SYSTEMATIZING FLEXIBILITY IN INSTRUCTIONAL DESIGN: EQUIPPING SUPPORT TEACHERS FOR THE UNIVERSAL DESIGN FOR LEARNING PARADIGM

METTERE A SISTEMA LA FLESSIBILITA' NELLA PROGETTAZIONE DIDATTICA: LA FORMAZIONE DEGLI INSEGNANTI DI SOSTEGNO AL PARADIGMA DELL'UDL

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ABSTRACT

In response to the increasing heterogeneity of school classrooms, Universal Design for Learning (UDL) emerges as a promising framework for implementing inclusive teaching practices. Although UDL provides detailed guidelines, many teachers remain sceptical and report significant challenges in applying the model effectively. Within the Specialization Course for Support Teaching at the University of Florence, a tool was introduced to 127 Lower Secondary School teacher trainees, aimed at supporting both instructional design and reflective practice through a UDL lens. This article presents the preliminary results of the experience.

Di fronte alla eterogeneità delle classi nella scuola, l'Universal Design for Learning (UDL) appare una soluzione per condurre interventi inclusivi. Benché il metodo offra linee guida dettagliate, molti docenti continuano a mostrare scetticismo e a rilevare difficoltà nella sua applicazione. All'interno del Corso di Specializzazione per Attività di Sostegno dell'Università degli Studi di Firenze, quindi, è stato proposto a corsisti della Scuola Secondaria di Primo Grado (N=127) uno strumento che supporta la progettazione e la riflessione in ottica UDL. L'articolo presenta i primi risultati.

KEYWORDS
Universal Design for Learning; inclusion; special education teachers. Lower Secondary School; inclusione; insegnanti specializzati; Scuola Secondaria di Primo Grado.

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1. Flexibility as a Systemic Element in Instructional Design

Didactic flexibility has long been considered a core principle to be followed in order to respond effectively to the heterogeneity of learners, in all educational and training contexts, particularly in schools (Cottini, 2017; Domenici, 1998; OECD, 2018; Tessaro, 2014).

Heterogeneity concerns a multiplicity of identity dimensions (e.g., gender, language, social role, spiritual values) and the various domains that define quality of life (e.g., physical well-being, material well-being, emotional well-being, self-determination, social inclusion, etc.) (Bakas et al., 2012; Ferrans, Zerwic, Wilbur, & Larson, 2005; Schalock & Verdugo Alonso, 2002; Wilson & Cleary, 1995).

Following the development of the social model of disability (Oliver, 1991), Disability Studies (Shakespeare, 2013), and in particular Disability Studies in Education (Baglieri, Valle, Connor, & Gallagher, 2010), emphasize how school can either reinforce or reduce inequalities that originate from the interaction between individuals and disabling environments. Meanwhile, neuroscience acknowledges that every human being has a specific and unique cognitive functioning, which can be clearly observed through the activation of different brain areas involved in learning processes (CAST, 2018; 2024). Moreover, many international frameworks— including the International Classification of Functioning, Disability and Health (WHO, 2001), adopted in educational contexts — agree on the need to move beyond diagnostic and categorical logics, and to adopt a functioning-based perspective, which better represents the uniqueness of interaction and participation through which everyone inhabits and defines life contexts, including educational ones.

In the first decade of the 2000s, the concept of “super-diversity” emerged through the work of Vertovec (2007), to describe an additional layer of complexity that especially characterizes contemporary societies, deeply transformed by global migration flows. Unlike the traditional multicultural perspective, super-diversity does not simply refer to the coexistence of multiple cultures but focuses on the stratifications and dynamic interconnections of differences, arising from circular and transformative interactions between migrants and local communities. From this perspective, belonging is no longer unidimensional or tied to a single community, but becomes plural and fluid, involving groups, networks, and collectivities of various origins. These dynamics have simultaneous effects at the

individual level — through the renegotiation of identity — and at the systemic level, by prompting society to respond to cultural changes through normative and organizational transformations. The term “super-diversity”, with its reference to complex realities, is interpreted by some — through semantic extension — as a concept that effectively encompasses any form of heterogeneity, including prior life experiences, personal preferences, multiple impairments, diverse educational trajectories, and the different modes of functioning of everyone (Zoletto, 2023).

