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The interactive and digital box for study management: an innovative and inclusive teaching tool for students with Special Educational Needs

Il box interattivo e digitale per la gestione dello studio: uno strumento didattico, innovativo e inclusivo per alunni con Bisogni Educativi Speciali

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Abstract:
Knowing how to manage one's own study and the ability to acquire an effective study method are the basis for achieving educational success for each student, in particular for students with Special Educational Needs. The role of the teacher becomes fundamental in developing methodologies and tools aimed at, on the one hand, enhancing individual potential and, on the other, maximizing the different learning opportunities of pupils, in order to build inclusive learning environments and processes. This article proposes an interactive, digital and inclusive teaching tool, tested within a middle school. The study was carried out by monitoring sample classes over the entire three-year period in the period 2020-

2023 and involved the application of quantitative observation method using grids filled by the special needs teachers. The results show that the interactive and digital box is a tool that promotes the management of individual study, increasing autonomy, a sense of responsibility and the competence to "learn to learn", as well as reflecting on the importance that environmental factors in producing better educational and school systems with a view to well-being at school.

Keywords: inclusion, skills, autonomy, innovative digital teaching, special educational needs.

Abstract:
Il saper gestire il proprio studio e la capacità di acquisire un metodo di studio efficace sono alla base del raggiungimento del successo formativo di ciascun alunno, in particolare per gli alunni con Bisogni Educativi Speciali. Il ruolo del docente diviene fondamentale per sviluppare metodologie e strumenti atti, da una parte, a valorizzare le potenzialità individuali e, dall'altra, massimizzare le diverse opportunità di apprendimento degli alunni, al fine di costruire ambienti e processi di apprendimento inclusivi. Questo articolo propone uno strumento didattico interattivo, digitale e inclusivo, sperimentato all'interno di una Scuola Secondaria di I grado. Lo studio è stato effettuato monitorando classi campione nell'intero percorso triennale nel periodo 2020-2023, utilizzando una griglia di osservazione compilata dagli insegnanti di sostegno. I risultati mostrano che il box interattivo e digitale è in grado di favorire la gestione dello studio individuale, accrescere l'autonomia, il senso di responsabilità e la competenza di "imparare ad imparare", oltre che riflettere sull'importanza che i fattori ambientali hanno nel produrre sistemi educativi e scolastici migliori nell'ottica del ben-essere a scuola.

Parole chiave: inclusione, competenze, autonomia, didattica digitale innovativa, bisogni educativi speciali.

1. Introduction: new education scenarios in the era of digital transformation

Knowing how to understand today's reality and the needs of students is the first step towards finding strategies and methods suited to fully satisfying them. This allows teachers to structure their teaching method to suit them in a meaningful way. In this path of continuous research, all teachers and protagonists of education in the school world must carry in their "special backpack" essential elements, such as passion, creativity, empathy, knowledge, listening, the ability to knowing how to put ourselves on the same level as students, to know them, understand them, and give them what they need to be the citizens of tomorrow. So, the research will lead to innovation, and an innovative school is a school that has been able to read, understand and deepen reality, and that is able to constantly follow its evolutions in a continuously changing context, capable, therefore, to offer immediate answers to those who are at the center of the educational process: the student.
The COVID-19 pandemic emergency has profoundly affected this reality, creating strong emotional and relational discomfort, profoundly impacting the harmonious growth of students on the one hand, and the difficulties for teachers in dealing with new scenarios.
Furthermore, the post-pandemic period was also characterized by the technological revolution in the field of teaching, putting teachers in the position of having to *re*-think and *re*-invent themselves, developing increasingly higher and more specific skills in the field of technology to withstand the educational

emergency on the one hand and, on the other hand, approaching a constantly evolving world, reading the digital transformation as a new configuration of the *teaching-learning* combination.
The teacher finds himself forced to create on a daily basis those conditions that allow the transition from solely "transmissive" teaching to authentic "active" teaching, promoting flexible environments, practices, methodologies and tools, taking into account digital technologies as a support for creation of new educational paradigms (also through digital civic education in the media) and the operational planning of both remote and in-person activities (De Marco, 2020).
The teacher, expert and facilitator of a more advanced *teaching-learning* process, is thus able to use a repertoire of adequate digital teaching materials and monitors the activities carried out by the student, orienting and *re*-orienting him, stimulating and facilitating metacognitive reflection (Mergendoller et al., 2013).
From this new perspective, school is configured as a flexible learning environment, characterized by a modified teaching approach, a receptor of impulses aimed at change produced by the media themselves. It is impossible today to think about training without the contribution of digital (De Marco, 2020).
The potential of digital transformation is scientifically demonstrated through an expansion of communication methods, collective writing, the representation of objects (*visual thinking*), the digitization of artefacts, the possibility for students to produce, modify and share texts, images, videos in digital environments.
Scientific literature identifies the sector of special education as one of the areas in which the favorable impact of the use of Information and Communication Technologies (ICT) on didactic-educational responses aimed at satisfying a plurality of special educational needs is most highlighted (Agenzia Europea per lo Sviluppo dell'Istruzione degli Alunni Disabili, 2013; Calvani & Vivanet, 2014).
This is certainly the motivation that leads to framing technologies as Environmental Factors from the biopsycho-social perspective which is the basis of the model of the International Classification of Personal Functioning, Disability and Health - ICF (WHO, 2001).
ICF promotes the possibility of understanding and interpreting how a specific technology affects or could affect a person's bio-psycho-social functioning. This is possible because ICF assumes that a person can "function" differently in different life contexts. In this way, technologies, digital tools and multimedia products are placed within the gap between capacity and performance indicated by the ICF (WHO, 2001) because they can be considered real learning and interaction tools, a combination that allows them to represent environments of facilitation/compensation or, on the contrary, obstacle/barrier in carrying out normal activities and carrying out life and learning tasks. Everything is closely related and dependent on the ways in which they are designed, implemented and applied.

2. Technologies for inclusion as a means for promoting well-being at school: the dimensions of the use of multimedia products for inclusice teaching

The school represents the space that promotes the growth and training of each student, and at the same time it is also a place for meeting and comparing with others, a privileged environment where students are trained and take shape, which adapts, or at least it tries, to their needs "in the here and now".
Therefore, the classroom, understood as a learning environment, appears to be a complex structure both due to the co-presence of the particular needs of each student and because of the need for inclusive management, so as to be able to respond to the needs of the individual, without however losing attention to the entire group (d'Alonzo, Maggiolini & Zanfroni, 2013).

The environment is called, therefore, to be not only physical space but also a set of material, human and symbolic resources such as to influence the quality of the students' scholastic performance, allowing teachers to enhance the characteristics of each one, enhancing and respecting their uniqueness. The different uniquenesses contribute to the creation of that social environment within which the teacher activates the delicate teaching-learning process.

The classroom, however, is also a physical space, where the teacher implements his own "classroom management" (d'Alonzo, 2012) characterized not only by the placement of the physical elements but also by the precise and timely structuring of the teaching material, thanks to which it is possible to promote the quality of teaching and the impact on the management of the group being trained.

The classroom, understood as a physical environment, is the place where technologies are placed. They are not to be understood as mere material for learning and teaching but as emerging possibilities for proposing more active and interactive teaching (Carruba, 2015).

Technology, in this sense, completely changes the way of teaching, not only because it tends to make teaching more attractive, but because it tends to satisfy the needs of each digital native student from an inclusive perspective.

Change, however, cannot be conducted only starting from the mere insertion of these technological supports within the life of the classroom; it is the teacher who is called to rethink and modify his teaching action by redesigning his interventions according to the devices he intends to use to reach each student (Carruba, 2014).

