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Teaching study skills. An inclusive approach to responding to students learning differences

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Abstract – *Student academic achievement is related to knowledge and application of effectivestudy skills. While students with normal development may experience academic difficulties in the absence of an effective study approach, students with special educational needs are at risk drop out. This paper proposes a structured learning approach divided into six steps: predict, read, identify key concepts, reorganize, reflect, recite. Each step involves active learning strategies and extensive flexibility to adapt to the variability of accademic content and individual student differences. It is an operational proposal that fits into the backdrop of Universal Design for Learning and its foundational principles: normalizing individual differences and preparing a multifaceted learning context and, as such, accessible to all.*

Riassunto – *I risultati scolastici degli studenti sono associati alla conoscenza e all'applicazione di abilità di studio efficaci. Se gli studenti a sviluppo tipico in assenza di un approccio efficace allo studio possono incontrare difficoltà scolastiche, gli studenti con bisogni educativi speciali possono persino abbandonare il percorso formativo. Questo contributo propone un approccio strutturato allo studio articolato in sei step: prevedi, leggi, individua i concetti chiave, riorganizza, rifletti, ripeti. Ogni step prevede strategie di apprendimento attive e ampi margini di flessibilità per adattarsi alla variabilità dei contenuti disciplinari e alle differenze individuali degli studenti. Si tratta di una proposta operativa che si inserisce sullo sfondo dell'Universal Design for Learning e dei suoi principi base: la normalizzazione delle differenze individuali e la predisposizione di un contesto di apprendimento multiforme e, in quanto tale, accessibile a tutti.*

Keywords – study skills, cognitive competences, visual tools, metacognitive process, individual learning differences

Parole chiave – abilità di studio, competenze cognitive, organizzatori grafici, processi metacognitivi, differenze individuali nell'apprendimento

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1. Introduction

This paper is based on the concept of school inclusion, understood as a practice that guarantees learning and participation for all[1], and on the concept of diversity and difference as ordinary rather than extraordinary aspects of human development. Based on these assumptions, inclusive teaching approaches should be a fundamental aspect in the preparation of all teachers, not just special education teachers[2]. The European Agency for Special Needs and Inclusive Education has identified four areas of competence necessary for an inclusive teacher: promoting student diversity, supporting all students, collaborating with others, and personal professional development. This paper will focus on the first two dimensions.

The 2018 European Recommendation highlights the need for inclusive teachers to be equipped to effectively address the diverse educational needs of students. However, how to prepare teachers to deal with the variety of individual differences that make up a class is still a challenge nowadays[3]. In a study conducted by Rank and Scholz[4], teachers emphasized the importance of differentiated instruction, but hardly anyone implemented it in school practice. And when there were no students with special education needs in the class, neither the deliveries nor the instructional materials were differentiated, even though some students showed obvious difficulties.

One of the models that most promotes the recognition of individual differences in learning is Universal Design for Learning (UDL). This is a theoretical and operational approach characterized by a flexible and pluralistic educational offer that does not require adjustments because it assumes the different learning styles already in the educational planning phase[5]. The educational proposal presented in this paper, a structured approach to teaching study skills, fits into the background of UDL and its basic principles: the normalization of individual differences and the preparation of a versatile and thus non-restrictive learning context[6].

[1] T. Booth, M. Ainscow, *Index for Inclusion: developing learning and participation in schools*, Bristol, CSIE, 2011.

[2] M. Rouse, I. Florian, *Inclusive practice project: Final report*, Aberdeen, University of Aberdeen, 2012; A.M. Villegas, F. Ciotoli, T. Lucas, *A framework for preparing teachers for classrooms that are inclusive of all students*, in "Teacher education for the changing demographics of schooling: issues for research and practice", 2017, pp.133-148.

[3] S. Griffin, M. Shevlin, *Responding to special needs education: An Irish perspective*, Dublin, Gill and Macmillian, 2007; L. Florian, D. Camedda, *Enhancing teacher education for inclusion*, in "European Journal of Teacher Education", 43, 1, 2020, pp.4-8.

[4] A. Rank, M. Scholz, *Teacher Education for Inclusion*, in "Special Education Needs and Inclusive Practices. An International Perspective", 2015, pp.154-158

[5]CAST, *Universal Design for Learning (UDL) Guidelines version 2.0*, in https://www.cast.org, retrieved on 23.01.2023; G. Savia (a cura di), *Universal Design for Learning. La Progettazione Universale per l'Apprendimento per una didattica inclusiva*, Trento, Erickson, 2016.

[6] T.E. Hall, A. Meyer, D.H. Rose, *Universal Design for Learning in the classroom*, New York-London, The Guilford Press, 2012; A. Meyer, D.H. Rose, D. Gordon, *Universal design for learning: Theory and Practice*, Wakefield, CAST Professional Publishing, 2014.

