SMALL SCHOOL NOTEBOOKS
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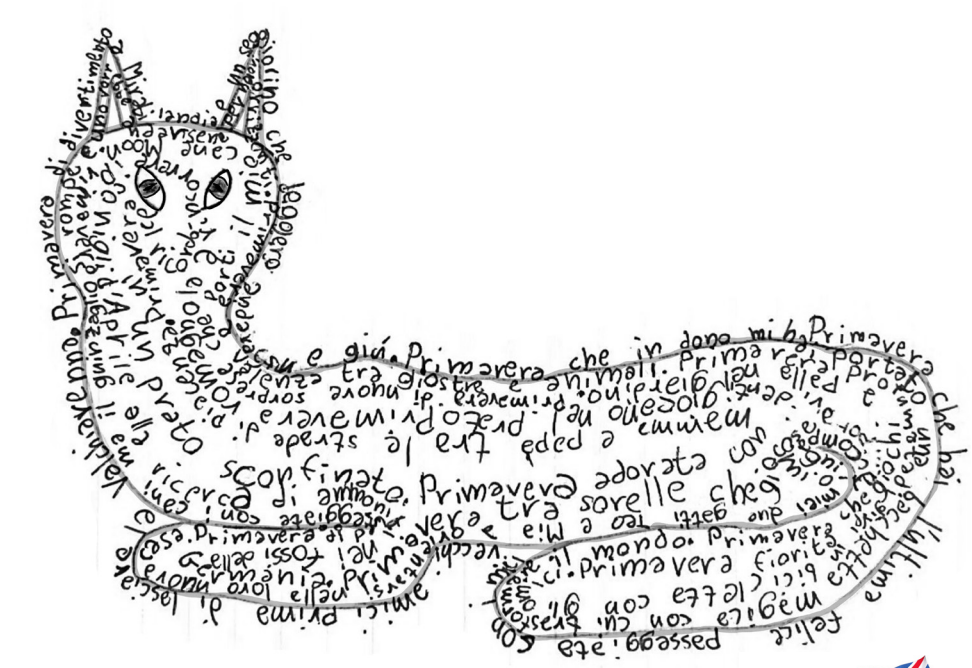
The art of changing your plans

Dialogic inquiry and the unexpected

Laura Parigi - INDIRE

Stories ☐
Tools ■
Studies ☐



English version

Calligram on the signs indicating the arrival of spring created by the students of a 4th/5th multiage primary school class

PICCOLE SCUOLE
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Authors: *Laura Parigi, INDIRE*

Series editor and contact person of the research group "Methodological and organizational innovation in small schools": *Giuseppina Rita Jose Mangione, INDIRE*

Graphics coordination: *Antonella Sagazio, INDIRE*

Editorial board: *Assunta Gambale, INDIRE*

Web communication: *Fabiana Bertazzi and Michele Squillantini, INDIRE*

Graphics: *Paolo Curina in association with Martina Trevisani*

Illustrations: *Andrea Paoli, INDIRE*

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The *working library* is an innovative and unique publishing work designed and directed by Mario Lodi.
From 1971 untill 1979 the project was managed by a group of educators: Fiorenzo Alfieri, Francesca Colombo,Tullio De Mauro, Caterina Foschi Pini, Alberto Gianola, Angelica Gianola, Roberto Lanterio, Palmira Maccarini, Luciano Manzuoli, Gioacchino Maviglia and Francesco Tonucci.
The working library was created as an alternative to the schoolbook. The format, functional to teacher's activities, contains 80 should be functional to teacher's activities. They collected 80 issues of "Documents", "Letters", "Guides" and 68 sheets with ideas, activities and practical tips for teachers so that they can be used according to their classroom needs.
A good collection of practice material experienced in Italy. A catalogue that teachers, parents and students can use in every social and geographical situation. Learning activities that have a different approach to the traditional lessons and use tools for effective teaching activities.
Mario Lodi and his colleagues wished that students' families and teachers know them.
Everybody wants a better school, a warm and scientifically correct place where the students' experience comes first. The working library had this goal.

Cosetta Lodi
President of Casa delle Arti e del Gioco
http://www.casadelleartiedelgioco.it

After so many years from the *working library*, the idea of creating a better school is still alive. Todays' model of schooling is still a traditional one, which is difficult to remove from the daily practices and belongs to the image of the standard school.
Indire main goal is to give support and highlight teachers' research activity to "learning experiences, classroom organisation and learning environment that foster the students' autonomy so as they can develop permanent competences and skills" (*Indicazioni Nazionali. Nuovi scenari*, 2017).
The tools in Lodi's *working library* were effective because they used a clear and simple language, essential format, a research work that came from teachers' daily activity. The tools contributed to disseminate innovative teaching method based on the active learning and an inclusive and democratic school model.
Documentation and teaching methods offered in the *working library* allowed teachers to practice and experience innovative pedagogy.
The S*mall Schools' Notebooks*, divided into "Stories", "Tools" and "Studies", wishes to pay homage to this experience that is a good practice of research and innovation in schools.
We wish to thank to Mario Lodi's heirs to allow us to use and rethink to the *Working Library*. We also wish to thank to Grandi & Associati which collaborated to the editorial activity and publishing of this volume.

Research team - INDIRE Small Schools
http://piccolescuole.indire.it

Contents

1. Expecting the unexpected in education

Dialogic inquiry

The teaching experiences collected in this Notebook were carried out during a workshop held in spring 2019, involving several teachers of the Small School Movement from the central and northern regions of Italy. In particular, the workshop offered the teachers the possibility to experience dialogic inquiry a teaching method developed following the research and experimentation conducted by Casa Laboratorio Cenci[1].

In the 1980s, within the scope of the Educational Cooperation Movement, several teachers - guided by psychanalyst Alessandra Ginzburg - started a research on the pedagogia dell"ascolto. The teaching techniques experimented consisted, for example, in: creating a wall magazine as a tool capable of making the recollection of experiences lived at school or outside the school visible (through drawings, images, etc.); creating a child's life-book as a tool capable of collecting individual and collective memories; recording and transcribing dialogues carried out in class.

Through these forms of documentation, it is possible to provide children and teenagers with a feedback on the product of their intelligence. This approach, in fact, originated from the firm strong belief that children's and teenagers' thoughts, the spontaneous hypotheses and theories that they formulate in the attempt to understand the origin and functioning of things, are the manifestation of a strong cogni-

Note

1. Casa Laboratorio Cenci (http://www.cencicasalab.it/) is an association coordinated by teachers Franco Lorenzoni and Roberta Passoni. The association conducts educational and teaching research activities in the countryside of Amelia, in the province of Terni.

tive tension. Even when said those thoughts appear irrational in the adults' eyes, they express the ability to formulate complex constructions which in some cases evoke the great ideas and the great questions of the history of culture (Ginzburg, 1979)[1]. This way of conceiving children's thinking finds confirmation also in cognitive science: children are capable of noticing, already at a very early age, regularities and anomalies both in the environment and in individuals' behaviors. Indeed, they precociously develop awareness concerning the difference between imagination and reality, and they are capable of processing imaginary counterfactual worlds (reveries, games, imaginary friends), in order to understand how the world works and how to act in it. However, adults, even school teachers, have difficulty in recognizing the value and importance of those thoughts, as their reasoning has a different quality: it is more selective and more conditioned by experiences and culture. Children are capable of expanded attention. They tend to build relations between things that adults would reject as not very plausible. This ability is found also in adults who express their creativity in art or in science, which enhances learning («In order to learn, it is necessary to remain open to all possibilities, even the unlikely ones, which however could turn out to be true (perhaps, that speck of dust hides the secret of the universe)») (Gopnik, 2010, p. 26)[2].

Children's thinking does not often find space in the educational process especially when the teachers think that their job is to transfer knowledge "objects" to students by assimilation. Dialogic inquiry assumes a constructivist perspective on knowledge: children thinking is acknowledged as the outcome of an intellectual effort originating from the same need and from the same desire at the basis of the great ideas of the history of thinking. In this sense, one of the most significant teaching experiences that draws inspiration from this approach is the one described by Franco Lorenzoni[2] in "I bambini pensano grande. Cronaca di un'avventura pedagogica" (Sellerio, 2014) and in "I bambini ci guardano: una esperienza educativa controvento" (Sellerio, 2019).

[1] Ginzburg a. (1979), *Premessa ad una pedagogia dell'ascolto nella scuola dell'infanzia,* Comune di Roma, Assessorato Scuola, Roma

[2] Gopnik, A.. *Il bambino filosofo.* Bollati Boringhieri, 2010

2. Franco Lorenzoni is a primary school teacher from the late 1970s to 2018. He is active in the Movimento di Cooperazione Educativa - MCE. Drawing from his teaching experiences, he also wrote, "Con il cielo negli occhi", La meridiana, Città di Castello. (1991); "L'ospite bambino. L'educazione come viaggio tra le culture nel diario di un maestro", Theoria, Roma (1994). He cooperates with the magazines "Cooperazione educativa", "Gli Asini" and "Lo Straniero".

Note

In his pedagogic accounts, Lorenzoni interweaves his considerations on what it means to be a teacher with the transcription of dialogues recorded in his classes during inquiry based learning practice that he conducted with his students in Giove, a small town in the province of Terni where he taught until 2018. Sometimes these pratices originates from the teacher's initiatives, or in other cases from the children's questions, («What's zero?», «How can philosophers talk about death, if they don't know what it is?»), or also from practical problems that the class had to face, such as the repair of the roof of a little house in the school's yard. In particular, the dialogues continue on for days, sometimes even for weeks and months, as the class recall them back up throughout the various academic years. In fact, starting from an initial hint, the children continued to develop questions and theories («You can't count zero», «It exists, here it is, it's a symbol», «Symbols don't count, because you can give a symbol to something you invent»).