Only in this way technology is able to find effective points of contact with special pedagogy, sharing with it the project and the commitment to research those appropriate teaching strategies such as to personalize the teaching intervention so as to allow students with disabilities or needs special educators to find space and opportunities to learn while respecting their specific needs.

According to some exponents of positive psychology, technology becomes "emotional", capable, therefore, of promoting the well-being of the user (Villani, Grassi & Riva, 2011) and capable of overcoming constraints and difficulties deriving from the impossibility of increasing the communicative dimension *face to face*.

The possibility of designing and creating a multimedia artefact is able to limit the difficulties experienced at school by the student with disabilities, influencing in a "positive" way the emotional development of the same and having an equally positive impact on the overall state of health of the student, which as specified by the World Health Organization it does not consist only in the absence of disease (WHO, 2001).

It is, therefore, possible to identify in technology a tool capable of enabling and compensating, therefore on the one hand allowing the "user" to be able to carry out tasks that would not be accessible due to his communication, relationship and movement problems, on the other to offer support to make the task more easily achievable.

Technology, defined as "furnishings and equipment" of the classroom, facilitates the structuring of an environment that acquires an important role for well-being-at-school, and literature shows how a comfortable environment promotes learning (Laurillard, 2015).

If the arrangement of the tools in the classroom is functional to the student's needs, he will be encouraged to use them and motivated to exploit their potential. To the extent that a device, a digital product or a multimedia and interactive tool allows the overcoming or compensation of a limit, it determines emotional well-being in the student and this inevitably incites him to awareness of his own responsibility

with respect to the processes and results, motivates him to learn, allows him a positive educational experience.

Technology understood in this way is, therefore, a privileged channel for inclusion, which passes through tools created not from a "special" perspective but which can enable us to compensate for some difficulties.

For more than twenty years, Italian schools have opened their doors to ICT in order to facilitate teaching-learning processes (de Anna, 2012).

Scientific literature highlights how IT tools, since they were introduced for teaching and communication, have been able to improve the lives of people with disabilities (Pecchia et al., 1992).

In the nineties, technological tools mainly had an adaptive and compensatory function (Pietrella, 1993, pp.91-94), but over time they have evolved, establishing themselves as tools to support teaching based on collaboration and sharing of knowledge (Calvani, 2004) in order to create training strategies with a view to more effective inclusion.

In 2007, the PNSD (National Digital School Plan), through three main actions attributable to the use of the IWB, Cl@ssi 2.0 and digital publishing, had set itself the objective of making teaching as laboratory and experiential, underlining the transversal potential of digital.

In the latest PNSD of 2015, which is in continuity with the previous one, "digital" is configured as an "enabling tool, connector and driving force for change" (MIUR, 2015, p. 26) promoting a school open and inclusive to inside a constantly changing society. The school, therefore, finds itself experiencing a true path of innovation and digitalisation, integrating three dimensions: the technological, the epistemological and the cultural.

This innovative process can only pass through the initial training of teachers who are therefore called upon to reformulate the teaching-learning methods in the light of ICT in terms of pedagogical accessibility and inclusion (de Anna, 2012).

The Italian legislation, taking into account the challenges proposed by the European Commission in the Europe 2020 Strategy (2015/C417/04), has included training on ICT in the training courses of both curricular and support teachers (Ministerial Decree 249/2010), in line also with European indications.

New technologies can become a tool for the redevelopment of the educational system only if they are used within appropriately designed teaching models.

Pedagogical problematism, led by the Italian pedagogist Giovanni Maria Bertin, for example, can be considered as the basis for developing models of this type. Specifically, it aims to encourage the acquisition of individual autonomy, conscious participation in life and sharing with peers.

The production of digital, interactive and multimedia products, based on a problematic technological model, is oriented through three perspective dimensions: monocognitive, metacognitive and fantasy-cognitive.

A digital content can constitute the main element of the monocognitive perspective whose priority objective is precisely the transmission of knowledge and consequent acquisition of the same by the learner. In this process it is necessary to take into account the quality of teaching on the one hand, and on the other the tools and strategies that can guarantee the implementation of individualized and personalized paths so as to allow everyone to achieve educational success. From this perspective, digital contents can constitute a basis for the construction of new knowledge, based not on generic literacy but on a conscious use of technologies.

Producing digital content necessarily requires *know-how*, a characteristic of the *metacognitive*

perspective that focuses on the construction of knowledge itself. This is a dimension of considerable importance as the student who uses technologies for teaching must be able to organize and re-elaborate a vast variety of materials.

This new way of teaching orients the student towards a conscious use of digital, and the teacher, guide and mentor of the learning process educates to strengthen the competence of *learning to learn* and the development of divergent thinking.

In this way, the student is increasingly at the center of the *teaching-learning* process, and this is an essential characteristic of the *fantasy-cognitive dimension of knowing* how to be (Levin, 2000). This dimension leads the student to a sympathetic attitude towards the points of view of others. Therefore, the use of educational technologies and digital, multimedia and interactive products effectively adapt to the characteristics of *fantasy cognition*: challenge, imagination, competition, cooperation and curiosity.

The new role of the teacher, i.e. guide and mentor, supports the importance of adequate training in the use of new technologies for the creation of increasingly inclusive teaching.

According with these considerations that the experimentation presented in this article is configured, i.e. the use of an interactive and digital box, created by the support teachers in synergy with the curricular teachers and with the students, for the benefit of the same, to guarantee them a method of study and study practice that can be managed with a view to co-building knowledge with the primary aim of: i) improvimg autonomy in the management of tasks by students, especially those with Special Educational Needs (with disabilities and with Specific Learning Disorders); ii) reducing stress and performance anxiety in ordinary home study; iii) learning to independently produce simplified study material, concept maps and interactive activities aimed at simplifying, facilitating and enhancing learning; iv) sharing useful resources with classmates to improve cooperative work, increase positive interdependence, develop divergent thinking and encourage metacognitive reflection; v) improving school performance.

3. The interactive and digital box for study management: an experimentation in middle school

3.1 The phases of experimentation and the statistical processing of data

At the Middle School (*Secondary School of First Grade*) belonging to the Comprehensive Institute (C.I.) "Foscolo-Gabelli", Foggia (Italy), an experiment based on the use of an "interactive and digital box", aimed at improving the management of the study of pupils and, in particular, of pupils with Special Educational Needs, was conducted.

Through the monitoring of variables such as autonomy, sense of responsibility, levels of attention, motivation to study, development and strengthening of students' "learning to learn" skills, a reflection was started on the importance that the environmental factors, and specifically, attitudes, methods and teaching strategies, play a role in the construction of a better school environment (Traversetti & Rizzo, 2022), based on a condition of well-being and happiness at school, as a competence to be co-construct (Dato et al., 2021; Bevilacqua & Filippone, 2023).

The school context where the experimentation took place is a school that adopts the DADA model. The Italian acronym DADA stands for *Didactics for Learning Environments*. This model, born from the intuition of Ottavio Fattorini and Lindia Cangemi, two head-teachers of two Secondary Schools in Rome (Italy), is based on a didactic and pedagogical innovation, and proposes a new educational paradigm, which is inspired by Anglo-Saxon or Northern European models, which consists in the transformation of the static classroom envisaged by the traditional school model into a *learning environment* classroom,

which is assigned to one or more teachers of the same discipline who interpret and live that space by adapting specific professional needs on the basis of changing teaching needs (Filippone & Carangella, 2023).
The teachers, therefore, do not move from one classroom to another during the time change, but rather it is the students who, in full autonomy, reach the *learning environment* classroom from hour to hour. This aspect represents a strong methodological innovation, paving the way for a new pedagogical-didactic *vision* (Fattorini et al., 2022).
The experiment was conducted on a sample class of 25 pupils, in the 2020/2021, 2021/2022, 2022/2023 school years, where the interactive and digital box was used to manage the study in ordinary teaching practice.
A further class of 25 pupils was used as a control class, where the teaching activities were not accompanied by the use of the interactive and digital box.
The classes identified for the experimentation were heterogeneous classes, characterized by the presence of pupils with Special Educational Needs (SEN), in particular pupils with Disabilities (Ds) and pupils with Specific Learning Disorders (SLD).
The classes of a DADA school are formed so as to present almost all the same characteristics in terms of numbers, division between boys and girls, presence of pupils with special educational needs, disabilities and specific learning disorders. Specifically, for this experiment, a control class was chosen that presented the same characteristics as the sample class.
The composition of the classes is shown in Table 1.