The school system, institutionally entrusted with the education and instruction of new generations — particularly in Italy, that adopted inclusion as a foundational commitment — faces this complexity on a daily basis. It does so by following ministerial regulations and guidelines, engaging with studies and proposals from the scientific community, and relying on the capacities and beliefs of teachers working in the field.

The various perspectives seem to converge in terms of their goals, all aimed at promoting the educational success of each learner within the classroom group: “The school of the new millennium takes into account two equally important dimensions: on one hand, the care and duty to recognize the uniqueness of individuals and to respect their originality; on the other hand, the ability to design personalized educational pathways within the classroom context, in a delicate balance between the individual and the group. […] Whenever the school institution loses sight of the person in favor of the system, or viceversa, it risks becoming an ‘instrument of increasingly irreversible differentiation’ (Scuola di Barbiana, 1967)” (MIUR, 2018).

Unfortunately, despite the stated principles, instructional activities are often still strongly influenced by teachers’ naïve beliefs, personal convictions, and cognitive frameworks. The evidence produced by scientific research — based on coherent theories, tested through replicable practices, and filtered from the effects of individual biases — is sometimes unknown, or known but disregarded in the name of a misunderstood sense of teacher autonomy and an overestimated, yet inherently limited, personal experience (Calderhead, 1996; Trinchero, 2017; Menichetti, Pellegrini, & Gola, 2019).

Didactic flexibility, in particular, should not be reduced to residual, ex-post adjustments of designs conceived for an unlikely “average learner,” nor should it be entrusted to the teacher’s spontaneity, renouncing conscious instructional

planning to passively respond to every student request. To overcome this logic of improvisation, the school, as a learning organization (Argyris & Schön, 1996), must adopt a systemic approach, involving processes, tools, and people, within a quality assurance framework.

The study presented in this contribution follows this orientation, aiming to prepare teachers for the use of a method whose effectiveness has been recognized by the scientific community, to support practice with a tool that remains accessible to teachers, and to stimulate professional reflection through guiding questions.

The Universal Design for Learning (UDL) paradigm, developed at the end of the last century, proposes responding to heterogeneity through universal design, that is, a multifaceted approach to educational designing. In this model, instructional design does not rely on a single method but is conceived from the outset to offer a multiplicity of options and pathways, taking into account the various ways individuals may perceive and represent information, act and express their knowledge and skills, and become engaged and motivated in learning tasks (Meyer, Rose, Gordon, 2014; Novak, 2022; Rose & Mayer, 2002). According to UDL advocates, such design is feasible on a daily basis and in any context, provided that its three key principles are respected: (i) the principle of representation; (ii) the principle of action and expression; (iii) the principle of engagement. However, the operational guidelines, although well-motivated, clearly articulated, and thoroughly documented, are still perceived by many as difficult to implement, if not outright utopian (Murawski & Novak, 2021).

At the University of Florence, during the ninth cycle of the Specialization Course for Support Activities[1], in the first semester of 2025, an effort was made to promote among pre-service teachers a systematic approach to flexibility based on the

[1] The courses are organized pursuant to two main decrees: a) D.M. 30 settembre 2011. Criteri e modalità per lo svolgimento dei corsi di formazione per il conseguimento della specializzazione per le attività di sostegno, ai sensi degli articoli 5 e 13 del decreto 10 settembre 2010, n. 249 (Criteria and procedures for conducting training courses for the attainment of specialization for support activities, freely translated by the author); b) D.M. 30 settembre 2019. Disposizioni concernenti le procedure di specializzazione sul sostegno di cui al decreto del Ministro dell'istruzione, dell'università e della ricerca 10 settembre 2010, n. 249 e successive modificazioni (Provisions concerning the specialization procedures for support as per the decree of the Minister of Education, University and Research dated September 10, 2010, no. 249 and subsequent amendments, freely translated by the author).

