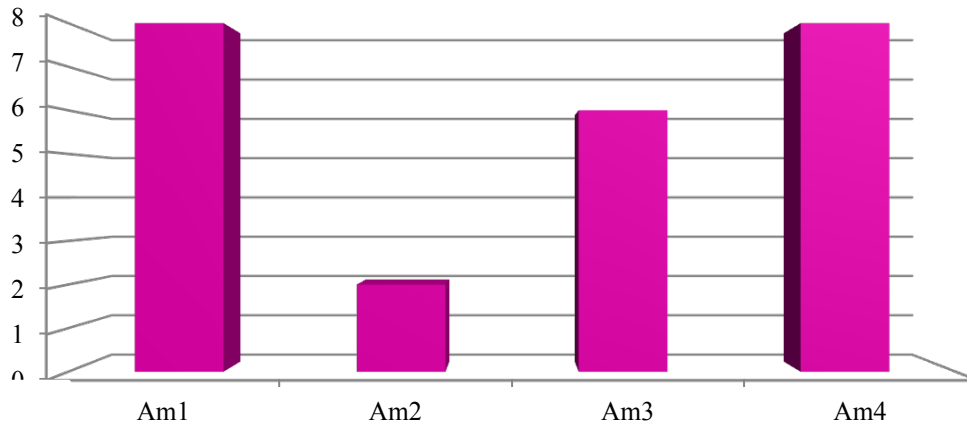
Ap1: (approaching future within the time) year 2030 moved from a future almost unthinkable to a closer future;

Ap2: (approaching future to reality), the future became something concretely approachable through achievable actions;

Ap3: (approaching future to ourselves) future challenges were perceived feasible.

Scaffolding
ENLARGEMENT & APPROACHING

En1: Knowledge of the topic;

En2: framework of possible actions;

En3: acquisition of new ways of thinking and looking at the problem;

En4: acquisition of new awareness and new confidence in their own potential and their role as responsible citizens.

Ap1: (approaching future within the time) year 2030 moved from a future almost unthinkable to a closer future;

Ap2: (approaching future to reality), the future became something concretely approachable through achievable actions;

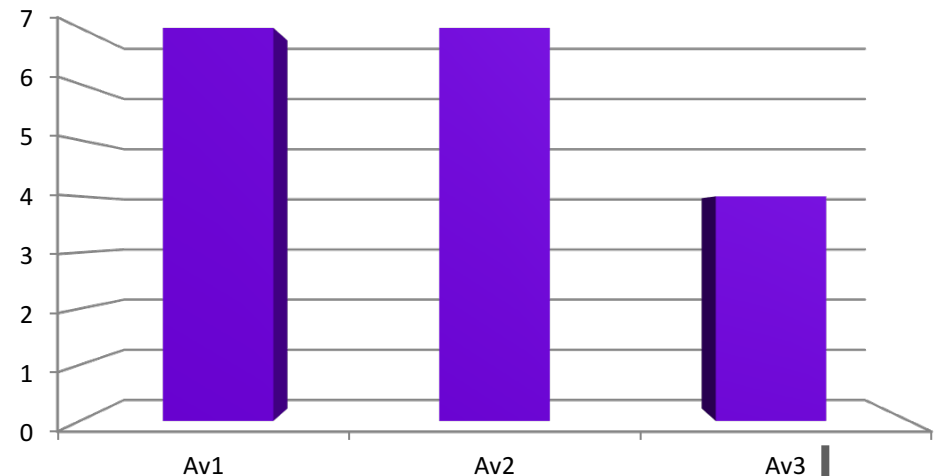**Ap3:** (approaching future to ourselves) future challenges were perceived feasible.

«The project has helped us **to think, to do something in relation to something else** [...] what I learned about **to move from problems to goals** struck me a lot, it also "woke me up", in the sense that many times we perhaps see all the problems and we do not see even a positive thing, with this project we have seen that and **how we can act** and otherwise **things are feasible**, we didn't that talk about abstract things. [...] If we are too much focused on one thing we can not see it in a global [...] instead **we must always have a vision both global and transversal, and then of course, when needed, we must able to go in the detail, but always remembering the context** in which you are.» (Elena)

«For me, **the activities have especially opened my mind and opened many ways more than I had before**. At the beginning, the activities have demoralized me so much because I thought, of course, to not be able to get there, however, I thought to not have a mind that could look ahead to what I can see now, better to what I could not see before, **rather through the project I am really able to get to the point where I thought that my mind does not arrive**. [...] The project changed my way of thinking, not only for me also for the others..» (Sara)

FINAL CONSIDERATIONS

BEFORE:

difficulty in imagining the future and imagine themselves in the future

(Too close, too far away, anchored to the present).

$\Rightarrow$

AFTER:

"Enlargment" of their own way of looking at the future "Approaching the future", a new way to look at the future
(It had also an impact on attitudes towards climate change).

- The construction of useful tools to think and to outline a method has allowed the construction of a scaffolding to push imagination toward the future

- The design activities have allowed to find new strategies and new ways of looking at the problem of climate change and the future

Selection of references

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Levrini, O., Fantini, P., Pecori, B., Tasquier, G., & Levin, M. (2014a). Defining and operationalizing 'appropriation' for science learning. *Journal of the Learning Sciences*. DOI:10.1080/10508406.2014.928215

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