	Sample Class (SC)	**Control Class (CC)**
Total pupils	**25**	**25**
Males	*12*	*12*
Females	*13*	*13*
Special Educational Needs	**6**	**6**
Pupils with Disabilities	2	2
Mild Cognitive Disability	*1*	*1*
Oppositional Defiant Disorder	*1*	*1*
Specific Learning Disorders	4	4
Dyslexia	*2*	*2*
Dyscalculia	*2*	*2*

Table 1 – Composition of Sample (SC) and Control (CC) Classes.

The experimentation was conducted using the following working protocol, also summarized in Table 2.
In the first phase, attributable to the beginning of the school career in the reference middle school, when the pupils attended the first class, and therefore in the first quarter of the 2020/2021 school year (September 2020 - January 2021), the pupils of the sample and control classes, carried out ordinary teaching activities without using the interactive and digital box.
In the second phase, at the end of the first quarter of the first school year (2020/2021) and precisely in the month of January 2021, only the students with Special Educational Needs of the sample class used an interactive and digital box, built by the support teachers specifically to help pupils deal with the oral tests for each school subject, scheduled by the curricular teachers, according to the indications of the Individualized Educational Plan, for students with disabilities, and the Personalized Educational Plan, for students with Specific Learning Disorders.

In the third phase, attributable to the entire second quarter of the first school year (2020/2021) and precisely in the period February 2021 - May 2021, all the pupils with Special Educational Needs in the sample class used an interactive and digital box for management of the study of the different curricular subjects. For all the other pupils in the sample class, the opportunity, on a voluntary basis, to use the interactive digital box to manage and support their personal study in the various curricular disciplines was given.
In the second and third phases, the pupils in the control class carried out ordinary teaching activities without using the interactive and digital box.
In the fourth phase of the experiment, attributable to the entire second school year of the three-year period (2021/2022), all the pupils of the sample class had the opportunity to use an interactive and digital box to manage their studies in reference to the different curricular subjects.
The digital tool was made by the support teachers in synergy with the curricular teachers. While the use of the digital box was not optional for pupils with Special Educational Needs, the possibility of choice was given to other pupils.
Unlike what was adopted for the sample class, the students in the control class carried out ordinary teaching activities without using the interactive and digital box.
In the fifth and final phase, attributable to the last year of the three-year period (2022/2023), the support teachers created an interactive and digital box for managing the study of the different curricular disciplines which was adopted by both the sample class and the class control. In this last phase, all the pupils in the sample class were given the opportunity to choose whether or not to make use of the aid of this tool, to evaluate in what terms the pupils with Special Educational Needs had made use of it. For the students in the control class, the use of the interactive and digital box was made optional, to evaluate in students who had never used it, the type of approach to a new multimedia tool for study management and any benefits in terms of autonomy, sense of responsibility, levels of attention, motivation to study, development and strengthening of students' "learning to learn" skills.

		Sample Class (SC)	**Control Class (CC)**
Phase 1	First quarter s.y. 2020/2021		
Pupils with special educational needs		no	no
Other pupils		no	no
Phase 2	January 2021		
Pupils with special educational needs		yes	no
Other pupils		no	no
Phase 3	Second quarter s.y. 2020/2021		
Pupils with special educational needs		yes	no
Other pupils		yes (optional)	no
Phase 4	school year 2021/2022		
Pupils with special educational needs		yes	no
Other pupils		yes (optional)	no
Phase 5	School year 2021/2022		
Pupils with special educational needs		yes (optional)	yes (optional)
Other pupils		yes (optional)	yes (optional)

Table 2 – Experimental working protocol..

The use of the interactive and digital box, in the different phases of the experimentation, was studied to promote the management of individual study. An application of a quantitative observation method using

grids filled by the special needs teachers was used to carry out all the phases of the experimentation to evaluate the variables identified relating to management of the study: autonomy, sense of responsibility, levels of attention, motivation to study, development and strengthening of students' "learning to learn" skills.
A graduated scale was used, with a score from 1 to 5, which represented in quantitative terms the value expressed by the support teachers of the two sample and control classes for each variable identified as reported in Table 3.
At the end of each lesson the support teacher, with the collaboration of the teachers of the different disciplines, compiled the observation grid, reporting the average values obtained at the end of each phase. For each variable studied, specific descriptors were used which guided the teacher in assigning the numerical score. In particular: i) autonomy was assessed as each student's ability to organize, prepare and plan the study material alone and without the teacher's help; ii) the sense of responsibility was assessed as each student's ability to complete the tasks received; iii) the level of attention was calculated as the time in which each student was able to carry out ordinary teaching activities, without the need for breaks; iv) motivation to study was assessed as the frequency of each student requesting to carry out the assigned assignments independently; v) the competence to learn to learn was assessed as each student's ability to refine the study method and learn in a meaningful way.
The average for each phase of the experiment was then calculated for each variable.

	1	**2**	**3**	**4**	**5**
Autonomy					
Sense of responsability					
Level of Attention					
Motivation to study					
"Learning to learn" skill					

Table 3 – Graduated scale used to observe the variables relating to management of the study.

An initial comparison was made between the results obtained between the different phases within both the sample and control classes, and a subsequent comparison between the results obtained for each phase in the two class groups to highlight significant differences between the class. sample and control one.
Furthermore, the following were studied and monitored: i) the performances of the students through the evaluation of learning through oral questions and written tests; ii) student performance through the assessment of skills through authentic tasks; iii) student absences; iv) compliance with deadlines in the delivery of tasks. Furthermore, the following was observed: i) the approach to study, ii) the interest in the different disciplines; iii) work in pairs or groups both in class and at home; iv) the well-being of pupils with special educational needs; v) the classroom climate.
In order to evaluate significant differences between the carrying out of ordinary teaching activities in the presence and absence of the interactive and digital box, specifically, at the end of the first school year (2020/2021), the *performance* of the pupils of the sample class both through learning assessment (LA) and skills assessment (SA), was calculated as *Improvement Index 1* (II_1)

$$II_1 = \frac{P_3 - P_1}{P_1} * 100$$

a standardized percentage index where:
P_1 indicates the arithmetic mean of the *performances* obtained in the different disciplines in the first phase of the experimentation;
P_3 indicates the arithmetic mean of the *performances* obtained in the different disciplines in the third phase of the experimentation.
Similarly, student absences were also calculated, for the 2020/2021 school year, as a standardized index, through the calculation of the *Absence Index 1* (AI_1)

$$AI_1 = \frac{NA_3 - NA_1}{NA_1} * 100$$

where:
NA_1 indicates the *number of absences* recorded in the first phase of the experiment;
NA_3 indicates the *number of absences* recorded in the third phase of the experiment
Compliance with deadlines in the delivery of homework was calculated, both for the control class and for the sample class, as the number of delays in delivery recorded respectively in the first and third phases of the experiment, during the entire experiment, to evaluate the trend over the entire time period.