During the dialogue the teacher does not talk much. Sometimes, he asks for clarifications and revives the debate («So, does zero exist?», «Are you sure that symbols don't count anything?», «How can a culture decide, at a certain point, that it is year zero?»). Sometimes he participate to introduce a new word and a new concept in the dialogue («Mathematicians define this number [the square root of two] irrational, which means without reason»), he gives suggestions for progressing in the search for answers («If we want to understand something about zero, let's try to understand where it is, where we can find it»), and every once and a while he summarizes the theories that emerge from the children's interactions («Francesca says that zero exists, Marianna says it doesn't, she says that only the symbol zero exists, which is something different. What do you think?»).

In many cases dialogues are recorded and turned into a trascriptions.

Trascriptions becomes a key step in planning the following educational actions. The teacher drew from repertoires of the educational research conducted by the Educational Cooperation Movement, or

Note

created activities based on observation, experiments, the construction of models aimed at providing answers to questions, verifying a hypothesis, giving value to a language intuition or invention. Sometimes, the teacher chose to develop the research of the entire class starting from an idea or a difficulty of a single student, as for example, a child who can't become convinced that the Earth is suspended in space («However, the Earth is held by a string»).

The teacher takes the child's firm belief seriously, also because he thinks that it will help everybody («His reasoning is firm and coherent, and helps us understand why even very intelligent women and men continued to believe, for millenniums, that the Earth rested on something, despite seeing the Sun set on one side and rise on the opposite side in the morning»). The teacher prepares an experiment («We immediately carried out an experiment with a bucket full of water spinning quickly without spilling the water, "because it is the spinning that pushes the water away from the center", as Simone observed, and we all discovered the true meaning of the word centrifugal») to help them understand gravity.

INDIRE's research form of dialogic inquiry[3] was aimed to collecttepertory of activities and examples from which other teachers can draw to carry out experiments in their classes. Indeed, we view dialogic inquiry as an educational practice that achieves, in a very practical way, the "student's centrality" mentioned in many pedagogical texts and institutional documents. Therefore, it recognizes the children's right to acquire deep and rooted learning at school - which can help them understand and act in the world surrounding them -, and experience culture not as a heap of basic knowledge to learn by heart in order to "do well at school", but as a social fact that relates to them, that belongs to them, that needs their curiosity and their thinking.

3. The practice of dialogic inquiry was object of a research conducted by INDIRE that involved primary school teachers and lower secondary school teachers. With regard to the research, see Parigi L., Lorenzoni F. Dialogo euristico. Orientamenti operativi per una pedagogia dell'ascolto nella scuola (Carocci, 2020).

Note

The art of changing your plans

One of the greatest efforts in dialogic inquiry is to balance curriculum design with children's thinking, as pupils often suggest unexpected associations and connections between different subjects and content. We collected many different cases of teachers that started with a "program", a precise idea on the contents to cover (the evolution theory, the italian verbal modes, perspective in paintings), and suddenly a child's question («I don't understand why monkeys no longer transform themselves into human beings») opens up a new direction for classroom inquiry.

As the pedagogist Paolo Perticari[4] wrote, acknowledgement of children's thinking as a valuable source for curriculum design challenges one of the pillars of transmissive schooling: teachers decide what to learn, content selection and progression. this idea is so rooted in teachers mindset, in textbooks structure and in parents' expectations, that during the radical change caused by the Covid 19 pandemic - which for many months forced children and teachers to distance schooling, the public and media talks on school mainly concentrated on technology had become indispensable - with its video lessons, webinars, online platforms - to continue curricular activites as designed, regardless of the global lifestyle changes that children were enduring.t was as if there were no matters in the pandemic connected to Mathematics, History and Geography that could be covered at school, at all ages.

In September 2020, Lorenzoni wrote an article published in Nuova Ecologia, stating as follows, «In these months, we are using – more or less consciously - many branches of learning trying to understand what is going on. First of all, Mathematics and Statistics in order to untangle the large amount of figures that continue to flood the news, as well as Geography so as to follow the movement of the virus, and Science, of course, because the virus moves amid the molecules composing our bodies and those of our animals. [..] Literature and History,

4. Paolo Perticari (1959 - 2018) was full professor of General Pedagogy at the University of Bergamo. His research concentrated on forms of oppression and abuse of power in educational contexts and on the related connections with forms of social violence. The theory of the "expected unexpected events" originated from his experimentation in schools centred on dialogic relations, on listening and on mistakes at school.

Note

because going back to Manzoni's or Boccaccio's narrations on the plague helps us understand a lot about the dynamics of our behaviors, and perhaps increase our knowledge on how the Spanish flu spread exactly a century ago causing 50 million deaths, doubling the victims of the First World War».

It is not easy for teachers to connect the curriculum with children thinking or with what is actually happening in the world, but it is urgent and necessary to learn how to do so, especially in the current academic year when, due to the rigor imposed by health protocols, there is the risk of cancelling also the small unexpected events which the school is used to tolerate in the children's and youngsters' behaviors, in their movements and even words. In this Notebook, we collected the work carried out by a group of teachers who put themselves to the test with practice where the unexpected is expectedr: «This doesn't mean that, since everything else is programmed, even the unexpected, the surprise, is to be programmed at school; it means, instead, that it is possible to set out on a path considering the elements that surprise us and find us in conflict, as an opportunity to review the implicit conditions underlying our ways of observing, listening, facing this or that situation [..] Unexpected answers, even the most surprising or strange ones, the answers that may seem to be a mistake or a poor show, unexpected events, become an opportunity to recalibrate the construction of contexts and, at the same time, the possibility to understand each single aspect» (Perticari, 1996)[3].

The teachers experienced the construction of contexts and conditions that trigger dialogue on cultural contents. They recorded and transcribed the conversations, learning how to "read" them so as to recalibrate the planning of their didactics, observing group dynamics, individual learning paths, recognizing the connections between the children's thoughts and the contents of the curriculum, creating learning experiences aimed at making the children's ideas grow, at testing their hypotheses. In this Notebook, we collected some extracts from said teachers' journals, where they documented the work carried out with the students, but also their moments of confusion, doubts, inventions and solutions, in some cases also thanks to Lorenzoni's assistance, who acted as "mentor" supporting the colleagues with his experience.

Some of those teachers work in multiage classes, which are rather common in Small Schools. In their case, dialogic inquiry can support whole class learning with children of different age. We wanted to experiment with them how dialogic inquiry can help doing science, mathematics, history with groups of children of different ages.

The experiences collected in this Notebook are examples of how it is possible to practice the art of changing the program without losing sight of the coordinates of doing school: in other words, the contents, the learning goals, the educational planning, the observation of the class. We hope that the experiences collected can be useful and encourage also other teachers to cultivate listening, to grasp the unexpected, to pause in the uncertainty which does not always find citizenship at school, because the expectation is that the teacher is there to transmit truths, certainties.

Learning to change the program is even more necessary now as children are going back to school after living experiences that even we as adults find difficult to understand, and they have questions that we do not know how to answer: «Children, youngsters and us all have suffered and learned a lot in these months, but we still do not know exactly what we have learned. Therefore, I end up thinking that, perhaps, we should try to develop and draw up darning curricula, capable of tying back together the many scattered threads of a new and upsetting experience that has changed various things in the way we perceive the world and its frailties, but that each one of us has perceived up to now in a personal and solitary way» (Lorenzoni, 2020)[4]

[3] Perticari, Paolo. *Attesi imprevisti: uno sguardo ritrovato su difficoltà di insegnamento/apprendimento e diversità delle intelligenze a scuola.* Bollati Boringhieri, 1996

[4] F. Lorenzoni, *L'imprevisto necessario, in "La nuova ecologia"* Settembre 2020 https://www.lanuovaecologia.it/settembre-2020-2/

Note

Note

2. A workshop for teachers

Fifteen moons in La Versa

The laboratory on dialogic inquiry started with a two-day meeting in presence. We met in Santa Maria della Versa in the province of Pavia, in the primary school of Valle Versa. The participants comprised the fifteen teachers who had signed up for the laboratory, ourselves – INDIRE researchers - and Franco Lorenzoni, our expert.

We started by sitting in a circle, outdoors, on the school's basketball court. Lorenzoni asked everybody to introduce themselves and to share a "Moon memory". We collected many memories linked to affections, loved ones, moments of amazement, discoveries, nostalgia. In many of those memories, the Moon was present in its various perceptive aspects: shape («You, thin slice of Moon that, framed by the window of the attic, came upon me in the heart of the night; You, extremely thin Moon at sunset; You, Moon showing your craters»), brightness («You, Moon that at the foot of the mountain enabled us to wonder in the night along four paths of four provinces; You, Moon that enable us to sleep together without a house and without a tent in the middle of a meadow surrounded by the woods and protect our new fresh love with your light»), position and color («You, yellow Moon that appeared all of a sudden, crossing the Chiavari pass; You, Moon of Monopoli which my daughter asks why you are so red; You, purple Moon from the window of a plane directed to South Africa»), size («You, small Moon of Piombino in the middle of the sea...»). Based on the differences contained in the subjective memories, we obtained many hints for the development of a research. In the case of color, for example, we discovered that the Moon can be yellow, red and purple: the question could have been, why is that so.

Note

What could have appeared as a "warm-up" activity aimed at building up the group, made us immediately enter into contact with the content and the object of the research. In fact, many possible aspects emerged concurring to the understanding of the phenomenon.

The activity helped the various aspects of the Moon emerge as a physical phenomenon. This was useful because we shared information that helped us think all together and identify possible ideas for the development of a path. Many elements originated also from the choice to start with a moment of mutual listening where no one felt "judged", as there are no right or wrong answers when sharing a personal memory. Perhaps, such large amount of elements would not have emerged if at the beginning of the laboratory the teacher had said, "Today we will be working on the phases of the Moon", because this would have reduced both the field and the focus of the attention. In the end, it was decided, under the expert's guidance, to work on shape.