Student academic achievement is related to knowledge and application of effective study skills[7]. While normally developing students may experience academic difficulties in the absence of an effective study approach[8], students with special education needs are at risk drop out of their education. There is ample evidence that active learning strategies used in the classroom have a positive long-term impact on all students, especially disadvantaged students[9]. Although time management skills in note-taking, testing, reviewing, organizing, and group learning improve students' academic performance[10], few interventions focus on study skills, and students tend to memorize content rather than deeply understand it even when they do well[11].

Thinking back to our experiences in classes, almost all of us could describe ourselves as *readers and reciters*, because our method of learning, from elementary school to college, has always been reading and reciting. We read a paragraph of a book, history, geography, or some other subjects, in some cases underlining the most important information, reading it over and over, and then reciting it out loud, trying to memorize the author's exact words and their order. This is still the most common learning method used by students. Repetition is the key to this method. The first few times the students leaves the book open in order to look it up if memory fails, then with the book closed he forces his mind to recall the content, possibly in the same words. But what are the pedagogical goals that the *reading and reciting student* achieves? What skills is he implementing? Does his method help him to improve the cognitive domain?[12]

The student who reads and recites acquires information and, as far as the cognitive field is concerned, develops short-term memory. In fact, his goal is to memorize as much information as possible for the day of the test. What then? Then the information can take two paths: the path of forgetting if it has not aroused any particular interest in the student, the path of long-term memory if the content has proved to be very motivating[13].

[7] M. Gettinger, J. K. Schurr, *Contributions of Study Skills to Academic Competence*, in "School Psychology Review", 31, 3, 2002, pp. 350-365.

[8] M. Nicaise, M. Gettinger, *Fostering reading comprehension in college students*, in "Reading Psychology", 16, 1995, pp. 283-337.

[9] C. J. Ballen, C. Wieman, S. Salehi, J. B. Searle, K. R. Zamudio, *Enhancing diversity in undergraduate science: Self-efficacy drives performance gains with active learning*, in "CBE-Life Sciences Education", 16, 4, 2017, pp.1-6; E. J. Theobald, M. J. Hill, E. Tran, S. Agrawal, E. Nicole Arroyo, S. Behling, S. Freeman, *Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math*, in "Proceedings of the National Academy of Sciences USA", 117, 12, 2020, pp. 6476-6483.

[10] P. Kudish, R. Shores, A. McClung, L. Smulyan, E. A. Vallen, K. K. Siwicki, *Active learning outside the classroom: Implementation and outcomes of peer-led team-learning workshops in introductory biology*, in "CBE-Life Sciences Education", 15, 3, 2016, pp.1–11; A. J. Sebesta, E. B. Speth, *How should I study for the exam? Self-regulated learning strategies and achievement in introductory biology*, in "CBE-Life Sciences Education", 16, 2, 2017, pp.1-12; C. J. Wienhold, J. Branchaw, *Exploring biology: A vision and change disciplinary first-year seminar improves academic performance in introductory biology*, in "CBE-Life Sciences Education", 17, 2, 2018, pp.1-11.

[11] D. T. Conley, *Rethinking college readiness,* in "New Directions for Higher Education", 144, 2008, pp.3-13; W. Barnes, J. R. Slate, A. Rojas-LeBouef, *College-readiness and academic preparedness: The same concepts?*, in "Current Issues in Education", 16, 1, 2010, pp. 3-13.

[12] C. Vedovelli, *Insegnare a studiare con il metodo PLKey3R. Dallo studente "leggi e ripeti" al "thinking student"*, Roma, tab edizioni, 2022.

[13] *Ivi.*

Nowadays, with the constant growth of knowledge and technological progress, the simple transmission of content has lost its pedagogical meaning. Content is available online anywhere, anytime, but the network of knowledge has become denser and the nodes of relationships have multiplied exponentially. To navigate it, you need to be good at selecting and reorganizing information according to your needs or interests. Cognitive flexibility is required to constantly update knowledge and revolutionize the thought patterns. In light of all this, the student who only reads and recites comes across as anachronistic, unresponsive to the demands of their time, and fails to develop skills that can be transferred to other contexts.

Some teachers expect students to spontaneously apply effective study skills and believe they should not spend time teaching or improving them[14]. Others would like to teach them intentionally but do not know how because they do not have the teaching tools to do so. Teaching effective learning requires teachers trained in the components of study skills, the specifics of cognitive functioning of students with SEN (Specific Educational Needs), and active learning strategies.

Several theoretical perspectives demonstrate the importance of teaching study strategies to students in order to improve their learning and academic performance. The most comprehensive approach to study skills comes from the information processing model, which assumes that the knowledge to be learned is manipulated by the student to improve its internalization and memorization[15]. The extent to which content is elaborated is influenced by the type of study strategy used by the student. The more sophisticated is the strategy, the deeper is the level of elaboration. Within this model, the development of study skills is conceptualized as strengthening cognitive processes across many information processing systems[16].