3.2 The structure of the interactive and digital box for the study management

The interactive and digital box for the study management was created using the free online application *Thinglink* (https://www.thinglink.com). It is a free online application that allows you to store images, transform them into interactive images and explore a virtual space using an image or a video within which the creator of the project inserts Tags, i.e. links, which, when clicked lead to digital assets. In fact, images can be connected, thanks to these internal links, to textual, musical, gamification, video or text content. The graphics were, however, edited and created with CANVA software (https://www.canva.com).
Below, as an example, is the structure of the interactive and digital box, created in the third phase of the experimentation, which can be consulted in demo format at the following link and can be scanned using the QR code shown in figure 1.

Figure 1 – QR code to explore the interactive and digital box also available to the link https://www.thinglink.com/card/1412463175013498882

The home page (figure 2) is characterized by a graphic mapping that shows the different disciplines

organized by study areas:

- Technical-scientific and artistic area;
- Linguistic-literary area.

Each discipline corresponds to a star-shaped icon which contains the links to access the contents of the individual disciplines.

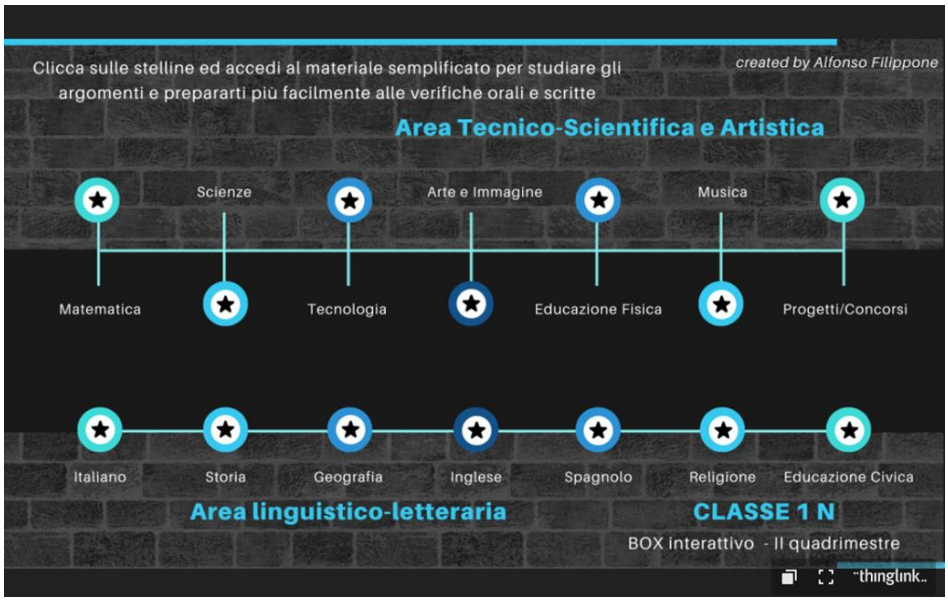

Figure 2 – Interactive and digital box (home page)

An interactive box was created for each quarter, so as to optimize the organization and management of contents, limiting the reference time frame. By clicking on the links relating to each discipline the student has the opportunity to explore the contents relating to the months of the respective quarter.

Figure 3 – Scansione temporale delle risorse per ciascuna disciplina.

By clicking on the links relating to each month, the student has the opportunity to explore the resources uploaded in chronological order (figure 3).
A special graphic, which recalls the time line, helps the student to recognize the chronology and to distinguish, through different icons and colours, the various links associated with the materials uploaded by the teacher for each teaching activity (figures 4).
Thanks to the link shared with the entire class group, each student, not just those with disabilities, can upload contents created independently, so as to be able to share them with other classmates and encourage cooperative work, positive interdependence and metacognitive reflection, bridging thus the gap created by the absence of face-to-face interaction.

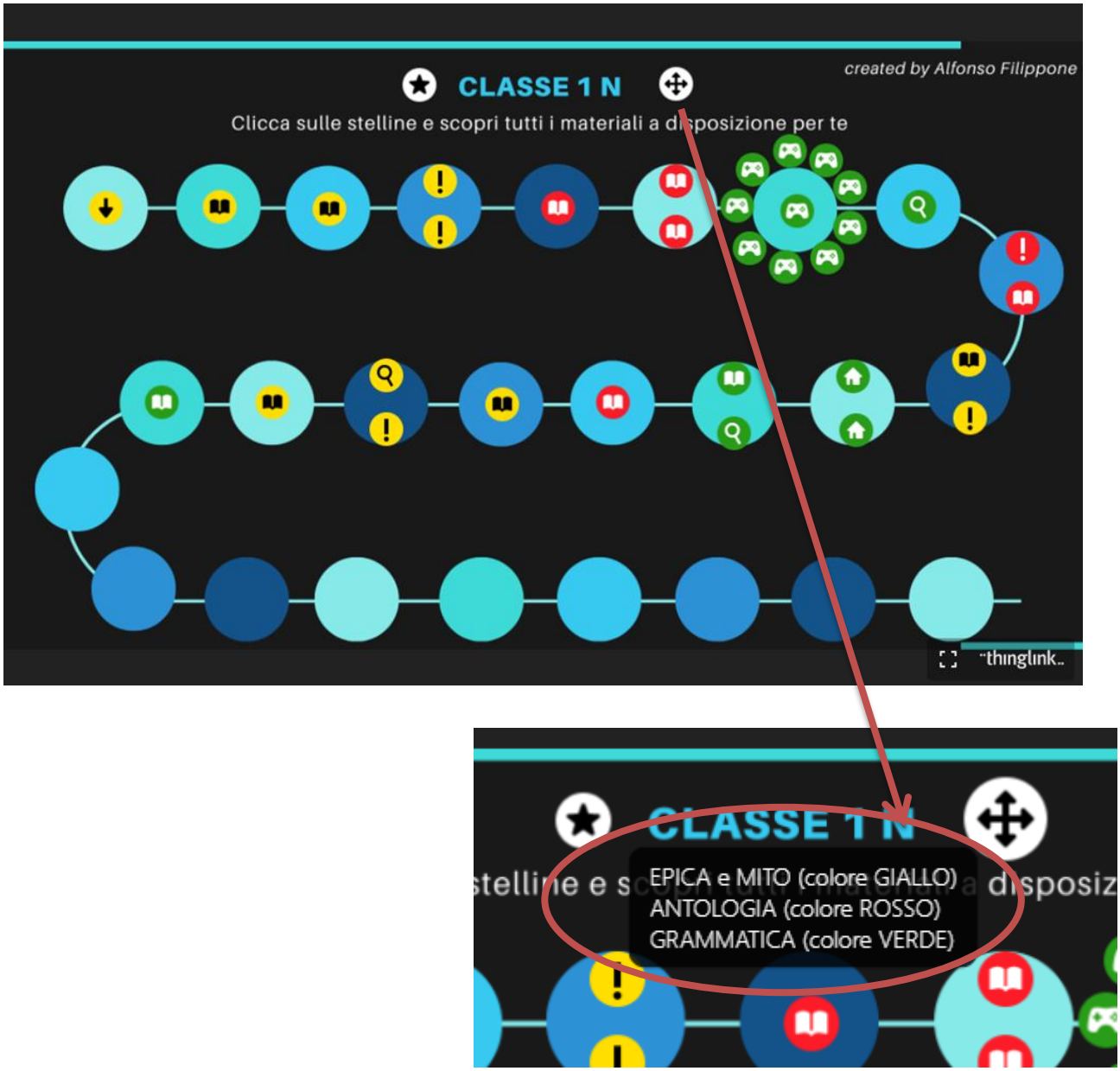

Figure 4 – Tags associated with the materials uploaded by the teacher for each teaching activity.

The resources and materials available by clicking on each tag can be of various types:

- simplified notes;
- mind maps;
- interactive games created with Learning apps (https://www.learningapps.org) or Wordwall (https://www.wordwall.net);
- subtitled videos;
- interactive videos created with Ed-puzzle (https://www.edpuzzle.com);
- multimedia texts;
- texts accompanied by audio;
- presentations created with Power Point, Prezi (https://www.prezi.com) or Canva;
- websites for further information.