The moon: science and romance

We started by asking ourselves why the Moon changes shape. There were fanciful hypothesis («Because it's bored, because it's curious, because it's vain») and scientific hypothesis(«It depends on the position of the Moon with respect to the Earth and the Sun»). Some of the participants asked Lorenzoni's to be more specific, because the task was not clear". This is a very common reaction when adult and children approach dialogic inquiry in school. Indeed, it is the effect of a type of mindset, of an implicit grammar of doing school, that teachers, students and parents have internalized, which is based on receiving a content, studying it, and reporting it.

Note

At a certain point, Daniela said, «The Moon changes shape due to a game of projections, exactly as individuals change based on the people with whom they relate». We thus seized the opportunity to put in discussion the net separation between "romantic" and scientific hypothesis: they both shared the idea that the Moon shape changes according to a relationship.This provided an example of how imagination can find place and be useful in scientific reasoning when being careful, for example, to grasp an analogy offered by language, as in this case. This is also a way to keep different forms of thinking "inside" the dialogue.

The circle and the orbit.

At about half past three in the afternoon, we sat in a circle. Bodies projected their shadows on the ground because the Sun was behind them; others were partially lit by the sun; others yet were completely lit by the sun.

Andrea noticed this aspect and immediately grasped a similarity between the shape of the shadows on our faces and the shape of the Moon in the various phases of its cycle. Others realized that Andrea, due to his position in the circle, was a bit like a Full Moon and that Alessandra, instead, was a Black Moon.

Lorenzoni: *"And where's the Earth?"*
Someone answered: i*t depends on where we're sitting, we're all earths.*
Francesca: *"But what if the Earth were in the middle and you were all Moons?"*

Francesca became the Earth placing herself in the middle and observed us as if our faces were all moons and as if the circle were the orbit.

By simply using a string, we verified and noticed that the phases of the Moon are connected to the angle that the Moon forms with the Sun, viewed from the Earth: at the first quarter, the angle is of 90°, while with the full Moon, the angle is of 180°, half a rotation of the orbit of the satellite around the Earth. Sitting in a circle, we worked in couples using pencils and paper: each one of us drew the face of the partner in front of us, trying to highlight the shadows drawn by the sunlight shining on us.

To form a circle taking into consideration the position of the Sun is an "approach maneuver" based on the construction of an analogy with the orbit of the Moon around the Earth. This analogy produces a perceptive effect that "helps realize" - that is, grasp - the aspects of the phenomenon and formulate explanations. The latter are hypotheses tested by the group as in the passage described above: there is an initial hypothesis (We're all moons), there is a question that puts the hypothesis in crisis (But where's the Earth?), and the surfacing of a hypothesis that the group considers more plausible.

The phases of the Moon

We arranged all the portraits in a circle on the ground with respect to the Sun, as if each face corresponded to one of the shapes of the Moon. We discovered that some knowledge about astronomical facts that many of us took for granted had not been considered in our effort to provide an explanation to why the Moon changes its shape.

Note

Note

The hour on the nose

For instance, no one mentioned Earth rotation. To investigate the effect of our planet moviments on the perception of the Moon shape, Lorenzoni arranged a simulation: Federica - who stood in the center of the circle - became the Earth, and everybody was asked to tellwhat time it was "on her nose", while she slowly rotated on herself.

Ome of us looked at the circle formed by the drawings and identified it as a 12-hour analogue clock: this mental image conditioned our calculations in the attempt to identify the right time. Something similar happened also when we recognized Moon phases on our faces: when a face was half lit by the Sun, it looked like a "quarter moon". It was like language, perception and memories were conflicting, be "we measure moons in fourths" Lorenzoni said, "and this is confusing. [..] We're using the true Sun, the one that lights the Earth. This is a very strong experience also for seven-year-old children, because they physically see, on their classmates' faces, what night and day are. All this work is also useful to demolish the idea that the phases of the Moon are the product of a sort of never-ending eclipse: an idea that many children and adults have».

To conclude the activity, we observed shadows in some famous paintings of different historical periods, positioning the reproductions in our Moon phase circle. Through this activity, we discovered that painters never represent a black Moon and a full Moon, and that they prefer the waning Moon over the waxing one. Calling to mind all the work carried out aimed at putting in relation shadows with angles formed by Sun, Earth and Moon, we replaced the painter of the Earth and the subject of the Moon and discovered that in order to give depth it is necessary to have an angle and a shadow.

Note

Note

Shadows in History of Art

In this final step, the activity was a chance to reflectt on how we can understand interdisciplinarity: «Knowledge domainsare organizational structures that open us up to the perception of the world and to thoughts on the world» Lorenzoni observed. «Every time we rootconsolidated knowledge in those domainswith our experience, we help children understand that what they study at school has to do with life».

The "loss" of time

During the second part of the afternoon we divided into couples. Each one of us had to listen to a story, an episode narrated by our partner, to then refer it to the group using the first person[5]. The theme indicated by Lorenzoni was: "The moment I lost time". After listening to each story, we tried to make a "time map" based on the stories. Someone immediately observed that the initial hint on how to carry out the activity had been interpreted in different ways. In fact, some participants told about a moment in their life when the lost the perception

Note

5. The expedient of narrating another person's experience in first person draws from the mirror technique used in theatre.

of time, while the majority of people shared stories and thoughts about the "waste of time"

We tried to divide the narratives between those communicating the idea that you always somehow treasure time («We don't lose time, what we do or we don't do in the time at disposal, always teaches us something») and those who experienced the loss in a negative way, with anger, frustration, affliction («It's convenient to say that a person never loses time; in fact, I've always fruitfully used the time that I've had at disposal; but I don't always live it that way, sometimes I live the fact of losing time as something that cannot be made up, I lost time that I can no longer make up for, and this makes me feel upset»). We realized that both views were connected to a productive idea of time that characterizes our everyday lives: «Someone mentioned the Latin otium, which is an unimaginable word for us, culturally distant» Lorenzoni observed. «For ancient Romans, otium was the opposite of negotium and it was elevation, philosophy, being with oneself[6]. Today, otium is unimaginable in the society in which we live: even when we do things for our wellbeing, we are always doing a negotium».

By developing the time map resulting from our narratives, we carried out the typical recalibration activity, a backwards planning, which characterizes dialogic inquiry. The reasoning about otium and negotium is a good example of how a dialogue originating from the sharing of personal experiences produces very strong connections with cultural contents and with the curriculum: it was an unexpected theme. However, the group and Lorenzoni were able to grasp it and to up it, sensing the possibility to work on how the notion of time, its measurement and its organization are strongly conditioned by the historical context.

Note

6. «Otium was the time not dedicated to political activities and public affairs (that is, the negotia), which could thus be dedicated to taking care of the house, the farm, or studies (whence the word started to be used to indicate the actual studies, literary activity)», from the Treccani online dictionary.

Liberating the globe

The following day we met on the school's basketball court where we found a globe that had been taken off its support, placed on top a cup, and was lit by the Sun. We positioned the globe in such a way to give it the same position of the Earth under our feet. In order to do so, we had to find the North and the South without a compass, and then we rotated the globe so that Santa Maria della Versa was in the highest point: that was our point of view.

"Globes set free" so as to observe shadows.

Note

A moment of observation

We thus created a "liberated globe". In the common model, the globe is inclined with respect to the perpendicular to the orbit plane: the Earth is represented as if observing it from the outside. The liberated globe" can be inclined in a homothetic position with respect to the observer's position. The change of inclination helps to observe, for example, when and where the Sun rises and sets with respect to our planet. We did the same, marking with a felt-tipped pen on the globe the line between shadow and light. We did so at regular intervals, every hour, so as to observe the changes.

The recording of the shadow projected from the liberated globe. In our observations, we searched for the North and the South, discovering that often – since we are used to thinking in a "flat" way - we forget that the Earth is curved. We learned how to measure angles with approximation, discovering that our thumb measures about 2,5°, our fist about 9°, and our palm about 15°. And this this is true for everybody, regardless of size.

Note

The approximate measuring of angles

The measuring of angles with a thread

Note

Note

La misura dell'angolo con lo spago

Note

The adult laboratory and the "discovery" of inert knowledge

The workshop with teachers was designed to provide a direct experience of dialogic inquiry. Instead of explaining to adult professionals how to perform it with children. Instead of proposing a distinct separation between theory and practice, between pedagogists and teachers, the workshop is based on one of Celestin Freinet's pedagogical principles: learning is always a research path (tâtonnement) that originates from ourselves, from our own story, and from experience. This is true both for children and youngsters and for educators: their training should be conducted in a context where it is possible to gain awareness, theorize starting from one's personal experience - and not from a context – so as to assimilate and apply predefined educational theories and models[7].

During the two days, we experienced, as if being "students", what can be called the dialogic inquiry "method".

We realized that also adults that constantly cultivate a relationship with knowledge, such as teachers and researchers, can experience difficulties in front of a problem that originates from experience, from observation, from an open question. In the activities proposed by the expert, we assumed the children's and youngsters' role and, as it happens to students, we gave "wrong" answers, or we "blocked" on ourselves, and we did not manage to go on.

The experiences were ideal to make inert knowledge (Whitehead, 1929)[5] emerge, that is the set of notions settled in our memory, which we are capable of recovering as declarative knowledge (for example, we know how to answer if someone asks us about the inclination of the earth's axis), but that we can't manage to anchor to a practical situation. It was an important moment that allowed us to personally experience the reasons at the basis of dialogic inquiry, and more in general of didactics based on research: that is, the idea that discovery is a resource for learning to take root.

Note

7. The adult laboratory is a «place where it is possible to learn in a group, within a network of relationships, where one passes from doing to thinking, giving meaning to the experience and at the same time giving concrete basis to thinking». The adult laboratory in the tradition of the Educational Cooperation Movement by Maria Teresa Sega.