principles of UDL. This was supported through the adoption of a planning tool, developed by adapting the models of Johnson and Cornelius (2021) and Murawski and Novak (2021). The participants were only partially in-service teachers; they were attending the course in order to obtain specialization for teaching in classrooms where at least one student has a certified physical, mental, intellectual, or sensory disability. This article presents the tool used and the preliminary results of the study, conducted with a group of 127 course participants for the Lower Secondary Schools.

2. Teaching Universal Design for Learning

The study presented in this contribution was conducted within the course "Special Pedagogy for Integrated Classroom Management" [2], worth 4 credits, corresponding to 30 hours of mandatory classroom attendance and 70 hours of individual study. The course utilized a Moodle classroom as the Learning Management System to host resources and manage activities.

The course syllabus included essential elements aimed at promoting effective classroom group management, covering organizational, didactic, communicative, and emotional-relational dimensions. The curriculum focused on understanding how to implement an inclusive curriculum, developing competence in selecting effective strategies, using appropriate verbal and non-verbal communication, providing effective feedback, and enabling teachers to manage their emotional states in relation to the relational and emotional dynamics of the classroom group. Each session of the course was structured to begin with a dialogic lecture providing the core concepts, followed by practical and/or reflective activities to be completed individually or in small groups.

Within the framework of implementing an inclusive curriculum, particularly in the deeper exploration of the didactic dimension, a lesson was dedicated to Universal Design for Learning (UDL) as an operational approach capable of guiding differentiated instructional design that addresses the diverse needs of a classroom group from the outset, while simultaneously being inclusive—where meeting the specific needs and preferences of some does not become a source of stigma for those individuals or exclusion for others.

[2] Dr. Silvia Micheletta was in charge of teaching.

To this end, the three fundamental principles of UDL, relating to the "what," "how," and "why" of learning, were explained, and the guidelines issued by the Center for Applied Special Technology (CAST), an organization founded in the United States in the 1980s and still today the leading international centre for UDL research, training, and advocacy, were analysed (CAST, 2018).

Subsequently, with the aim of initiating a gradual adoption of this paradigm, some essential practical recommendations were outlined (Murawski & Novak, 2021):

- The first emphasizes the need to formulate "broad" learning objectives, that is, objectives which, in order to respect the individual variability of each and every learner, are specific yet not tied to a single method of achievement;
- The second encourages the definition of "open" procedures, meaning the consideration of multiple modalities, methods, and operational strategies for progressing in the learning process;
- The third advocates for offering a variety of instructional materials, allowing for differentiated pathways to achieve the learning objective, as well as leveraging multiple channels to foster group engagement;
- The fourth, finally, consistent with the first, calls for diversifying assessment methods, freeing them from reliance on any single approach.

Subsequently, some practical demonstrations of the application of the four points outlined above were provided: starting from examples of standard instructional design—referred to as "non-UDL"—participants were guided through possible "UDL" reformulations (Johnson & Cornelius, 2021). These models were presented and discussed during the session and made available among the course resources for further consultation.

To conclude the session, and in order to encourage practical application and subsequent reflection, participants were assigned the task of engaging, for the first time in their training pathway, in the development of a lesson plan based on the Universal Design for Learning framework. This activity, to be completed individually during independent study time outside of class meetings and submitted by the end of the course, was part of the formal assessment and contributed, along with other tasks, to the final grade. During the following classroom session, based on the first voluntary draft submissions by some participants and in light of the assessment

criteria previously shared, whole-class feedback was provided to guide everyone toward improving their proposals before the final submission.