Figure 5 shows the graphic interface relating to the different types of materials that can be loaded into the interactive and digital box.

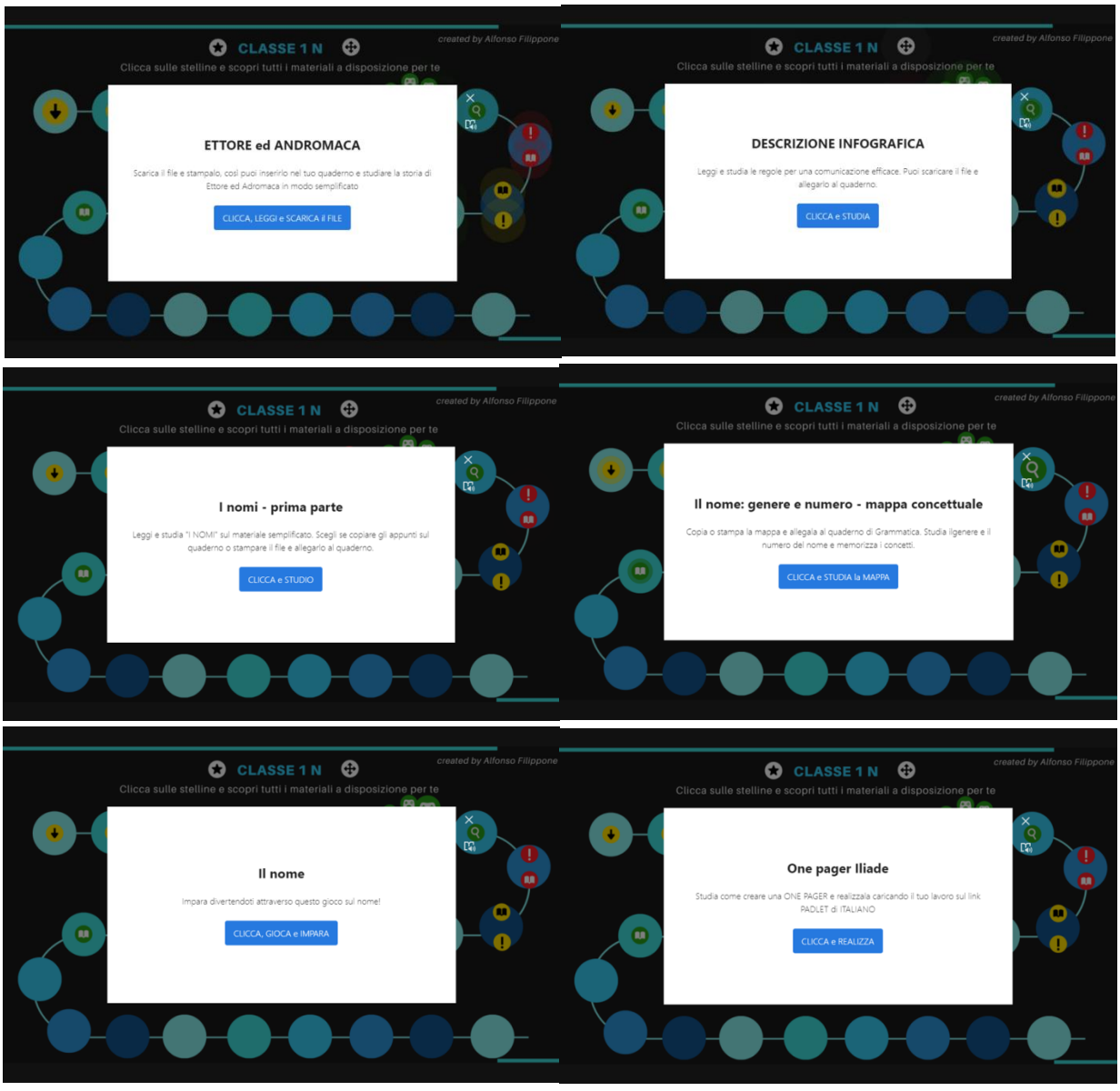

Figure 5 – The interface relating to the different types of materials that can be loaded into the multimedia box.

To facilitate the self-evaluation process, a central moment for skills-based teaching, each student was asked to upload the papers produced by personal and individual study onto a virtual noticeboard created with a Padlet (https://www.padlet.com), so that everyone could have the opportunity to compare themselves with the papers carried out by their classmates, enrich their own knowledge, evaluate and self-evaluate and thus encourage metacognitive reflection (figures 6).

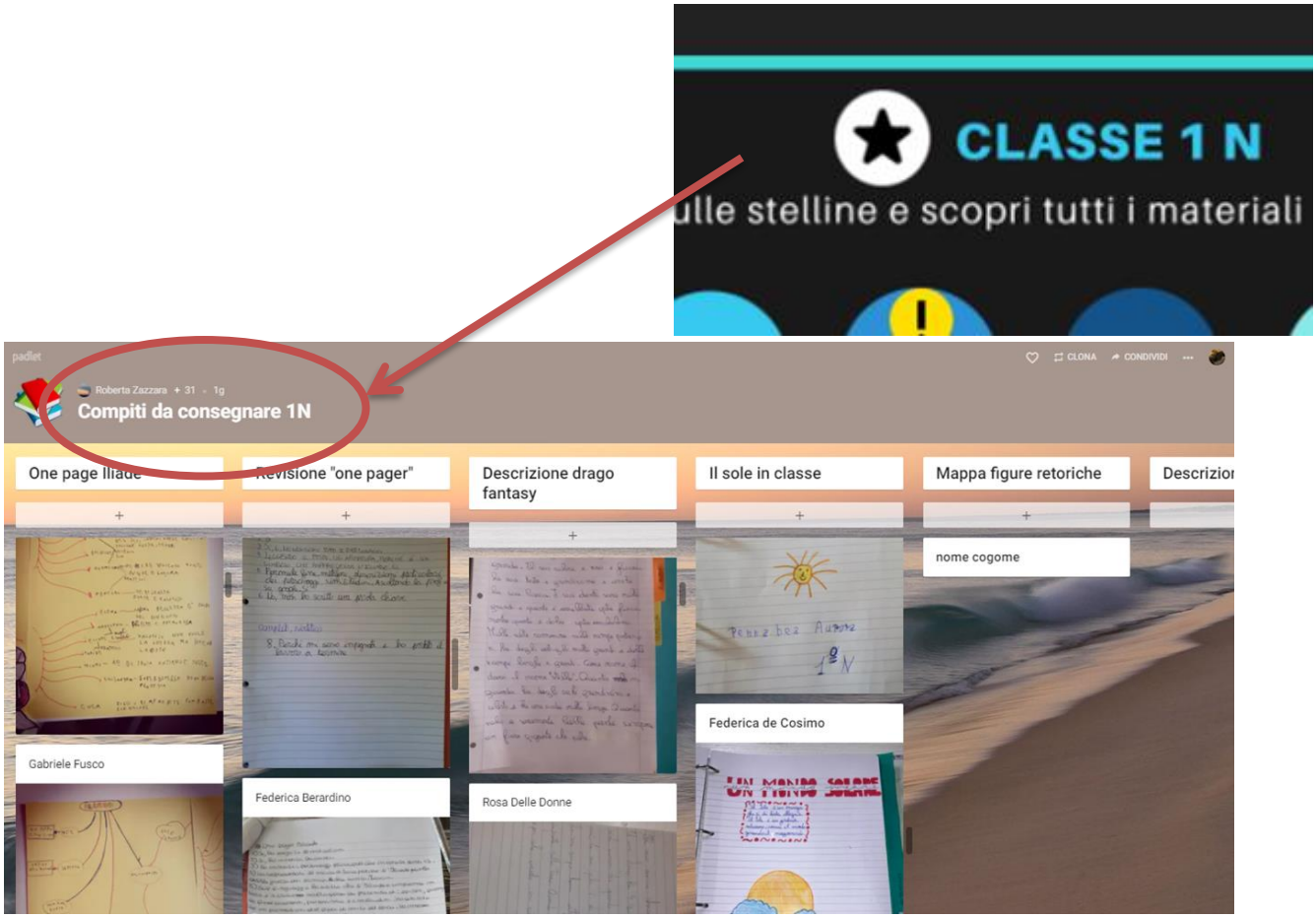

Figure 6 – Padlet for self-assessment and metacognitive reflection.