[5] Whitehead A.N. (1992), Il fine dell'educazione e altri saggi, Nuova Italia, Firenze.

Through the laboratory activities we also experienced how some of our mental, intuitive or learned models guide us and sometimes hinder the understanding of phenomena, such as in the case, for example, of misconceptions. Even in this case, the direct and organized experience of a phenomenon helps us gain experience concerning the students' difficulties.

Reading the dialogues

After meeting the workshop, we invited the teachers to experience the activities in their classes. The shared object of research was the relationship between sky and time. We asked everybody to document their work in a diary, describing the activities and the materials they used, and collecting the transcriptions of the dialogues recorded in class. At the same time, we fixed a series of online meeting, in order to meet about every three weeks.

During t the online meetings, Lorenzoni listened to the teachers' accounts of the experiencen being carried out in their classes, and helped them "read the dialogues", to use dialogue transcription in order to develop classroom research. His careful reading aimed at grasping the thoughts that could offer connections with cultural contents, dynamics for developing knowledge within the group, details that can help grasp the single students' traits or paths, suggest possible changes, activities and experiences to develop the research theme… Thee online meetings were mentor support " where it was possible to receive the expert's help. In many cases, the participants exchanged suggestions, and the reading of the dialogues became a participate reading. All dialogues transcriptions were very rich with children's questions, hypotheses and images that could be connected to curricular content. We selected some, as they represent good examples of teachers' ability to take children's thinking into account as a source for curricular activites.

[5] *Whitehead A.N. (1992), Il fine dell'educazione e altri saggi, Nuova Italia, Firenze.*

Note

In the first case, "Federico's way", Maria Antonietta replicated in her classroom to organize a scientific conversation with the class on the topic of time. The second case, "Elephants on top our heads, or magnets under our feet?", started from the approach maneuvers experienced in the adult laboratory, that Federica had already planned to cover with her class. However, the "approach maneuver", the wink, led the children to make unexpected scientific discoveries that changed the route of the path.

In the third case, "The mural of the first times", Alessandra, a Literature teacher in a multiage classroom of an upper secondary school, started from a more open hint, centered on the experiences and on the relationships within the group, sharing her difficulty in finding the connection with the branch of learning that she teaches.

Finally, the other two documentations that we here provide in their integral version are examples of how listening can fuel paths where the branches of learning interweave with each other: in "Star hunters", the interweaving between Astronomy and Art was carried out by Paola, the teacher, while in Daniela and Stefania's experience, the children were the ones who fueled the passing from a branch to another and to realize what they had done.

Note

3. Classroom pratice

Federico's way

From Maria Antonietta Raguseo's documentation, primary school.

Maria Antonietta worked with a second-year primary class composed of 14 children.

She began asking the children to bring to school an object related to time. Maria Antonietta's choice turned out to be a good way to help the children express a thought on an abstract concept. «Someone brought an umbrella, others brought a sandglass and a clock, stuffed animals or PlayStation games, another child brought a bathing suit. We spent a good half an hour sitting in a circle talking about time».

A couple of days later, Maria Antonietta provided the children with the literal transcription of the dialogue: «I asked them to group the objects based on their usefulness and on their "relation with time"». The resulting map was produced by the students and showed the classification of the objects of time:

- the weather: an umbrella;
- the time that passes: a dog, a karate belt, videogames, stuffed animals, a handkerchief, a mini pony and a ball;
- the cyclic time: a bathing suit;
- the measurement: a sandglass, a clock, an agenda.

Maria Antonietta said that she was particularly impressed by the reasoning of a child (Catia:«I brought a bathing suit because it's what I use to spend my time on Saturdays when I have nothing to do and I go to the swimming-pool. It's a pleasant time for me. It's a time that repeats continuously. We can insert it in the wheel of the week, it's cyclical, it repeats every Saturday»): «I must say that we have already worked on the concept of cyclic time. Another child said, for example, that a dog that grows is something that can't be stopped, but that passes. In that case, we talked about linear time, of the time that doesn't come back».

Lorenzoni suggested Maria Antonietta, and all the participants, not to come to conclusions too quickly. Sometimes teachers tend to read the dialogues as evidence of learning, but dialogues can offer more than that: «If you worked on it, it's normal to reconduct the children's words to the concepts of cyclical and linear time, but then what's really interesting is how these two concepts form in a child's mind and how they are expressed through language. 'The time that doesn't come back' and 'linear time' are two different ways of saying».

Time measurement before clocks

«The following week we talked again about how they notice that time passes. I asked children what they wanted to learn about time measurement, and almost all of them told me they wante to learn how to read a clock "like the one on the wall" (an analog clock) and not the one "with numbers" (digital) that they were already able to read».

Maria Antonietta told the children to pretend they go back in time, to the Ancient ages, before clocks were invented: «Now we have this great instrument that allows us to track time. But how do you think they managed to measure time in the past, when there were no clocks?».

Giorgio: *With the Moon and the Sun you already know when it's night and day!*
Paolo: *Yeah, but then you have morning and afternoon, how do you manage that?*
Valerio: *You can tell time based on the light, if it's strong or weak.*
Catia: *Plus, at midday it's hotter!*
Stefania: *Sometimes it's hot also in the afternoon*!
Federico: *I can tell the time thanks to shadows.*
Catia: *What in the world are you saying?*

Note

Note

Maria Antonietta: *Explain yourself better… what do you mean?*
Federico: *For example, early in the morning in front of my house there's a very big shadow, at midday there is very little shadow that almost disappears and then, in the afternoon, the shadow moves behind the house, on the other side!*
Giorgio: *Maybe he's right! Even when we come to school in the morning, the bus parks on the side where there's shade, while when we go away, always in the same point there's the sun, in fact we take our clothes off because we're boiling hot when we get on the bus».*

In this short dialogue, the class behaves like a small research community, because different theories emerge to answer the initial question (time is measured with the movement of celestial bodies, the intensity of light, heat). The children talk to each other, and talk about their research: some theories are questioned (Stefania: «Sometimes it's hot also in the afternoon!»). The intuition of a child, Federico, awakens in others the memory of perceptive facts and is recognized, accepted as valid, plausible, believable: (Giorgio: «Maybe he's right!»). Pairs acknowledgement of Federico's insight means that children are listening carefully to each other: this is very important, in dialogic inquiry.

Maria Antonietta: «A child said, "I can tell the time thanks to shadows", and this surprised me, because I would have never expected such an answer from him [...] At that point, everybody else started to say, "True, when we arrive at school in the morning with the bus there's shade on the bus and when we leave school the shade is no longer there". At that point, I told them that we would have studied an object taking into consideration both shadows and sunlight. I placed a stick in a point that would have enabled us to see the projections of its shadow at 9 o'clock in the morning, at midday and right before leaving at 3:30 in the afternoon. We marked the various projections with a piece of chalk and then analyzed them so that the students could understand that the Sun can help us make a temporal scansion of the day, even before the clock».

Note

Lorenzoni invited Maria Antonietta not to be in a hurry to set the children's intuitions with a typical "school" work, such as the stick's activity: «I find it very interesting when dialogue becomes the place where science bursts in. In fact, Federico's discovery of shadows is a great scientific discovery, and the interesting fact is that this discovery is an effect of his perceptual ability. He sees things that others don't see [...] It's very interesting that she said that she would not have expected such an answer from him. One of the most significant characteristics of dialoguing is the fact that the attitudes and qualities of the various children emerge, and when we become aware of them, we have to up them. If we do so with Federico today, then we will certainly discover in another girl or boy a quality that we had not noticed».

Studying the shadows

Following the suggestion, Maria Antonietta took the class to observe the shadows on the school building and on the parking lot poles.

The class recorded on the ground the position of shadow of the first pole. I asked them where it was with respect to the Sun. A child said on the left side and another added, "On the left from where you're standing, from where I'm standing it's on the right!" and then the dialogue continued:

Lucia: *In order not to make a mistake, we can say that at the moment the Sun is in the east.*
Maria Antonietta: *So, if the Sun rises in the east, what's the direction of the shadow of the pole right now?*
Federico: *The shadow goes in the opposite direction, towards the west.*

Note

The children learnthe names of the cardinal points because they found them drawn on their classroom walls by the students that had used the room in the previous five years cycle[8].

The class repeated the observation once every hour, several times. Some children noticed that the shadow, besides moving, became also shorter.

> ***Federico*** said: *«The shadow is smaller also on the other pole! Look!»*. ***Paolo:*** *«Look at the shadow of the corner of the school's roof as well! The Earth has moved again!»*, and ***Catia:*** *«It has become smaller because the Earth has turned, now the Sun is high in the sky, in the south, and the shadow is smaller. Beforehand, when the sun was low, the shadow was longer»*, hypothesizing a first explanation.

Two hours later, the class repeated the observation. Davide noticed that the recordings of the movement of the shadow formed a "Sun" with many rays. The children traced the movement of the shadow at regular intervals.

8. In Italy, primary school's course of study lasts five years, from first grade to fifth grade.

Note

Children trace the displacement of the shadow at regular intervals

«Where did the shadow of the school's roof go?» one of the children asked. The shadow of the roof had become so short that it had ended up on the wall of the school building. «In a while we won't be able to see it anymore because the Sun is exactly above us!» the children observed. So Maria Antonietta asked: «And where will the Sun be in an hour from now?», Perla answered: «On our right!», and Giorgio: «C'mon! You're not supposed to say on our right or on our left! You have to say in the west!». The "language of the cardinal points" was becoming the class's patrimony and the children often corrected each other.

The observations continued in the afternoon. Federico made an important geometrical reasoning: «Initially the shadow was long, then short, then very short, now it's becoming long again. This shadow looks like the one of two hours ago, but it's on the other side. It has the same length of the orange one».