3. The tool provided for UDL-based instructional design

The UDL-based instructional design task assigned to participants was supported by a structured worksheet divided into two parts: the first part asked them to develop a universal design, while the second part included guiding questions to stimulate reflection on the work produced.

The first part was structured as a toolkit designed to guide planning with respect to three essential components: (i) learning objectives, (ii) methods for assessing the achievement of those objectives, and (iii) learning activities, organized into procedures, that is, phases of work, materials, and learning environments (Calvani & Menichetti, 2020). In the third section, the worksheet provided examples of both "non-UDL" and "UDL" approaches, to enable immediate recall of the topics discussed in class. Additionally, the worksheet offered further prompts to provide multiple options for representation, engagement, and action/expression, in alignment with UDL principles (drawn from and freely adapted from Murawski & Novak, 2021).

The second part of the worksheet presented a set of reflective prompts, coherently following the three essential elements of design mentioned above (i.e., objectives, assessment, and activities), and included an additional section to help focus specifically on the needs of students who might require further accommodations within the class group.

No specific context or constraints were imposed for the design activity. Therefore, participants were free to choose subjects and topics, class level and group composition, timing and resources, time of the school year, and classroom setting. They could refer to contexts they had experienced during prior teaching or imagine entirely hypothetical ones.

4. The research

4.1. Research design

The research presented in this article aims to assess the level of universality and flexibility in the instructional proposals developed by the participants enrolled in the course “Special Pedagogy for the Integrated Management of the Classroom Group”. Specifically, the objective was to evaluate the degree of flexibility in the instructional design according to the three key principles of UDL, by addressing the following three questions:

- To what extent is the instructional proposal universal and aligned with the first principle of Universal Design for Learning: the principle of representation?
- To what extent is the instructional proposal universal and aligned with the second principle of Universal Design for Learning: the principle of action and expression?
- To what extent is the instructional proposal universal and aligned with the third principle of Universal Design for Learning: the principle of engagement?

For this purpose, a 5-point rating scale was developed, ranging from 0 to 4, where 0 corresponds to a proposal not aligned with UDL principles, and 4 to a proposal fully aligned with UDL principles. Specifically, the 5 levels were coded as follows: 0 = “non-UDL,” 1 = “limited,” 2 = “fair,” 3 = “good,” and 4 = “excellent.” Each proposal was assessed in relation to the three key questions. This scoring system not only provided a detailed view of the degree of universality of each proposal in terms of the three UDL principles, but also made it possible to analyse the overall performance of the group with respect to the goal of the task.

The two researchers, who are also the authors of this paper, independently analysed and assessed the assignments after jointly agreeing on the scoring criteria to ensure consistency and alignment in their evaluations. At the end of the process, the inter-rater agreement, calculated using Cohen’s Kappa (1960), was 0.88.

4.2. The sample

The study was conducted on a non-probabilistic convenience sample.

The participants included 127 pre-service teachers, of whom 93 identified as female and 34 as male.

The vast majority held a Master's degree (114), with a smaller number holding a PhD (6), a Bachelor's degree (1), or a high school diploma (1). A total of 101 participants had already obtained a teaching qualification.

In the current school year, 77 of the participants were actively teaching in schools. Regarding previous teaching experience, 36 participants reported having no prior experience, 49 had between 1 and 5 years, 34 had between 6 and 10 years, and 8 had more than 10 years of teaching experience (Figure 1).