3.3 Experinmental results

Being able to manage one's study independently is certainly one of the main objectives that a teacher aims to help his students achieve, particularly if they have special educational needs.

The vastness of resources and study materials available, above all thanks to the easy possibility of finding them in the virtual world, is certainly a cause of difficulties in the management, cataloging and use by students, especially if integrated with the paper material produced in class and available on teaching aids.

Being able to develop an effective study method is certainly favored by the ability to use and organize the study material available.

The interactive and digital box for studio management, presented in this experimentation, certainly presents itself as an accessible tool capable of achieving these important objectives. Its digital,

multimedia and interactive nature stimulates students, arouses their curiosity and promotes continuous innovation, encouraging students to have a positive and creative attitude towards studying (Sousa et al., 2017).

In the first phase of the experiment, the students conducted their ordinary curricular and personal study activities at home without the aid of the interactive box, of which they did not know the existence. At the end of the first four months (time span of this first experimental phase), the arithmetic mean was calculated between the final assessments assigned in each discipline both in terms of learning assessment (LA_1) and in terms of skills assessment (SA_1) which are turned out to be, respectively, equal to 7.18/10 and 7.15/10 for the sample class and 7.20/10 and 7.18/10 for the control class.

Also at the end of this time period, the arithmetic mean of the LA_1 and SA_1 between the different disciplines was recorded, subsequently calculating the respective *Improvement Index 1* LA_1 and *Improvement Index 1* SA_1.

Figure 7 represents the trend of the II_1 (LA_1) percentage indices for each pupil. Students marked with an asterisk are students with Specific Learning Disorders, those marked with a double asterisk are students with disabilities.

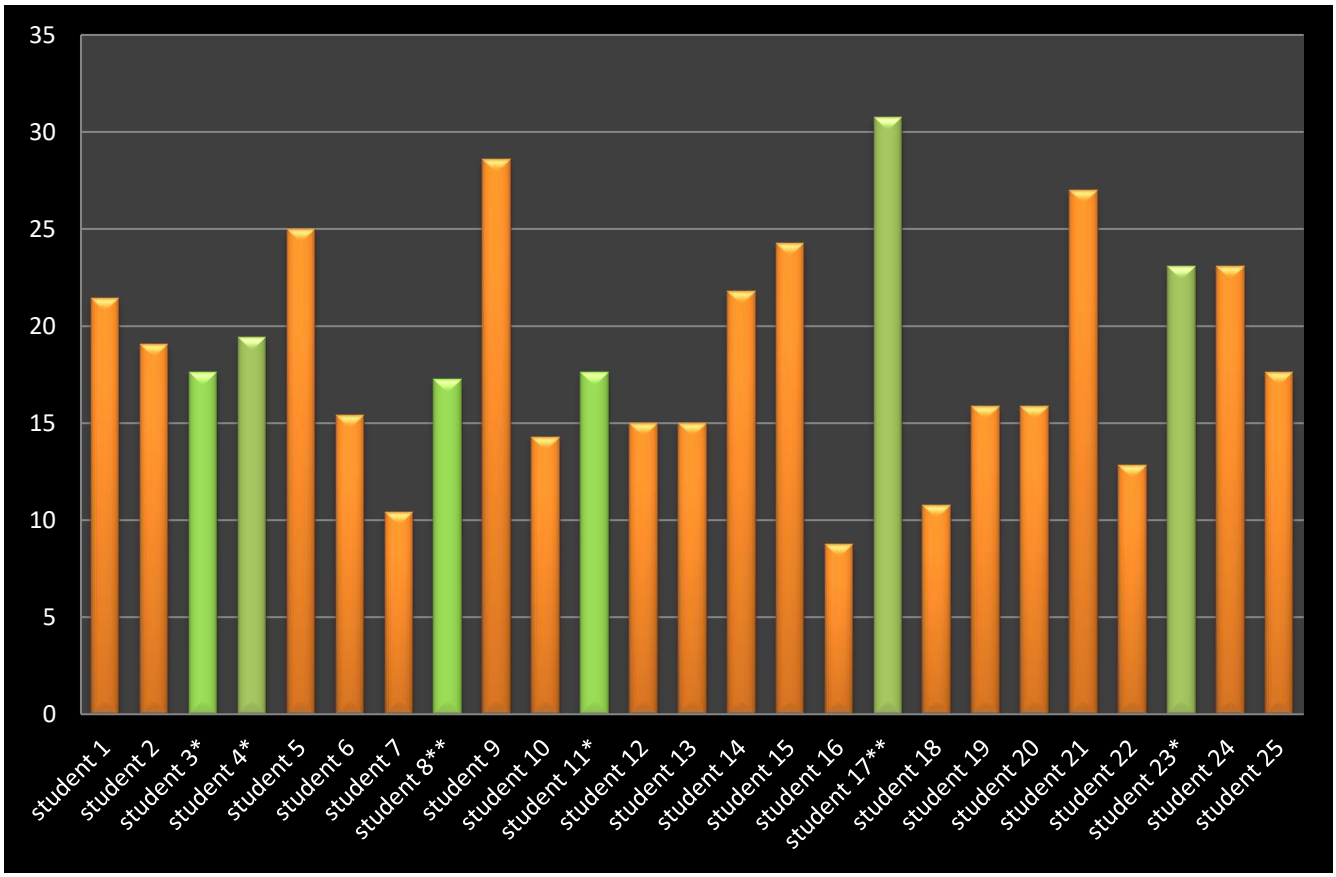

Figure 7 – Trend of the Improvement Index 1 (LA_1) percentages indices for each pupil.

As can be seen from the figure, all the II_1 (LA_1) calculated are positive and are placed in a range between 8.75% (minimum value) and 30.77% (maximum value), with an average value of 19.31%. This data allows us to understand clearly and unequivocally that the students' performances in terms of learning evaluation in the second experimental phase have significantly improved compared to what was found

in the first phase of the experiment. Furthermore, no statistically significant differences were found between the II_1 (LA_1) calculated for pupils with special educational needs and all other pupils.
This data highlights how the improvement in performance in terms of learning assessment for pupils with special educational needs is clearly comparable to what was found for all other pupils. Indeed, in the case of pupil 17, higher values were found than those observed for the majority of other pupils.
A result of this type leads us to hypothesize how a tool such as the interactive box studied in this experiment can be considered an effective teaching tool capable of bringing out the potential of all students, especially those with Special Educational Needs and Learning Specifics Disorders (Traversetti, 2018; Traversetti & Rizzo, 2023).
A similar result was recorded for the values of the II_1 (SA_1) index, as shown in figure 8. In this case, however, all the II_1 (SA_1) are placed in a wider range, between 10.75% (minimum value) and 32.31% (maximum value). This data leads us to reflect on how the assessment of skills recorded better performances compared to what was observed for the assessment of learning, leading to hypothesize how the management of study material and learning resources, as proposed in this experimentation, positively influence the strengthening and consolidation of skills.