Note

In the documentation, Maria Antonietta wrote: «It was hard work, I must say, it really tired me, but they had lots of fun, it was very fruitful. [...] It was hard work because when they talked, they were excited; it took me four hours to transcribe all the observations, but I was satisfied. Valerio told me, «Now I understand why in the classroom I read South/Midday and North/Midnight». It made me think that by working that way, instead of learning by heart, they also better understood the clock, which was something very abstract for them. I must say that they were good, I didn't expect all those achievements».

Maria Antonietta added that the work gave space to a child with a certified Attention Deficit Hyperactivity Disorder, who has great difficulty in carrying out work in class with books and notebooks. He is a child with a high IQ, but who does not tolerate impositions:«When we went outside, he acted as my assistant.A collegue observed that it was as if he had "gone mad", in a positive sense, he "managed" the other children, reproaching them when they didn't pay attention. He surprised me when in order to explain that it's not the Sun to move, but we are the ones who move, he made a simulation». A simulation that was useful for everybody.

Elephants on top our heads, or magnets under our feet?

From Federica Fontanini's documentation, primary school.

Federica teaches in a multiage class composed of 8 children: one fifth-year student, one fourth-year student, two three-year students, two second-year students and two first-year students. In the group, there is one child with language difficulties, one hyperactive child, another child with selective mutism and a child that she defines reserved and with "her head in the clouds".

Note

In her diary, Federica wrote:

«In my annual programming, I had decided to cover the topic of the Solar System in the second part of the year with the third-year, fourth-year and fifth-year students. I hadn't thought of how to present it before going to Santa Maria La Versa, and by coincidence we talked about the Moon and the rotation of the Earth. I liked the experience very much and I decided to perfom it in class on the occasion of the vernal equinox. This year the equinox was on 20th March, but I realized that it wouldn't have been possible to have the experience in class on that day: the sun arrived on our window right after midday, due to quite large eaves on the outside of the structure. Our class ends at 12:35, but we have classes in the afternoon on Thursdays, so I decided to carry out the activity on 21st March».

The Sun's eye

Federica reproposed The Sun's eye activity in class, that is an activity experienced during the teachers' workshop «I cut out a circle from a cardboard and stuck it on the window that looks towards south, telling the children, who were intrigued, that that was the "Sun's eye".

The Sun's eye

Note

I waited for the first shadow to form on the floor with the circle in the center and I asked Miriam to outline the shadow on the floor with a felt-tipped pen. Miriam drew the circle and then moved away. After a while, Erika walked up and told her that she had mistaken in drawing the circle, because it was more to the left. Miriam worried immediately and when she saw that indeed it was, she told me several times that she was sorry: she was concerned and ashamed. In the meantime, they had all come up close and someone started to say that the circle continued to move to the left (they were standing in front of the window). Miriam calmed down and she started to ask me why this was happening. I asked the same question to the rest of the class».

Lisa, the oldest student, said: «Because the Sun moves». At that point, Miriam confirmed the movement and said, «but it's not the Sun to move, it's the Earth that rotates». At that point it became a game to draw a circle on the floor about every 10 minutes, in turn. By the end of the day, a sequence of lined up "ovals" had been drawn on the floor.

The recording of the Sun's eye

Note

Federica also wrote: «All the children understood without any problems that the rotation is counterclockwise and that the line ended with the East on the one side, where the Sun rises, and the West on the other, where the Sun sets. At a certain point, Monica, a fourth-year student, said that we had studied the Sun as the Sumerians used to. The children also noticed that the "oval" tended to become narrower and longer as time went by and the evening started to set in. During the activity, the children were amazed by how quickly the circle moved on the floor, and at a certain point Lisa asked why we do not fall during the rotation of the Earth. I turned this question into a research that they had to carry out at home for the day after, and the following dialogue is the transcription of said research».

The discovery of the Earth's rotation speed is present in many experiences implementing the wink activity proposed by Federica. Many children answered Lisa's question («If the Earth rotates, why don't we fall?») and, drawing from their "perceptive experience", their idea was that the movement is a very slow movement. When they realized, instead, that the Earth moves quickly, they were "caught off-guard" and spurred to formulate alternative hypotheses.

A few days later, Federica dedicated some f time to a small experiment on the perception of time. With the Music teacher's help, she had the children listen to a piece of music. From the listening, a debate started on duration («So Stefania said 10 minutes, Erika said 5 minutes») and on subjective perception. Federica recalled the Sun's eye activity and the students' discoveries in the previous dialogue («Miriam: We saw that the Earth rotates slowly, but in actual fact it rotates quite quickly...»), and then upped Lisa's question.

Note

Federica: *So, why don't we fall during the rotation of the Earth?*
Monica: *Because the atmospheric pressure keeps us attached to the Earth. The pressure that keeps us attached to the ground is equal to the weight of three elephants on top our bodies*[9].
Federica: *My goodness!*
Miriam: *It's the force of gravity!*
Federica: *Wow! I had the feeling that something heavy was on top my head, but I had no idea that there were three elephants. Now that I know it, three elephants are lots of stuff on my head. Do you all feel the three elephants?*
Lisa: *I don't feel them.*
Miriam: *No, I fall asleep.*
Monica: *Ah, so that's why my body hurts sometimes when I wake up, because there are elephants on top of me!*
Federica: *You slept with elephants!!!*
Lisa: *During the rotation of the Earth, we don't fall because we're drawn by the force of gravity.*
Federica: *Very well, did you all understand what she said? She talked about the force of gravity. Anna, what do you think about it?*
Anna: *It's because there's the force of gravity!*
Miriam: *I agree, because, as Lisa said, I didn't know what keeps us attached to the ground, but I thought of the force of gravity.*
Stefania: *I agree.*
Erika: *It's because of the force of gravity.*
Federica: *I think that we remain attached to the ground because we're a bit magical …*
Miriam: *No, we're not magical…*
Lisa: *We're not magical…*
Federica: *Please notice that I didn't tell any of you that what you were saying wasn't true. So, I don't think you're being kind. What circle is this? It's a circle where we can say whatever we think. Can the teacher express her theory?*

Note

9. This information is found on the Internet. «The atmosphere presses enormously on the surface of the globe and we are not miserably crunched by it only because the pressure is exerted on our bodies not only externally on all sides, but also internally, producing a balance. Should such balance lack, this would cause serious disorders and death. We can consider it as if we are carrying the weight of three elephants of about five tons each on our shoulders, and this without having any problems» (https://www.lapappadolce.net/fenomeni-meteorologici-materiale-didattico/)

Monica: *But which one is right?*
Federica: *We have to understand which one is the right one. So, according to my opinion, we're a bit magical, because it's as if our feet have magnets in the bones that basically make us stay attached to the ground. Since there's a nucleus with a magnet in the center of the Earth, we remain attached.*
Miriam: *It's a hypothesis that could be true.*
Federica: *It's my idea. My idea is that we have magnets in the bones of our feet that keep us attached to the ground.*
Stefania: *But we can jump. How can that be?*
Miriam: *Because we're stronger than magnets…*
Federica: *You can jump, but the magnets pull you back down and attach you to the ground immediately.*
Erika: *Look, I'm pulling them up (and she raises her legs and feet).*
Federica: *Try standing up, though (she sits on the floor and raises her legs). Now your rear end is attached to the ground.*
Lisa: *So they're also in the hands when you do a handstand?*
Federica: *The magnet keeps you attached to the ground, it doesn't let go of you, even if it comes unstuck a little, it continues to hold you down.*
Erika: *But maybe that's why we fall sometimes?*
Monica: *But the magnets are in our feet, not in our entire body!*
Lisa: *There are no magnets!*
Miriam: *Now I know why Erika falls immediately when she does a handstand, because the magnets are powerful.*
Monica: *No, because there are some people that can even walk in a handstand position.*
Miriam: *Right, but they're very athletic, they're strong… they train, they become powerful.*
Lisa: *If you look inside the bones, though, there're no magnets, so…*
Monica: *True, if you have an X-ray, ….*
Federica: *Ok. So, the scientific answer, this to calm you all down, because I see that it's a huge concern, is exactly the force of gravity.*

Note

Monica introduced a a very powerful image in the dialogue – the three elephants on top of our heads – that led to work on atmospheric pressure, but almost immediately Miriam mentioned the force of gravity, which led everybody to agree. So, in order to prevent the dialogue from ending with the "correct answer" and the research from being interrupted with superficial knowledge, based on notions, Federica proposed a "fanciful hypothesis" («According to my opinion, we're a bit magical, because it's as if our feet have magnets in the bones that basically make us stay attached to the ground. Since there's a nucleus with a magnet in the center of the Earth, we remain attached») which the children initially rejected, considering it not very plausible, not very scientific.

With this fhypothesis, though, Federica did two important things: she helped the children understand the importance of listening to other people's ideas, also of those who represent a "minority" in the group's debate («Please notice that I didn't tell any of you that what you were saying wasn't true»), and then she obtained that they continued talking about gravity, without being satisfied with having given the correct answer, but posing questions on how it works. The children went along with the game and tested the teacher's hypothesis drawing from the experiences made with the body, like jumping, doing a handstand. Starting from the physical movement, some tried to demolish it, asking each other and asking Federica if the magnets are present in the entire body or only in the feet. They started to reason on forces (Miriam: «Because we're stronger than magnets») which can then be used to develop an educational work on the topic.

Note

The mural of the first times

From Alessandra Orsi's documentation, lower secondary school.

Alessandra teaches Literature in the lower secondary school, in a multiage class composed of 5 first-year students and 10 second-year students.

In her documentation she describes her class as follows: «The two class groups are very different in terms of participation, motivation and interests. The first-year students are very closed, their relationships are "limited" to the teachers and the rest of the class; they're not much interested in the activities proposed and their participation has to be spurred and guided.