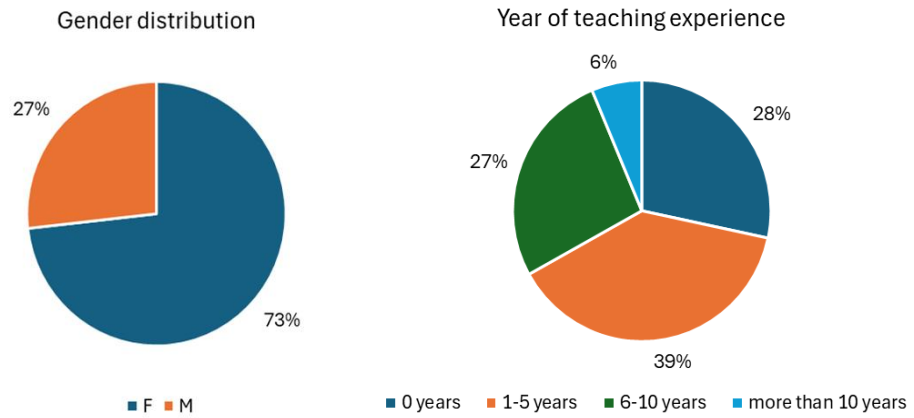

Figure 1. Distribution by gender and by number of years of teaching experience in schools

4.3. Results and analysis

The projects were distributed across various areas of the school curriculum as shown in Figure 2 (for each project, the main subject was considered here).

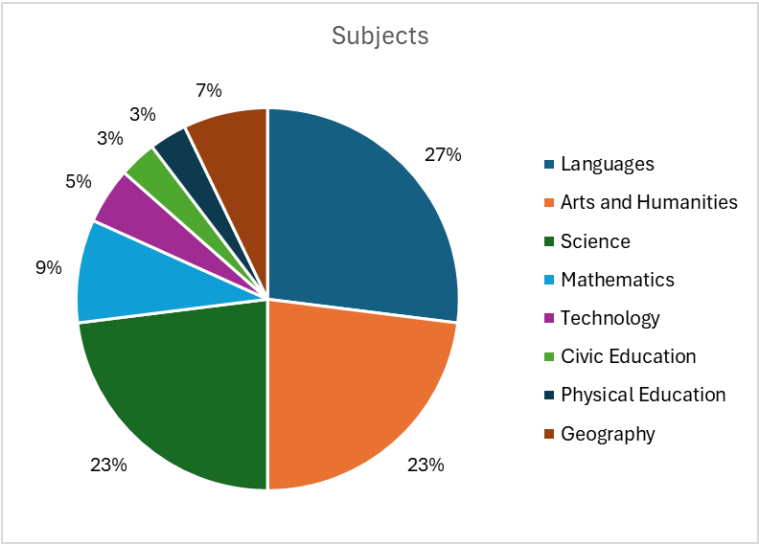

Figure 2. Distribution of subjects grouped by areas[3]

The analysis of the proposals revealed an overall adherence to the three principles of Universal Design for Learning, especially considering this was the first application for the course participants. Specifically, the first two principles — expression and representation — were addressed more thoroughly, while the engagement principle received comparatively less attention. In 42% of cases, the projects provided students with options to express their knowledge and/or skills (expression principle); in 35%, they showed greater consideration of interindividual variability within a hypothetical classroom by offering multiple ways to present information (representation principle); and in 23%, they proposed different ways for students to interact with learning experiences (engagement principle) (Figure 3).

[3] "Languages" includes Italian, English, Spanish, French, and German. "Arts and Humanities" encompasses Art, Music, and History. "Science" covers Science, Chemistry, and Physics. "Mathematics" includes Mathematics and Geometry. The "Technologies" category comprises subjects with a technical focus, sometimes broadly referred to by the participants (e.g., Technical Education or Technology), and sometimes specified in more detail (e.g., Cooking).