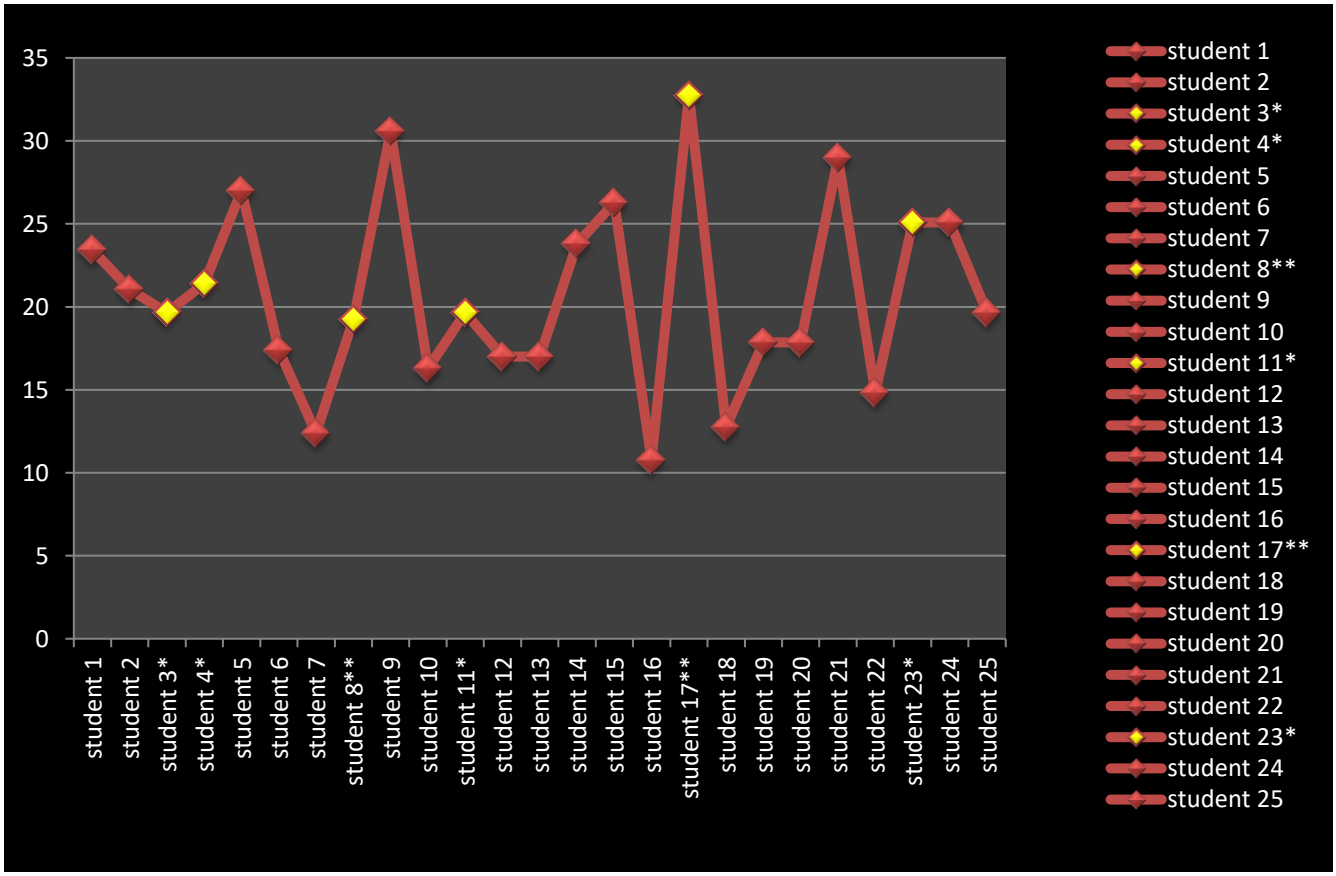

Figure 8 – Improvement Index SA_1.

Again for the sample crates, negative values of the *Absence Index 1* (AI_1) were also recorded, a figure corresponding to a significant decrease in absences (data not shown). This data leads us to reflect on the condition of well-being that adequate study management, instilling greater confidence in students, projects them into a more serene context, characterized by a collaborative climate that encourages class

attendance (Nzoka & Orodho, 2014).
A positive evolution of the climate within the classroom was observed. On the one hand, the progress of time has certainly favored the possibility of cementing personal relationships by promoting positive relationships, but on the other hand, the possibility of working cooperatively on the creation of shared materials within the interactive box has certainly, offered increasingly effective moments of meeting and mutual exchange.
There were no longer any delays in the delivery of homework, except in sporadic cases (data not shown). It is therefore easy to hypothesize and state that the approach to study has evolved in a positive way, developing interest in the different disciplines. The study of study management, through the monitoring of autonomy, sense of responsibility, levels of attention, motivation to study, development and strengthening of students' "learning to learn" skills was conducted by the support teachers through the compilation of a grid of observation, where for each pupil, every 15 days, each variable was monitored with a numerical value from 1 to 5. At the end of each phase, the arithmetic average of the recorded values was calculated first for each pupil and subsequently the arithmetic mean of the average values obtained for each variable considered. The results show how for both the sample class and the control class there was, over the three-year period, an increase in the values relating to each variable, and this is attributable to the fact that with natural personal growth and maturation, achieve greater autonomy, greater responsibility and aptitude for study and its management. But from the comparison between the values recorded between the control class and the sample class, a higher value was found for the latter and for each variable in each phase of the experiment (a.s. 2020/2021, 2021/2022, 2022/2023) (figure 9).

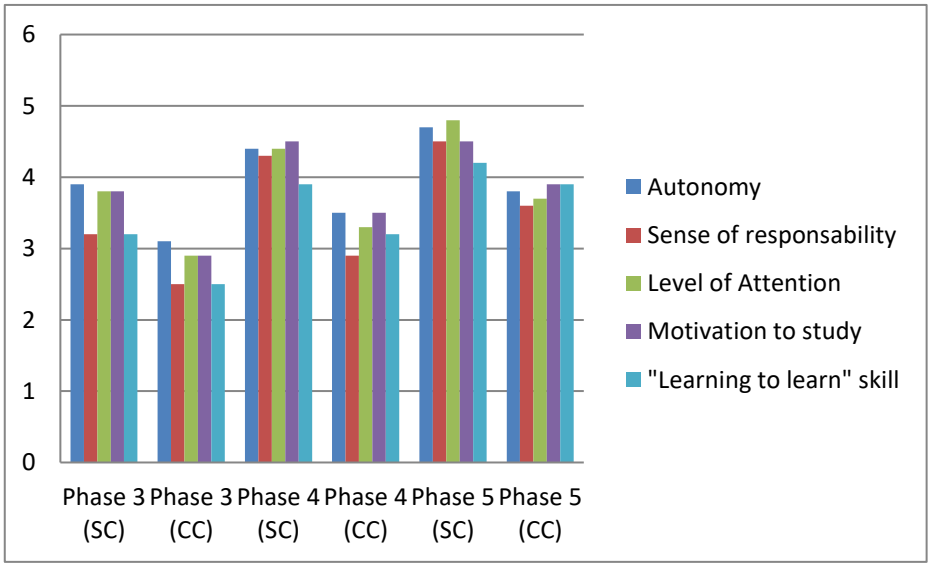

Figure 9 – Stydy Management – a.s. 2020/2021, 2021/2022, 2022/2023 – Phases 3,4 and 5 (SC Vs CC)

This suggests that the presence of an innovative tool such as the interactive and digital box for study management makes the desired objectives achieved more quickly and with better effectiveness and efficiency. A data of considerable importance, in this sense, is that relating to the comparison between the data recorded in the first three phases of the experimentation on the sample class (a.s. 2020/2021) (figure 10).