Based on these assumptions, this paper proposes a structured approach to study that, starting from the critical analysis of the advantages and limitations of structured methods[17], integrates the PQ4R model of Robinson and Thomas[18] with the theoretical and practical proposal of the visual tools of David Hyerle[19] and the method of cognitive enhancement of Feuerstein[20]. The approach, called PLKey3R, is divided into six steps: Predict, Read, Identify Key Concepts,

[14] B. J. Zimmerman, *Academic studying and the development of personal skill: A self-regulatory perspective*, in "Educational Psychologist"*,* 33, 1998, pp. 73-86.

[15] D. Adams, M. Hamm, *New designs for teaching and learning: Promoting active learning in tomorrow's schools*, San Francisco, Jossey-Bass, 1994; M. Gettinger, M. Nicaise, *Study skills*, in G. G. Bear, K. M. Minke, A. Thomas (Eds.), *Children'sneeds II: Development, problems, and alternatives,* Bethesda, MD, National Association of School Psychologists, 1997, pp.407-418; S. Harvey, A. Goudvis, *Strategies that work:Teaching comprehension to enhance under standing,* York, ME, Stenhouse, 2000; D. H. Schunk, *Learning theories: An educational perspective,* Upper Saddle River, NJ, Prentice-Hall, 2000.

[16]D. H. Schunk, *Learning theories: An educational perspective,* cit.

[17] C. Cornoldi, R. De Beni, Gruppo MT, *Imparare a studiare. Strategie, stili cognitivi, metacognizione,atteggiamenti nello studio*, Trento, Erickson, 2015[2].

[18] E. L. Thomas, H. A. Robinson, *Improving reading in every class: a sourcebook for teachers*, Boston, Houghton Mifflin, 1972.

[19] D. Hyerle, *Thinking Maps: Visual Tools for Activating Habits of Mind*, in A.L. Costa, Kallick, B. (Eds), *Learning and Leading with Habits of Mind: 16 Essential Characteristics for Success*, ASCD, 2008, pp.149-174.

[20] R. Feuerstein, R. S. Feuerstein, L. Falik, Y. Rand, *Il Programma di Arricchimento Strumentale di Feuerstein*, Trento, Erikson, 2008.

Reorganize, Reflect, Recite. Each step involves the use of active and co-constructive learning strategies and a wide range of flexibility to adapt to the variability of disciplinary content and the particular educational needs of students[21].

The method springs from a pedagogical vision that seeks to unfold in a concrete pedagogical act: to transform the time spent studying accademic content into a space for building cognitive skills that can be generalized to different contexts.

2. Framework

Study skills encompass a set of coordinated cognitive abilities and processes that improve the effectiveness and efficiency of student learning[22]. The AMOS 8-15 test, which assesses study skills and motivation[23], identifies seven components involved in study activity: motivation, organization, elaboration, flexibility, concentration, anxiety, and attitude toward school. The motivation component presupposes the concept of intentionality, since learning requires an intentional and conscious effort, an act of will that needs motivational elements to be initiated and sustained. The components of organization and concentration fall within the broader dimension of self-regulation, which refers to the operational functioning of the learner: initiative, persistence, goal setting, planning are essential subcomponents of learning activity[24] that we often find impaired and poorly functioning in students with SEN.

The processing component is the one that is most sensitive to individual differences in both cognitive functioning and learning style, thus requiring the teaching of a variety of learning strategies to address differentiated needs.

Over the past thirty years, researchers and teachers have developed a variety of theoretical and practical proposals to assist students in acquiring an effective study method. We can schematically divide these studies into three major groups: studies that focus on the implementation of the cognitive skills that underlie the study ability, especially on information processing and memory strategies[25], mnemonics[26], metacognitive-motivational strategies[27]; studies that propose specific study strategies for students with learning difficulties related to intellectual disabilities[28] and specific disorders[29]; studies that propose structured learning programs, step-by-step paths for the student to follow from reading to memorization, with specific cues for each stage.

[21] C. Vedovelli*, Insegnare a studiare con il metodo PLKey3R. Dallo studente "leggi e ripeti" al "thinking student",* cit.

[22] T. G. Devine, *Teaching study skills: A guide for teachers,* Boston, Allyn and Bacon, 1987.

[23] C. Cornoldi, R. De Beni, C. Zamperlin, C. Meneghetti, *Test AMOS 8-15. Abilità e motivazione allo studio: prove di valutazione per ragazzi dagli 8 ai 15 anni,* Trento, Erickson, 2022

[24] B. J. Zimmerman, S. Bonner, R. Kovach, *Developing self-regulated learners: Beyond achievement to self-efficacy,* Washington, DC, American Psychological Association, 1996.

[25] W. Schneider, M. Pressley, *Memory development between 2 and 20*, New York, Springer-Verlag, 1989.