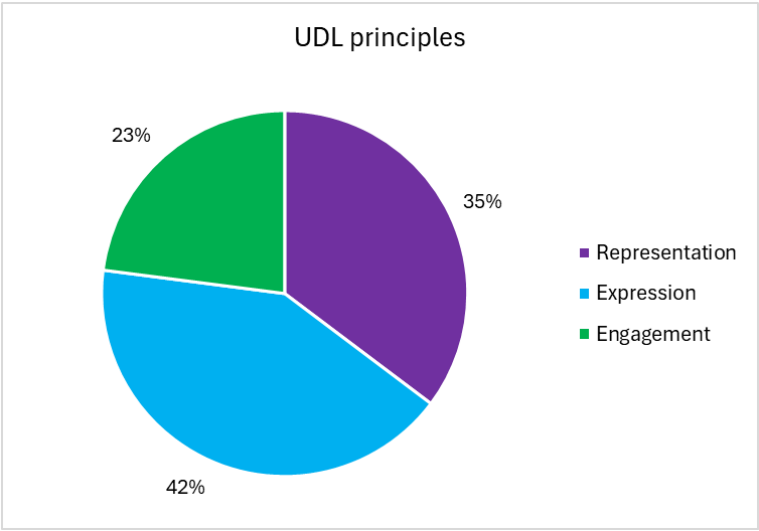

Figure 3. Distribution of proposals according to the predominant UDL principle

The assignment of scores on the 0 to 4 scale allowed for a more detailed evaluation of the proposals.

Isolating each principle, a significant difference can be observed in the distribution of the frequencies of individual scores.

For the first two principles, the trend line shows a positive slope, with a noticeable increase in frequencies toward the higher scores (Figures 4 and 5). Regarding the third principle, the trend line has a negative slope, with a higher frequency of lower scores, although the overall distribution is at least bimodal (Figure 6).

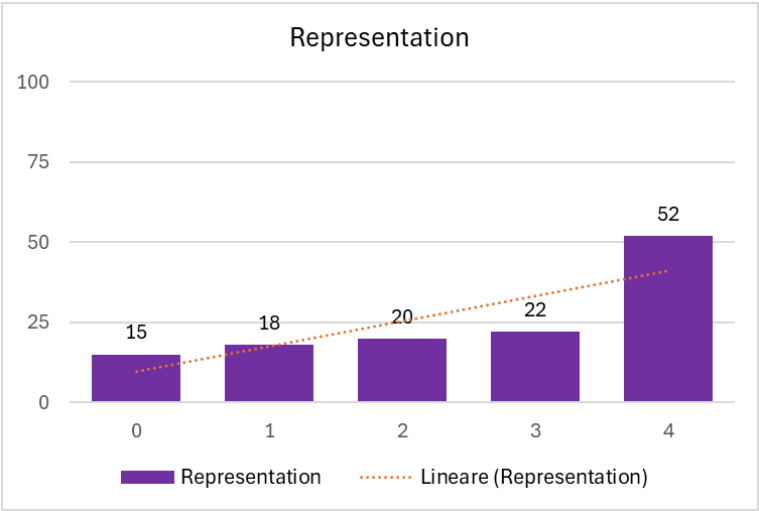

Figure 4. Frequency distribution of scores assigned in relation to the flexibility of the proposals according to the UDL principle of representation

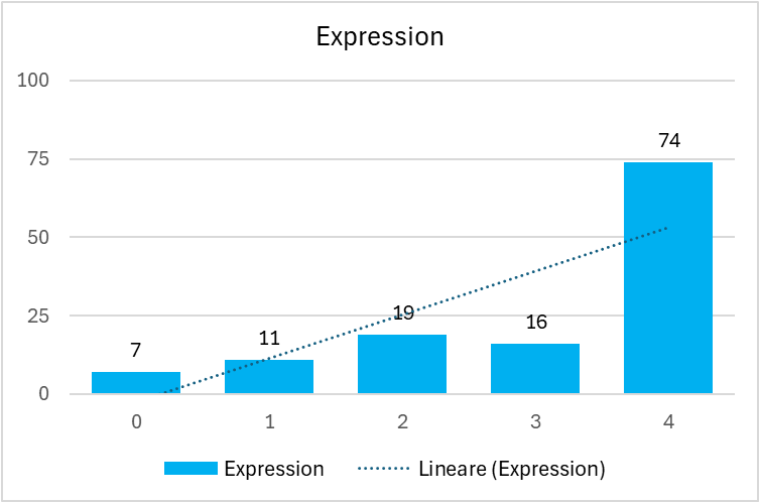

Figure 5. Frequency distribution of scores assigned in relation to the flexibility of the proposals according to the UDL principle of expression