The second-year students are certainly livelier and easier to involve; they are more open to share and discuss, even if the relationships are a bit conflictual, but not to the point of creating problems». She shared the fear of meeting a bit of difficulty in involving the students: «Working with the lower secondary school, I don't have the same directness that one normally has with smaller children».

In order to work on the topic of time, Alessandra asked the students to make a drawing: «I handed out pieces of paper and felt-tipped pens and each one of them represented time in different ways. In the end, besides the classic drawings representing a clock or the cycle of time, three drawings drew my attention: a drawing of infinity with lots of red, blue and green dots which expressed different emotions; a brain "in confusion", with some scribbles inside ("It's my brain in this moment, because I didn't understand the request", the author told me); the third one was the drawing of a boy from whom I would have expected the classic clock, who instead represented two trees, a very big one with a dense crown and another one with few leaves».

Emanuele, the author, explained his drawing to the rest of the class in the following way:

«I decided to represent a tree in two moments. For a certain period of the year, the tree has leaves and, in that period, it tries to accumulate

Note

more and more resources to nourish itself. The second tree represents the autumn and winter periods: it no longer has leaves and it has to try and keep its energies. The first represents the adolescents, who have more time at disposal, the second instead the adults. Adolescence is the nicest period of life because it's possible to have fun and think a bit less about one's actions, we always have someone who corrects us. Instead, when we're adults, we have to reason on ideas and think of how not to mistake».

With regard to the drawings, Alessandra seized the opportunity "to listen" to the students' thinking through a language different from the verbal one and asked for help, during one of the group's meetings, to analyze in depth the meaning of the allegory created by Emanuele:

«I was thinking of developing this image also because it seems closer to their experience and to their growth stage. I could write a shared narration for them, but what could they retain from it?»

Lorenzoni invited Alessandra not to decide too hastily, because also the other drawings could contain important meanings for the adolescents of her class: «I don't know what the closest thing to their experience is, but the main point is to enable all of them to have a try at a path proposed by a youngster. Therefore, what comes to my mind in this moment is that you could ask them: "How would you all draw these trees?". Or, have them all draw infinity. That is how research begins: someone has an intuition and the others, starting from that, continue».

A bit of time after the first dialogue, Alessandra divided the class into groups and asked each group to create some maps of the meanings of the drawings. In one case, the students distinguished the objective time from the subjective time, while in another group the distinction was between present and future. The debate that followed the groups' work, though, had an unexpected development.

Alessandra: *Is there a memory connected to time that comes to your minds?*

Nicola: *I was three years old and for the first time I took a plane to go to Palma de Mallorca. It was a very strong emotion.*
Mirko: *Also for me it's a vacation. Last year, I took a plane for the first time and when it took off, I felt as if I had jumped into the air and that I would have never come back down anymore. Then, when I arrived, I was disoriented, very disoriented.*
Susanna: *Last year, I went to another region for the first time, and when you leave your territory you notice the differences. Perhaps, you're attracted also to this landscape and you hope that time will never pass so you can stay there longer.*
Fabio: *I was three or four years old; I had gone out with my mother and I met Pierre for the first time. We immediately became friends. Time passed very quickly. And we didn't want to leave that home.*

Nicola's intervention caused a chain reaction and they all interpreted the memory requested by Alessandra as an invitation to share a "first time" memory. The students suggested to collect these memories writing them on cards, to indicate the precise dates and then create a puzzle.The idea was very full of possibilities for the development of an educational activity:«This is an wide topic, beautiful» Lorenzoni observed, highlighting that the work could be developed starting from the students' request to date their memories and from the idea of creating a puzzle.«We all create puzzles with our memories, all our adventures in the territory of memory are a reconstruction. Think of when we remember something: in many cases we have a clear detail and everything else escapes us. The students developed a nice metaphor and it could be interesting to give it value working on it with Literature. We always have to search for ways to give a cultural value to the students' mental constructions and hypotheses equal to what they study. Every time we do so, we reinforce the idea that studying has something to do with us, which is a key concept in education».

Note

Note

Star hunters

From Paola Malandrone's documentation, primary school

Paola works in a small municipality in the province of Asti and teaches in a multiage class composed of 13 children attending the fourth-year and fifth-year primary school classes.

Among the students there are foreign children who still do not perfectly master the Italian language, as well as students with Special Educational Needs. In her documentation, Paola describes the class as follows:

«These children have been in this multiage class for four years now; they are lively and interested in discovering the world, but the atmosphere is very competitive and conflictual, despite the teachers' efforts. The fifth-year students tend to underestimate their fourth-year classmates and, vice versa, the smaller students have the desire to get even with the older ones. It is necessary to work on respecting each other, on listening to each other and sharing, working towards the development of more solid empathic bonds and the implementation of mutual understanding.It is necessary to enhance the students' vocabulary».

The little windows of the sky

«Today, we're going to meet the sky», Paola said one day in class.

The children answered laughing: «We all know what the sky is, it's nothing new!». So, Paola asked the children to observe and then to share a thought. Some did not know what to say, they were afraid of making mistakes, but Paola reassured them that all our adventures in the territory of memory are reconstructions, a puzzle.

Paola asked the children to share their knowledge on the sky: some turned to their Science book, but there was also who protested («We haven't studied it!»). The children already knew many things with regard to: dimensions («There's a song that says "the palms that touch the sky", but it's impossible – with a resolute tone – because the sky is never-ending»), the variations of color («When the sun is setting, the sky changes color»), the atmosphere («The sky is a sort of shield against sunrays»), the celestial bodies («In the sky there's the space and in the space there are planets, so we can say that there are planets in the sky»), pollution («The sky is polluted, I mean…we're polluting it with the gases of the cars and factories»). It is a piece of knowledge deriving from various sources: observation, school work, reading, media, relationships with parents, relatives, friends.

Before Easter vacations, Paola gave the children a strip of white cardboard folded into eight equal parts and asked the children to draw the sky every evening, for eight days, always from the same point of observation. «Be precise in your drawings, with regard both to objects and colors[10]».

The "little astronomic windows" realized by Paola's students

When returning from their vacations, the children observed and talked about the works realized.

Paola: *What did you observe in these drawings?*
Catia: *The sky. There's a drawing that isn't really understandable, it's all of the same color.*
Giovanni: *I noticed that the sky changes colors, like when it rained and there were clouds the sky was greyer, instead when it was clear, beautiful, beautiful (he repeated) the color was all blue, I mean, I used blue.*
Fabiana: *When there are clouds in the sky, you can't see the stars and you can't even see the Moon… they weren't there.*

Note

Note

10. This activity has been designed by Cenci's research group on elementary astronomy «The "little astronomic windows" [..] consist in drawing for several days in a row, a small portion of the horizon». Lanciano, N. "Strumenti per i giardini del cielo." (2002).

Paolo: *Basically, in one (of the drawings) I found that one day it was very clear and the day after was very dark, s I think that it means that one day was nice and the other was not.*

The children understood that the weather conditioned everybody's observation.

Paola: *So, some days it was possible to see the stars and other days they weren't visible.*

Everybody: *Right! Exactly!*

Paola: *What else did you notice?*

Viola: *You told us to always look at the same piece of sky. Well, the drawings aren't similar. I believe (she stops to think…) that the stars and the Moon move. I mean, the Earth rotates and moves, so it's not always the same sky.*

Paola: *Very well. The stars that change position make us understand that the Earth rotates. Very good!*

Daniele: *Or, there are more or less stars depending on if you look at the sky earlier or later.*

Paola: *Interesting observation! The stars we see in the sky depend on the movements of the Earth, on our position as observers, on the time of the observation.*

The comparison between the little windows helped the class make discoveries. Observing the recurring elements in the drawings, some considerations were made on the variables that affect observation: they are important discoveries on elementary astronomy, but also on the scientific method. Some of the children's attention fell upon the shape of the Moon, which changes in the drawings in the same way.

Observing the drawings with the teacher's guide, the children discovered that the Moon changes position in the sky with the passing of the days.

9. It is an activity experimented during the laboratory in presence and falls within the researches conducted by the MCE group and Casa Laboratorio Cenci on sky pedagogy «The little astronomic windows [..] consist in drawing, also very schematically, a portion of horizon, also small, and in recording the position of the celestial bodies. Lanciano, N. "Strumenti per i giardini del cielo." (2002).

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Paola: *So, the Moon wasn't always the same?*

Giovanni: *Yeah, and I think that it even moved, yeah, it went up higher and lower in the sky, I think.*

Paola: *So, it's also a matter of position.*

Tutti: *Yeah, position.*

Paola: *Let's look at Federico's drawing, observe carefully. Federico, did you observe the Moon always at the same time of the day?*

Federico: *No, not always, because when I went to play soccer, I observed it later.*

Paola: *Look at the Moon.*

Leonardo: *First it's a small crescent, then in the other drawings it becomes bigger and round.*

Federico: *I noticed that on some days the Moon has the form of a banana and then it becomes bigger as the days go by, up to becoming almost a circle.*

Paola: *So, some days we see less Moon and others more?*

Leonardo: *I think so.*

Paola: *The Moon is different, true. But it depends on how much it's lit.*

Daniele: *I'd never thought about that!*

Paola: *Look at your drawings… What else do you notice?*

Catia: *The Moon seems higher and higher!*

Paolo: *Basically, you see the Moon, or the stars, or both the Moon and the stars.*

Catia: *I think that also the Moon moves, it walks.*

Tutti: *Yeah, you're right!*

Simone: *It's clear in Federico's drawing, he started drawing it more towards the bottom, and then it's higher up.*

Since the work of the "little windows" was carried out at home, during vacations, some parents were involved by the children and the task became an opportunity for exchanges between them. The children reported in their dialogues some of the things that they had lear-

9. Si tratta di un'attività sperimentata durante il laboratorio in presenza e tratta dalle ricerche del gruppo MCE e della Casa Laboratorio Cenci sulla pedagogia del cielo «Le finestrelle astronomiche [..] consistono in un disegno anche molto schematico di una porzione di orizzonte, anche piccola, rispetto a cui è registrata la posizione degli astri. Lanciano, N. "Strumenti per i giardini del cielo." (2002).