[26] K. L. Higbee, *Your Memory: How it Works and how to Improve it*, New York, Marlowe, 2001.

[27] R. De Beni, A. Moè, *Motivazione e apprendimento*, Bologna, il Mulino, 2000.

[28] C. Cornoldi, B. Caponi, *Memoria e metacognizione*, Trento, Erickson, 1991.

[29] G. Stella, L. Grandi, *Come leggere la Dislessia e i DSA*, Firenze, Giunti Scuola, 2011.

One of the earliest and best known structured methods called PQ4R was published by Robinson in 1961 and updated by Robinson and Thomas in 1972. Each letter represents the beginning of the six steps that students are a expectid totake: 1. *preview*, preliminarily skim the text to identify the main topics, the sections that make it up, and the figures and graphs; 2. *questions*, ask questions about the text; 3. *read*, read the text and try to answer the questions formulated; 4. *reflect*, think about what you have read, look for examples, relate the new information to what you already have; 5. *recite*, repeat what you have read and the answers given; 6. *Review* , general revision the content[30].

This method, like other structured programs that include a sequence of steps, has undeniable advantages: it traces all the moments of the study process, from opening the book to verbalization; it includes specific strategies for each stage of the process; it provides precise guidance to teachers who want to supportstudents in acquiring an effective study method.

However, Cornoldi[31] highlights the limitations of structured methods. First of all, knowing a method does not mearn being able to put it in practice. Awareness of its usefulness, motivation, desire to engage, knowledge of when and how to apply the method are also necessary. In addition, reference to a learning method adds an additional burden, at least in the learning phase of the method itself: students often perceive the methods as too complicated or too structured, they do not remember the different phases or what to do in each case; it takes a lot of practice to internalize the steps of the method; finally, any structured method carries the risk of excessive rigidity: If it is not flexible enough to be applied to different types of texts or information, or if it does not take into account the specific characteristics of the learners, it will very soon be abandoned by both the students and the teachers themselves.

The application and effectiveness of a structured method can be improved by proper study strategies. Indeed, a study strategy does not correspond to a step mechanical repetition,but involves the way a person thinks and acts when planning and evaluating their learning behavior. It is about knowing how to study, making decisions about the choise of proper study techniques, and taking responsibility for their own learning. Students with good study skills know their own learning style, how to use a variety of techniques depending on the goal, how to perform them in a planned sequence, and how to monitor their use depending on the learning situation[32].

The visual tools model, first proposed by David Hyerle in 1996[33], offers an interesting way to combine structured models for teaching study skills with a strategic approach. Graphic organizers, as tools for visually organizing knowledge, are proposed in teaching to promote meaningful learning and develop cognitive skills that enable students to select, reorganize, and critically rethink knowledge. Through these tools, students better memorize accademic content because they rework it, integrating it into a more complex web of knowledge in which it acquires meaning

[30] E.L. Thomas, H.A. Robinson, *Improving reading in every class: a sourcebook for teachers*, cit.

[31] C. Cornoldi, R. De Beni, Gruppo MT, *Imparare a studiare. Strategie, stili cognitivi, metacognizione, atteggiamenti nello studio*, cit.

[32] M. Gettinger, J. K. Schurr, *Contributions of Study Skills to Academic Competence*, in "School Psychology Review", 31, 3, 2002, pp. 350-365.

[33] D. Hyerle, *Visual Tools for Constructing Knowledge*, Alexandria, Association for Supervision and Curriculum Development, 1996.

and significance. The level of comprehension required when studying a piece of school content does not result from the sum of implicit and explicit information in the text; rather, it requires that the connections be understood, that the information be reassembled into a meaningful whole[34].

However, in schools, graphic organizers of knowledge are often used in a way that is "approximate, simplistic, and counterproductive from a pedagogical perspective"[35]. For example, maps are downloaded from the Internet or created by teachers to simplify study content. Even when elaborated by students, they do not follow a common syntax that highlights their logical matrices (ibid.). But a visual knowledge organizer is not a cognitive facilitator, but "represents a maturation process based on awareness of the complexity of one's learning processes"[36]. It is an intensive work of comparison, selection, deconstruction and reconstruction, organization, and critical linkage through which students become experts and develop lifelong necessary habits of thought (Hyerle, 2008)[37].

Hyerle groups the total of about 400 graphic organizers into eight categories, each of which corresponds to a thinking process or cognitive operation: contextualize, describe, compare, classify, analyze (whole/partial), sequence, identify cause and effect, find analogies (Fig.1).