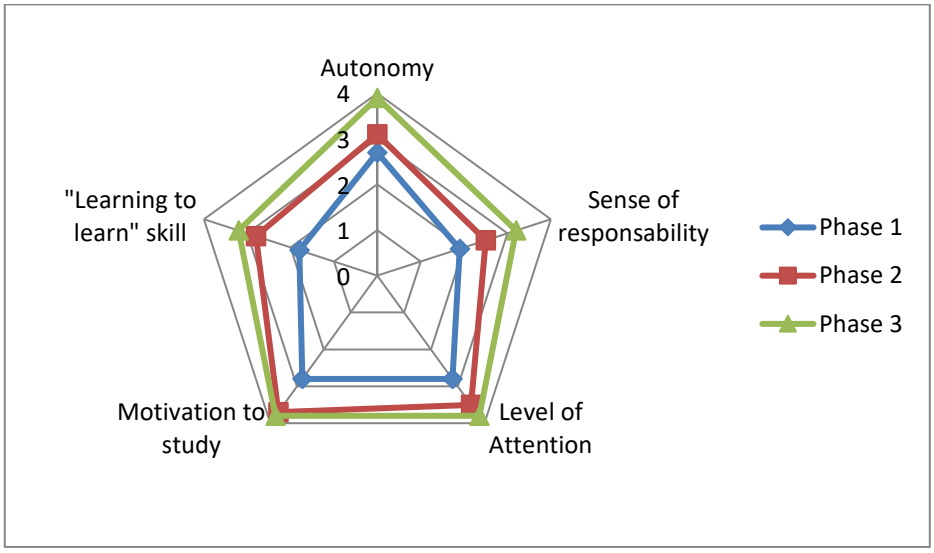

Figure 10 – Study Management – a.s. 2020/2021 (SC)

Already in the second phase it was possible to record an increase in the average values of the variables considered; this suggests that the introduction of the interactive and digital box immediately favored a general improvement in the management of the practice, which maintained a constant evolution in the subsequent phases of the experimentation (a.s. 2020/2021, 2021/2022, 2022/2023) (figure 11).

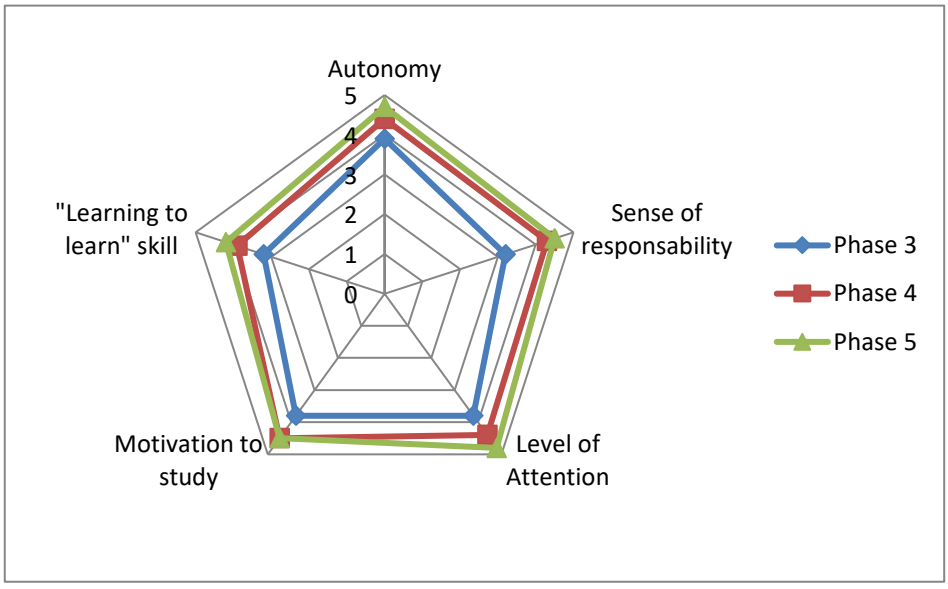

Figure 11 – Study Management – a.s 2020/2021, 2021/2022, 2022/2023 (SC)

Furthermore, since the end of the first year of the three-year period, higher values were recorded in the sample class compared to the control class (a.s. 2020/2021) (figure 12). This is in full agreement with what was recorded in the second phase in the sample class and strengthens the hypothesis that the use of the interactive and digital box allows the achievement of the set objectives with greater speed and effectiveness from the first moments of its use.

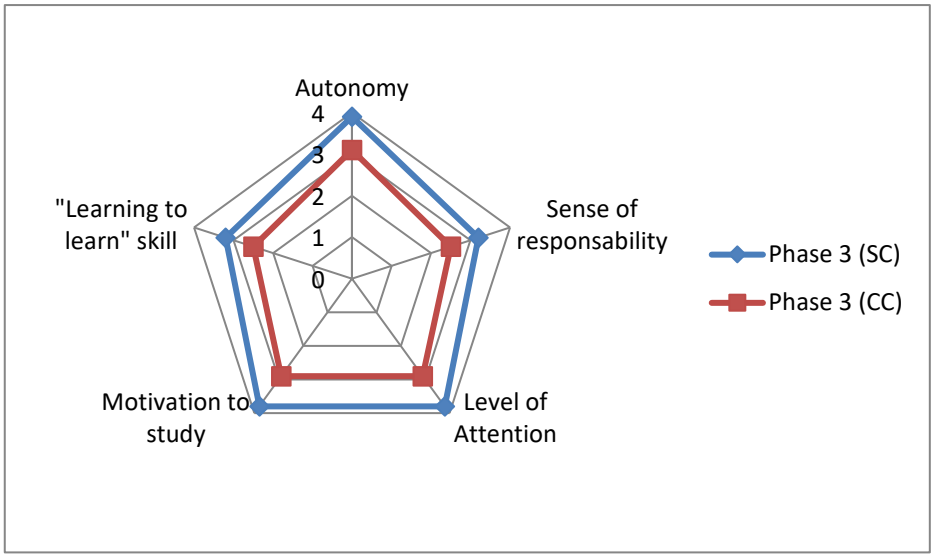

Figure 12 – Study Management – a.s. 2020/2021 – Phase 3 (SC Vs CC)

4. Conclusions, reflections and perspectives

The structuring of the school environment, understood not only as a physical environment, but as a learning environment, plays a fundamental role in promoting *well-being* at school and, without a shadow of a doubt, a comfortable environment favors the delicate *teaching-learning* process (Pietarinen et al., 2014).

The digital, multimedia and interactive box presented in this experimentation can constitute a "furnishing and equipment" of the classroom and for the classroom, for all students and not only for those with special educational needs, with a view to an increasingly effective promotion of scholastic inclusion. It can act as a tool to help the student consolidate their study method, which for students with Specific Learning Disorders can be considered as a "first compensatory measure" (Cajola & Traversetti, 2016), expecially from a bio-psycho-social perspective, as considered by the ICF (Cajola & Traversetti, 2018). The person with disability needs to feel more and more an active part in society, so as to be able to make their contribution to others.

The interactive box for studio management represents a real educational technological tool that can be considered as an alternative way to carry out actions that would otherwise be denied to the "weaker" people.

Technology becomes "special" to the extent that it invites reflection on how to allow everyone to use it and becomes an investment capable of enhancing an individual's capabilities in relation to learning, well-being and health (Carruba, 2015).

What emerged from this study focuses attention on how new technologies in the classroom affect the learning processes of pupils, strengthening those of inclusion (Emili & Gaggioli, 2017), and these environmental factors allow, especially pupils with Special Educational Needs, to “function” as people capable of learning without difficulty, in an environment that promotes well-being and happiness (Ruggiero et al., 2021).

Only in this way school will be the place where everyone could grow and learn equally (UNESCO, 2017) and research will become that innovation capable of offering immediate answers to who is the true

center of the educational process: the student.

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