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ned from their parents. Catia, for example, shared with her classmates: «My father told me that it's necessary to look at the Moon for the vegetable garden». Paola asked everybody to carry out a brief research on this aspect («It would be a new piece of knowledge for everybody») and a child, Viola, proposed a scientific work on popular beliefs.

(Viola: «May I express a hypothesis? If someone plants something without looking at the Moon, is it ok?»). Giovanni, instead, talked about when his father helped him recognize in the sky the constellation of the Big Dipper.

Paola: *What's a constellation? Do you all know?*
Simone: *I do, I do! They're stars that are close to each other and form a design in the sky, a set of stars that form something.*
Fabiana: *C'mon… There're no designs in the sky, my mother told me that man pretends to see them, but they're not there.*
Giorgio: *Like when connecting the dots?*
Fabiana: *Yeah, exactly. There are many designs made by man, but stars are not connected with a string!*
Catia: *They're useful to understand where we are, at night.*
Paola: *Very well, Catia! But how and why do we need them to understand where we are, that is to orient us at night?*
Catia: *You look at a star and you always go in that direction and it leads you to destination.*
Paola: *Very good! Does anybody know any star that helps us orient ourselves?*
Leonardo: *The Pole Star.*
Fabiana: *Right, it indicates the North!*

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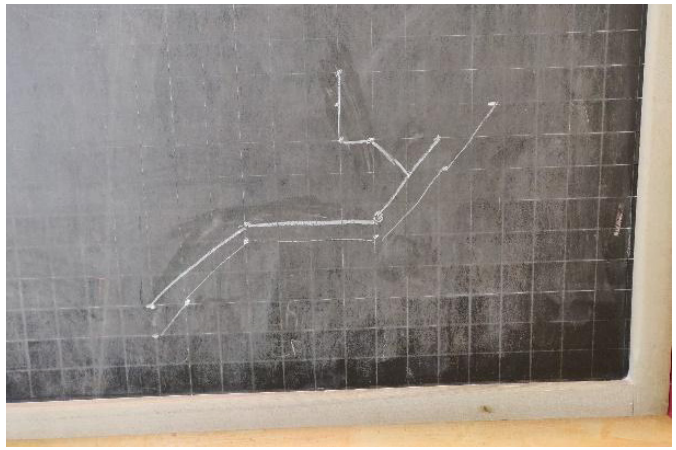

Constellations on the blackboard

Stars in Art

Paola asked the children: «Apart from the beautiful and distant stars that you saw and observed in the sky and that you then drew… where have you seen other stars here in San Paolo where you live? […] Not true stars, but stars in images. Stars that you can see even from here, from our classroom ».

Paola wanted to stimulate children ability to observe the town's parish church where stars can be found in some: it was a good opportunity to develop the path in an interdisciplinary key and to discover the territory with the children. Lorenzoni commented her work as follows: «Your experience is very interesting because your giving children something to look for, and that makes the eye active. I think of the thousands of children that walk around museums distracted, bored. I remember that once, with a class, we went to the Uffizi after

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10. Si tratta di un'attività sperimentata durante il laboratorio in presenza e tratta dalle ricerche del gruppo MCE e della Casa Laboratorio Cenci sulla pedagogia del cielo «Le finestrelle astronomiche [..] consistono in un disegno anche molto schematico di una porzione di orizzonte, anche piccola, rispetto a cui è registrata la posizione degli astri (Lanciano, 2009).

working on shadows, light, the body, and we searched for shadows in the paintings: the children discovered that up to the ’300s there were no shadows, there was a diffused light».

Paola developed the activity, showing the children some prints of pieces of art that have stars as theme, painted by various authors in different periods:

Paola: *Look at the images very carefully: all these paintings have something in common: what?*
Giovanni: *Stars! They all have stars, but different!*
Catia: *Yeah, they’re different from... normal stars (she says after hesitating), because each painter drew based on a personal way of imagining them.*
Paola: *Very well, Catia, you said that each painter drew the stars in a non-realistic manner, based on a personal preference. Very well, that’s a good observation.*
Paolo: *I notice that the theme is the same, but each painter developed it in a different way, just like the stars.*
Paola: *Exactly, there are various paintings depicting the Magi visiting Jesus, but they are different from each other. They are of different periods: between the ’400s and ’600s. So, here you can see a part of the history of art belonging to important centuries.*

In this work, the children also formulated some theories to explain the differences in the representations:

Carlo: *I think that the stars are all different from painter to painter based on how the painter felt when painting them. For example, here (“The Starry Night”, Van Gogh) the stars are like… I don’t know how to describe them… maybe the painter was nervous, very nervous.*
Paolo: *Those stars move.*

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Leonardo: *They look like crazy windmills!*
[...]
Paola: *And this one? (“Icarus”, Matisse).*
Anna: *The stars are calm, they’re big.*
Daniele: *They’re strange.*
Paolo: *They look like Suns, they have a peculiar shape.*

In her documentation, Paola commented her work as follows: «The dialogue turned out to be first of all a very effective tool to enable all the children to participate. They all said something, they all wanted to express their opinion, their thoughts, they all felt accepted and listened to. To know that there was no judgment, that there was no right or wrong, helped them. Everything was experience, knowledge, opportunity.

The path covered thousands of topics, it explored paths in Literature, Science, Geography, Astronomy; it brought farming traditions into the classroom, it transformed the classroom into a museum full of wonderful paintings. The class needed to talk and listen; the conflicts present in the class had never allowed working serenely in group, feeling like a group. I observed how a child in particular who is passively “subjected” to school, really put himself to the test, always expressed his opinion, shared his ideas; I believe he felt accepted and listened to by his peers, finding the right state of mind to open up».

Let’s do Geography, let’s do Science, let’s do it all!

From Daniela Stella and Stefania Porpiglia’s documentation

Daniela and Stefania work in a multiage class composed of 7 children in the fourth-year (6 males and 1 female) and 5 children in the fifth-year (4 females and 1 male) for a total of 12 students. Their work on the topic of time started with a simple question:

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Teacher: *What's the date today?*
Everybody: *March 11th.*
Teacher: *Do you think the date is important?*
Everybody: *Yes, it is.*
Marco: *It's my brother's birthday and it's the first time that he celebrates it at school... He's no longer in nursery school like last year. It's important, it's different … Because he was born and we're celebrating his birth. He was born on 11th March 2012, so 7 years ago.*
Luca: *The date tells us how much time has gone by since he was born.*
Marco: *He was born in the evening.*
Davide: *We find out how old he is.*
Teacher: *Can you think of anything else? Only how much time has gone by?*
Davide: *It can also tell us something about the future, things that will happen... appointments.*
Teacher: *Exactly... for example, I know that on Wednesday, 13th March, I have to take my daughters to the hospital for tests.*
Fatima: *The number tells us on what day an event will take place, and the month helps us discover the season.*
Alessandro: *We know if it will be hot or cold or warm.*
Marco: *That before 21st March it's still winter.*

The dialogue highlighted that the date is a very useful "mental tool" to think about time, because it helps calculate how much time has gone by and identify a specific moment in the future, anticipate it, plan it, prepare for what will happen. It's a way of thinking of a "specific time", which is very useful in order to develop the class's work because it allows approaching a great philosophical and scientific question: is time an objective physical quantity or a subjective way of entering into a relationship with the world?

Marco's sentence, though, changes the course of the conversation: starting from spring, the children talked about how grass changes color during seasons. The teacher asked the students to make some hypotheses concerning why such change takes place.

The children shared some ideas (Aisha: «Because it seems brighter with the Sun. The sun reflects and illuminates»./ Mark: «In the shade it's darker, though»./Alessandro: «In the winter it's darker»./Teacher: «Is that the only reason?»/Marco: «It's because of the cold»).

Daniela and Stefania decided to continue the research proposed by Aisha and programmed a field trip. In the meantime, the two teachers arranged the "liberated globe" activity for their class.

Teacher: *Let's go get the globe!*
Davide: *Are we to look for Italy?*
Marco: *What happens at equinox?*
Davide: *Let's do Geography.*
Alessandro: *And Science.*
Teacher: *Yes, let's do everything.*

In one of the online meetings with Lorenzoni, Daniela said that the children had been very much impressed by the passages between subjects:

«In the end, they asked me which subject I was going to write in the class register. We came up with a metaphor all together: knowledge is a big chocolate cake which we cut it into slices, which are the different subjects, because it's easier to eat». «I like the metaphor of the cake» Lorenzoni said in a webinar, «But I'd say that knowledge is the flavor, that is the relationship between the cake and I».

Daniela and Stefania said that, while waiting for the end of the school day, the children asked to share a memory of spring. Some shared their memories of family vacations, bike rides with friends, playing soccer. Aisha shared the memory of a long walk with his friends before moving and thus leaving them. Another child talked about a long, "endless" walk with her mother and father. She is a child who, along with

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two classmates ives in a rehabilitation center, apart from her parents: she can see her family according to social service following her case.

«Listening to this story, which is so dramatic, what I think is that you could work on the story of Demeter and Persephone, which is the founding myth of spring, as well as a story of separation and rejoining, and a narration connected to the cyclic time» Lorenzoni commented. «In a class like yours, where there are children who have experienced separation, it would be nice to cover the greatest cycle of nature through the metaphor on abandonment created by the ancients, thus using such a powerful mythical background».

Perception and knowledge, poetry and language. The class went out on an exploration, in search of the signs of spring. Daniela said: «We went out around the territory, like little explorers, to read the "change of time" in the surrounding area, the arrival of a new season. The children had to investigate, like investigators, the details that mark the change.