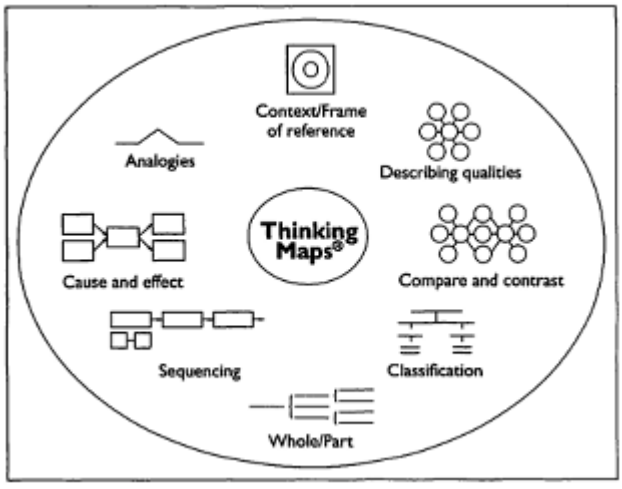

Figure 1 – "The types of visual tools", from: A.L. Costa, B. Kallick, Learning and leading with habits of mind: 16 essential characteristics for success, ASCD, 2008

Each organizer is a form of deconstruction and reorganization of knowledge that visually represents a thought process. As such, it develops the metacognitive functions of the mind that

[34] M. Della Casa, *I generi e la scrittura*, Brescia, La Scuola, 2003.
[35] F. Fogarolo, M. Guastavigna, *Insegnare e imparare con le mappe*, Trento, Erickson, 2013, p.10.
[36] *Ivi*, p.14.
[37] D. Hyerle D., *Thinking Maps: Visual Tools for Activating Habits of Mind*, cit.

allow one not only to examine their own thoughts, but also to see, compare, discuss, and share the thoughts of others.

The teacher guides students in the use of graphic organizers depending on the type of content/task being worked on or the learning objectives. Students discuss which organizer to use and why.

According to Hyerle, the use of visual tools in learning encourages the development of habits such as: perseverance, control of impulsivity, accuracy, clear and concise communication. The structures that visual tools suggest allow the student to approach the task systematically, organize ideas and stay focused. Therefore, the teacher, activating the relationship between theirstudent and knowledge through the visual organizers of thought, is involved in a learning process that takes place before his eyes. As he works with the student on historical, geographic, or scientific content, he can observe how the student gathers, analyzes, evaluates, transforms, and then uses information during a discussion, presentation or review. He can observe the student's cognitive functions, in terms of intellectual ability, behavior, attitude, orientation: something that the person expresses or manifests when they think, and in which the act of thinking takes shape and becomes externally legible[38]. The teacher can observe the mental operations that come into play, the strategies that are spontaneously implemented, those that instead need to be corrected or integrated, the strengths and the areas that need to be monitored with more intense mediation or with more conscious self-control.

Aware that monitoring students' cognitive functions during learning is a very complex process that the teacher can face only with full awareness of its limits, the list of cognitive functions proposed by Feuerstein[39] can be considered a useful teaching tool for this purpose. The model proposed by the scholar may not be exhaustive, he himself refers to it as a dynamic tool subject to changes and additions depending on the progress of the research process, but it has undeniable advantages for its practicality and immediate applicability in teaching situations.

Feuerstein proposes to identify three basic moments in any thinking process: 1. an *input* phase in which the student, confronted with the problem or task to solve, collects data and information; 2. a central phase, *elaboration*, in which the learner elaborates, selects, compares the collected data, uses the information possessed; 3. a final phase, *output*, in which the student provides the result of the processing and communicates the answer.

According to the proposed model (Fig. 2), in each of the three phases the individual brings into play certain cognitive functions that determine the quality of the act of thinking or, on the contrary, whose lack or insufficiency leads to errors. From this perspective, the teacher's intervention consists in analyzing thinking by breaking it down into its three phases in order to identify the cognitive functions involved in each of them[40].

[38] R. Feuerstein, R. S. Feuerstein, L. H. Falik, Y. Rand, *LPAD: Learning Propensity Assessment Device. Batteria per la Valutazione Dinamica della Propensione all'Apprendimento di Reuven Feuerstein,* Trento, Erickson, 2013.

[39] R. Feuerstein, R. S. Feuerstein, L. Falik, Y. Rand, *Il Programma di Arricchimento Strumentale di Feuerstein*, Trento, Erickson, 2008.

[40] R. Feuerstein, R. S. Feuerstein, L. H. Falik, Y. Rand, *LPAD: Learning Propensity Assessment Device. Batteria per la Valutazione Dinamica della Propensione all'Apprendimento di Reuven Feuerstein,* cit.

INPUT	ELABORATION	OUTPUT
Clear perception Systematic and not impulsive exploration Have appropriate terminology Spatial and temporal orientation Maintaining object constancy Simultaneous consideration of several pieces of information You need precision and accuracy	Perception of the existence of a problem and its definition Distinction between relevant data and irrelevant data Spontaneous comparative behavior Size of the mental field Planning behavior Necessity of logical thinking Internalization Hypothetical thinking Identify strategies for testing hypotheses Elaboration of cognitive categories Summative behavior	Egocentric communication Reduce the trial and error approach Control impulsivity Overcome blocking situations Need for accuracy and precision in the transmission of responses Sufficient visual implementation Projection of virtual relationships

Figure 2 – "List of cognitive functions", from:
R. Feuerstein, R.S. Feuerstein, L. Falik, Y. Rand,Il programma di Arricchimento Strumentale, cit.

In the next paragraph (Fig. 6), an adaptation of Feuerstein's list of cognitive functions to the PLKey3R method is proposed, which can assist the teacher in observing the student engaged in a subject content.

3. The PLKey3R model

The PLKey3R model arises from an attempt to preserve the advantages of structured methods by integrating a strategic approach. To this end, the PQ4R model of Robinson and Thomas is integrated with the theoretical and didactic proposal of the visual tools of David Hyerle and Feuerstein's list of cognitive functions.

The method is divided into the following phases[41]:

[41] C. Vedovelli, *Insegnare a studiare con il metodo PLKey3R.Dallo studente "leggi e ripeti" al "thinking student"*, cit.

1. *Predict*: preliminary browsing of the text to identify the main themes, identification of the sections that compose it, examination of the illustrations and graphics. In other words: identifying the knowledge anticipators[42].

In this phase, the teacher asks the students to look at the pages of the text they want to work on for a few minutes, but forbids them to read them completely. To counter students' habit of reading without having looked at the page as a whole, the teacher sometimes offers the page of the book in digital format through the digital whiteboard and masks all written parts (except the title and subtitle).

The teacher sets a timer to extend the time for reflection and curb impulsivity. During this time, students can only think silently and keep their eyes on the task: they arenot allowed to speak or raise their hands to ask questions. The default is for them to look at the pictures, graphics, titles, and subtitles. When the timer rings, students describe the items they observed while the teacher writes what they said on the board. The purpose of this phase is to anticipate the topic being covered in the text and to elaborate as much as possible. If the teacher feels that the information gathered is insufficient, she can suggest watching a video, at the end of which she will ask the students to integrate the information noted on the board. The teacher can ask students to collect similar information or information that falls into the same typology and to group them with relative labeling. This is an anticipation of the categorization process that will be explored in the *key* stage.

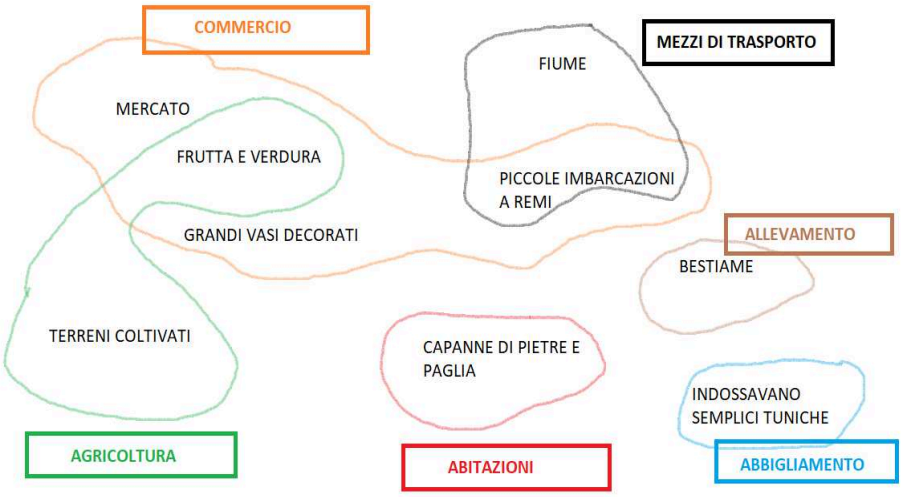

Figure 3 – "Example of collecting information on the board and starting the categorization process"

[42] D. P. Ausubel, *Educazione e processi cognitivi: guida psicologica per gli insegnanti*, Milano, FrancoAngeli, 1978.

This is a very motivating phase for students, especially those with dyslexia, because the visual channel is more involved through pictures. Students with reading difficulties participate enthusiastically, contributing to the class community and strengthening their sense of self-efficacy and self-esteem. Moreover, this phase strengthens systematic approach to the task and hypothetical thinking, both cognitive functions often lacking in students with specific learning difficulties.

2. *Reading*: this phase consists of two moments:

– global reading: to read the text from beginning to end without pausing;
– analytical reading: to read each paragraph, checking if you understand the content and underlining the most important information.

The reading phase is a moment that students do individually. It requires silence, a relaxed, tension-free atmosphere, and no time constraints. One of the logistical organizations that facilitates this phase is to distribute students in spaces adjacent to the classroom: some can settle in the hallways, others on the stairs, still others in empty classrooms. Everyone can find a space where they can concentrate. The teacher alternates between the different reading stations. Allowing all students to do some phases of work individually or peer to peer in spaces outside the classroom normalizes the pull-out phenomenon, that is all situations in which students with special educational needs spend part of the school day outside the classroom[43].