Their task was to create a photographic reportage of those signs. They photographed the intense blue of the blue sky, both the field and the cultivated flowers in bloom, the work in the fields: a woman who was preparing the vineyard and the tractors that were tilling the land.

In the end, we arrived at the Sanctuary of Fogliata, where they relaxed and lied down. It was natural for them to take their shoes off, put their feet in the grass, in order to feel the effect. There, we recorded a dialogue that started spontaneously between them. For example, a child said:

"Flowers tickle". "There's lots of tickling", "It's soft", "I'd sleep here". A different work came out, that took us away from the topic of the clock that we had thought of initially; we arrived at another theme, but we would like to continue this one». «I don't think you went too far from the initial topic» Lorenzoni reassured, «Because you did the work that is behind the flowing of time: that fact of realizing that nature talks to us».

Perceptive experiences on the signs of the arrival of spring. Daniela and Stefania thought of using photographs to create a mural on

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spring. «I think it's important to somehow characterize the details grasped by their photographs» Lorenzoni suggested. «It would be interesting, in this collective work, to keep the quality of the single views, of the single children or of a group of children, and make it so that the mural does not recall spring, but the many details of spring that each child managed to grasp. It would be nice to keep in the overall big picture the flower, the corner, the blue of the sky, grasped by the single child, with his/her name, and a sentence that he/she said. The next time you carry out a perceptive work, with photography or drawing, the children will be careful in grasping details because the latter represent their points of view on what happens. It's interesting to carry out a team work without giving up individuality».

The noise of a lawnmower, flowers in ditches, butterflies flying in the fields: three of the many details grasped by the children in their field trip. In one of the dialogues collected by Stefania and Daniela, a child said: «My flower is yellow! Like sunrays. If I half-close my eyes, the yellow gets longer and looks like bright rays», and added, «These are metaphors, we can invent many of them».

Davide, the child who said this sentence, connected poetry with the observation of the world. «This is the great theme of the relationship between vision, concepts and words», Lorenzoni observed. «Certainly, when discovering visual art or poetry you look at nature in a different way. Poetry is full of metaphors, images. How does my way of looking at trees change if I know ten words or seventy? Do I see only what I'm capable of calling by name or do I also see what I'm not capable of naming? And what's my way of viewing things that I'm not capable of naming? From a cognitive viewpoint, it's very interesting to understand if words come first or if sight comes first: in some children, words come first and in other children, sight comes first. I'm convinced that words are very helpful to distinguish, identify and be more attentive.

Daniela and Stefania continued their work in the month of May following Lorenzoni's suggestion. Daniela: «We started to work on the

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mural trying to keep and highlight the point of view of each student: we're trying to understand how to carry out the work along with the children, one step at a time. Up to now, we've started to paint meadows on a large blue sheet. We're using different shades of green, following what teachers said in the dialogue».

Daniela and Stefania decided to develop Davide's insight: «Alessandro created "a flowered tree like the rising Sun". Miriam thought of what another child said, "Newly sprouted wheat looks like a new born child"; Marco said, "Whitethorn bushes decorate the sky like fireworks"; Mark, "Violets have a sweet and intense smell like the one you smell in a vineyard"; and Eniel observed that "Dandelions fly like look of parachuters". We're at this point right now: but even the children who have more difficulty have understood how a metaphor works».

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4. Light schooling

After several weeks of experimentation, the group gathered again in presence to share the worked carried out in the classes.

Someone defined dialogic inquiry as an "airy, light, amusing" to teach starting from the children's life", their memory, their emotion sand the topics studied at school.

«The opposite of "airy" is claustrophobic, closed» Lorenzoni commented, adding that it would be good to ask oneself how much a claustrophobic, boring, heavy school contributes to rejecting the two million and a half of adolescents that drop out of school in Italy. However, an "airy" teaching does not mean to give up working curriculum content: «I believe that the great cultural battle to be carried out is to keep these aspects together and separated. Based on your experiences, this interweaving occurred several times: while talking about an important object of knowledge – time – the children had the possibility to say something about themselves».

Talked for long about the complex relationship between listening and the teacher's planning. Some shared their being caught off-guard and their disorientation when hearing the children's ideas, others felt reassured when they managed to lead the children "on their ground", to reconduct them to the chosen topic and to the stages of the path that they had imagined. Lorenzoni invited everybody to reflect on that aspect: «Sometimes we have to accept the fact that children go off on their own, opening learning paths which we had not thought about. This has happened to me many times. When we say that we want the students to build knowledge, we have to be willing to take a step back, to experience a bit of chaos».

To pause in that chaos also helps the students understand that the subjects are connected to one another, that they are different views of

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a same phenomenon or of a research question. Some teachers said that dialogue is like a set of Russian dolls, from one thing, another thing comes out: «This is an idea of culture to cultivate at school, because we tend to separate topics, to line up the chapters of books. To discover, instead, that the beauty of culture is that one thing is inside another helps to fuel tension towards knowledge».

The documentation, and in particular the transcription of the dialogues, is one of the key tools to orient oneself in the complexity of the possible interweaving and to develop a balance between the project and the unexpected. It is an observation tool, because it allows the teachers to return to dialogue, to evaluate which of the children's reasonings can be developed within a trajectory of sense and in accordance with the curriculum: the unexpected is "recorded", and this allows thinking of the changes that can be made in the program, without having to improvise said changes. The documentation of the dialogues is also necessary in order to provide the children with a feedback on their thinking, thanks to the teacher's systematization (through voice, maps and posters).

The experimentation lasted a few months, and it was not possible to analyze in depth how much the dialogue experiences were useful to develop rooted learnings. An immediate effect, though, that many teachers shared during the final meeting, concerns the space that this practice manages to build for the expression of the different intelligences and of the different learning styles. Somehow, the combination of learning experiences, dialogue and listening, and feedback helps to "re-write the class's hierarchy". «What you said is interesting, the fact that in dialogue "the best" are initially caught off-guard. I think that it's good for all of them to discover that each one can finally be recognized as a thinking individual», Lorenzoni highlighted. «Listening to all of them is difficult and as teachers we have to learn how to use less time with our words. This effort, as you all said, led to the possibility to hear the voice of those who usually do not speak, and this is a very important fact.

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The school is a great gym of democracy, that is a place where everybody acquires the right to speak: a school where only the clever speak, is a school that is building a sick society, a society that does not believe in the fact that everybody has the right to express a personal opinion».

- Personally, I believe that dialogue constitutes the methodological basis that allows listening to each other and creating together; then, this can be carried out in different ways (theatre, music...). To dismantle the school of the cleverest and of the less clever, the folly of marks, of decimals, is an actual perversion with respect to the substance of a year spent together.

Note

5. Dialogic inquiry at a glance

1. "Triggering and scaffolding children inquiry". In dialogic inquiry, the class is involved in a learning path on a topic, an "object of knowledge" (sky, time, buoyancy, perspective), that can be chosen by the teacher or can originate from the children's and youngsters' questions and interests. Around this topic, the teacher set up experiences for the class that have the aim to create a problem, a stumbling block, a cognitive dissonance that allows operating going beyond the means offered by their cognitive habitIn many cases, they are perceptive experiences that can have various levels of organization (free and guided observations, construction of objects, authentic problem solving). Teachers can set the learning environment for this kind of experience, sometimes simply scaffolding observation, in other cases using tools and materials tha t can help cognitive dissonance to happen. Said experiences are integrated with "objects of discovery", materials, tools identified or constructed by the teacher to guide the reasoning, texts chosen by the teacher to spur the creation of a problem or to enable the students to meet the thinking of great historical characters. Approach maneuvers are a resource that allow delimiting the field of the dialogue, so that the debate can develop starting from a ground of common experiences.
2. A community of research. Dialoguee, strictly understood as the class's conversation on the research topics, is a space of cognitive structuring, a "gym" where, owing to negotiation at verbal level, and not only, questions and hypotheses are developed. For dialogic inquiry to take place, it is necessary to put the students in the condition to share their hypotheses and discoveries; this generate further insights and hypothesis and associations in the group; it is then necessary to enhance a common language; and finally, the knowledge shared by each one has to gradually become everybody's knowledge. The teacher creates these conditions giving the students space to express themselves, cultivating mutual attention, trying to avoid explanations that are too direct. It is important for the students to understand that there are no right and wrong answers in this context, by trying not to have an assessing attitude, and choosing authentic and open research questions, to which no one is capable of giving answers easily. In order to develop the participation of all the students, it is useful to choose an extended timeframe and to come back to the contents of the dialogues, phrases, concepts, questions many times.
3. Documentation. The teacher records and transcribes the class's dialogues during the research path. Thanks to this patient work, the teacher has at disposal a documentation that allows him/her to identify the processes in the construction of knowledge that are developed in class, to grasp the turning points, the questions, the research paths, to observe the ways in which each single student participates and thinks. The transcription is also a resource that helps build a memory of the research path carried out in class: by sharing it with the students, the dialogue work is consolidated and settled, and it is possible to go back to concepts already expressed and to open questions. It is a type of material that, along with other forms of documentation - such as photographs, posters, murals - constitutes the individual and collective memory of the research path. The afore-mentioned material is represents the background, taking the form of educational exhibitions, collective texts, theatrical performances often open to parents or citizens.
4. Planning as recalibration. In order to listen to the students, teachers must have a way of considering teaching which is open

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to the unexpected. The students' interventions often introduce path deviations with respect to the path thought by the teacher, digressions from the topics proposed by the teacher, opening unexpected research paths. The initial educational program is subject to a constant recalibration work that starts from reading the dialogues, and which involves the choice or the invention of further "approach maneuvers". However, it also involves the organization of the curriculum which should be structured starting from an "outline" of contents that the students necessarily have to learn (essential curriculum) and the contents introduced according to their own interests and on the research developments (emerging curriculum).

Note

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Firenze, via M. Buonarroti 10
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