It is a phase in which it is important to respect the times and peculiarities of each one. Students with specific learning difficulties read the text from the digital book using speech synthesis or, alternatively, can work in pairs with a partner reading to them. At the end of the reading, students gather in the classroom and, sitting in semicircle, they discuss and debate unclear concepts, supported by the teacher's mediation. In this phase, discussion and confrontation can flow freely without the teacher providing structure. Thus, unexpected thoughts or connections can emerge and critical and creative thinking can flourish.

3. *Key*: write keywords or categorize.

This is a crucial stage that is fundamental to reorganizing the information later. The teacher asks students to find a keyword for each paragraph that summarizes the content. This is a complex cognitive process that involves formulating higher-level concepts.

In this phase, students work in groups of two or three to discuss the appropriateness of the key concepts. They have small sticker notes available on which they write the identified key

[43] S. D'Alessio, *Inclusive Education in Italy. A Critical Analysis of the Policy of IntegrazioneScolastica*, Rotterdam, Sense Publishers, 2011; D. Ianes, H. Demo, F. Zambotti, *Integration in Italian schools: Teachers' perceptions regarding day-to-day practice and its effectiveness*, in "International Journal of Inclusive Education", 18, 6, 2013, pp. 626-653.

concepts, which they stick next to each paragraph. Students using digital texts can also write the keywords on PDF. The teacher may also suggest identifying a key image, a small symbol drawn on thesticky note next to the word "container". This variation is appreciated by students with SLD (Specific Learning Disorder) and favors the categorization process for students with a visual learning style by pictures.

Figure 4 – "Categorization through the use of sticky note"

This is the phase of categorization, an inductive process in which, given a set of information contained in a paragraph, students identify a concept that defines it, labels it. During the *key*phase, the value of discovery prevails, the comparison between students who sharethe most appropriate label.

The metaphor that best reflects this phase is that of arranging information in the drawers of the brain: information of the same type is kept in the same drawer, on which a label is placed to remember its contents. Ordering allows you to reduce the complexity of stimuli, expands the mental field and promotes memorization. The insistence on the process of categorization favors the cognitive improvement of students with borderline functioning, who often have an episodic representation of reality.

4. *Reorganize*: create a reorganizing graphic representation of the identified concepts and their relationships.

The teacher suggests three or four graphic representations and opens discussion about the possibility of using one of the graphics rather than another. The graphic representations selected by the teacher can be displayed on the digital whiteboard or laminated in large sheets

and hung on the wall. It is advisable that, in order to stimulate class discussion, the teacher proposes both organizers unsuitable for the content being covered and suitable organizers.

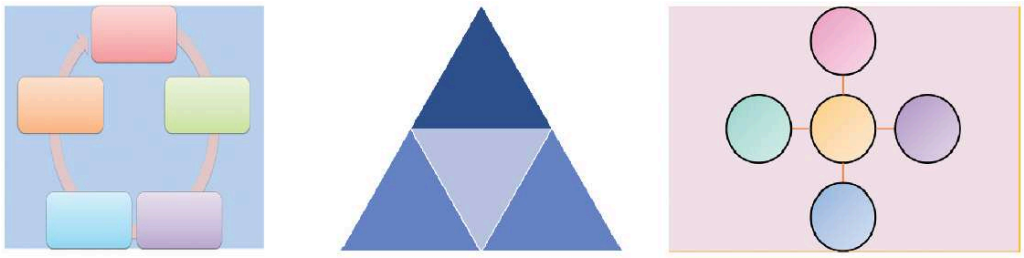

Figure5 – The teacher asks, "Wich of these graphic tools do you think is moresuitable for the text you are analyzing?"

The final selection of students must respond appropriately to the text typology and the specific content on which they are working. The key terms identified and their relationships will be a basic reference at this stage. Students must clearly justify their choices, including the reasons why they exclude one graphic resource and not another.

If students disagree, the teacher, after assessing the validity of the proposed arguments, may allow the use of different graphic tools.

Once the choice is made, students reconstruct the organizer on the notebook and add the information and pictures. Students with SLD reconstruct the chosen visual tools on Power Point and complete it on PC. This choice can be extended to all students if the teacher deems it appropriate. The same indication may include students with visual-spatial impairments. Alternatively, it is advisable to provide the visual tools already printed with the blank geometric areas.

It is a central phase in the information processing process that involves de-construction and reconstruction of knowledge. It favors the projection of relationships between contents or concepts, a planning behavior and a better internalization. The visual dimension supports students with specific learning disorder, language difficulties, or borderline cognitive functioning by making knowledge tangible and actionable.

5. *Reflect*: think about the type of cognitive effort the task requires.

In this phase, the teacher uses Feuerstein's list of cognitive functions adapted from the PLKey3R method (Fig. 6).

METHOD PHASE	COGNITIVE FUNCTIONS
PREDICT	Clear perception Systematic and not impulsive exploration Possession of an adequate terminology Hypothetical-inferential thinking
ANALYTICAL READING	Differentiation between relevant and irrelevant data Perceiving/defining/understanding content
KEY	Elaboration of cognitive categories
REORGANIZE	Comparative behavior Logical reasoning Establishing relationships Planning and organizing behavior
REFLECT	Internalization (concepts, relationships, procedures...) Definition of the required cognitive effort
RECITE	Use of appropriate lexical concepts Non-egocentric communication Overcoming blocking situations

Figure 6 – "List of Feuerstein cognitive functions adapted to the PLKey3R method"

After identifying the cognitive functions associated with the task from the list, the teacher asks students to think about the type of engagement they have been subjected to:

"At what stage of the work did you encounter most difficulties? And why? What obstacles did you have to face? How did you overcome them?"
"What is the difference between this way of learning and the traditional way of reading and reciting? What are the advantages of bothmethods? "
"What was the greatest cognitive effort you made? Do you think this increased your intelligence? Why?"

The aim of the discussion is to make students reflect metacognitively on the cognitive effort made during the learning activity, on the strategies used in each phase, on the possibility of

flexible use of the method according to the content and their own learning style. It is a moment of discussion in which students can reveal their difficulties and their strengths, and find out between the phases and the different strategies what best supports their learning.

6. *Recitation*: presentation of the discussed topic to the classmates.

In this phase, the students present the topic they have worked on to their classmates: they project their complete visual tools on the digital whiteboard and explain its contents. Special attention is given to the use of clear, non-egocentric and very specific language, as well as verbal and non-verbal communication skills.

This phase is designed as a real moment of competence verification. It is the teacher's task to embed it in an authentic and realistic context, preferring varied situations for the presentation of the studied topics. One of them is the organization of lessons by the students for the learners of lower or parallel classes.

In order for the model to be properly applied, the teacher must respect some methodological constraints:

– the constant testing of the phases of the method in class over a long period of time (two or three school years) through the teacher's mediation;
– the flexible application of the phases of the method: in response to the content covered or to specific training needs, the teacher will be able to give more space to one or another phase or even change its order;
– the introduction of low-tech or high-tech compensatory tools for students with specific learning disabilities.

The goal is that after practicing the method for a long time, students will automate and internalize the phases so that they can use them naturally and effortlessly.

4. Conclusion

Every day, teachers encounter students who do not meet expected goals, who do not seem to learn, or who seem to learn very slowly and poorly. And often the teachers' sense of helplessness and frustration, the parents' disappointment and dissatisfaction, feed an experience of inability and inadequacy in the students that reverberates in other contexts. The efforts of teachers, educators, and parents have gradually focused on one central question: What do children and youth need to succeed in school, work, and life in general?

The profound changes that reality has undergone in recent decades have meant that the factors that made a person a winner in the past are not the same factors that make theirwinners nowadays. Schools are called upon to overcome the fictional dimension because content has lost its traditional educational value. Students should be encouraged to develop cognitive skills that will help them navigate and succeed in a complex and constantly changing reality. Teachers who want to meet this challenge must redefine their teaching strategies by adopting approaches

that effectively address individual differences in learning and thus the variability of students' learning needs. The idea is to create diverse, multifaceted, and flexible learning contexts that are accessible to all from the beginning, without the need for later adjustments (Demo and Veronesi, 2019)[44]. These are the basic principles of the theoretical and operational model of Universal Design for Learning that inspire the educational proposal in this article.

The contribution aims to provide teachers with a teaching method that counteracts the habit of memorizing concepts and promotes the development of generalizable cognitive skills. It is a structured approach to study called PLKey3R from the beginning of each phase: predict, read, identify key concepts, reorganize, reflect, recite. The purpose of the proposal is offering to teachers a toolbox, a structured but flexible method with tools that can be adapted to different subject areas and to individual learning differences. Each phase focuses on a different component of the complex study process and is presented as a flexible and plural path. Each student, based on their own learning style, will tend to derive greater benefit and therefore focus on one phase rather than another, in some cases changing the order of the phases and in others integrating digital tools.

The PLKey3R educational model aims to facilitate the transition from a *reading and reciting* student to third millennium student: a reflective, systematic student who selects information, rearranges it, deconstructs and restructures knowledge, modifies his own thinking patterns, questions himself, hypothesizes and plans[45]. The model effectively addresses to variability of individual differences and enables teachers to use it in the school setting to significantly improve study strategies, learning, and automation of effective thinking processes. It provides clear and simple guidance that allows for immediate application in classroom practice to teach cognitive skills through accademic content.

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