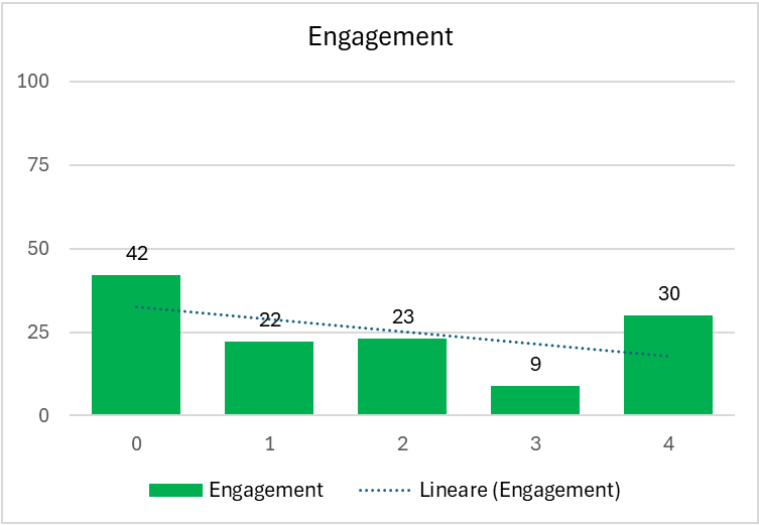

Figure 6. Frequency distribution of scores assigned in relation to the flexibility of the proposals according to the UDL principle of engagement

The recorded data overall suggest a good level of attention from the trainees to the diversity found in classroom groups, as well as a willingness to manage multiple situations while keeping the need for inclusive practices clearly in mind. However, the differences in how the three UDL principles were addressed become more apparent when considering the internal degree of flexibility: the instructional design proposals not only responded more frequently to the principles of expression and representation, but also did so more effectively, as shown in the graphs above and in the values presented in Table 1.

	Representation	Expression	Engagement	Total scores
Mean	2,6	3,1	1,7	7,4
Median	3	4	1	8
Mode	4	4	0	12
Dev. St.	1,4	1,3	1,6	3,6

Table 1. Descriptive statistics of scores for the three UDL principles and overall proposal quality

With regard to the three principles of Universal Design for Learning, the trainee teachers demonstrated a clear awareness of interindividual variability — independent of certified disability conditions — particularly in terms of how

students are asked to act and express themselves. In their proposals, they almost always offered a wide range of assessment and evaluation methods, allowing not only for a choice of tools (e.g., whether work was produced by hand or with technological aids), but also for a choice of expressive channels (e.g., textual, oral, or graphic outputs).

Similarly, the course participants sought to meet potential specific needs within the classroom group by varying the representation of content, employing multiple presentation modes (such as visual, auditory, tactile, or experiential channels, or combinations thereof), or offering adaptations of the content itself (e.g., using simplified or shortened texts).

The discrepancy between these two trends and the comparatively lower attention—both in frequency and effectiveness—dedicated to the third UDL principle, that of varying materials and methods of engagement and motivation, does not appear to stem from disinterest or misunderstanding. Rather, it is likely that the trainees, based on their prior teaching or internship experiences and perhaps also their more or less recent personal experiences as students, perceive the application of this principle as challenging, distant, and even utopian (Murawski & Novak, 2021). Classroom discussions that followed the activity suggest several possible interpretations: the perceived impracticality of offering diverse means of engagement—such as through workstations or allowing students to choose the materials they want to use—may be linked to constraints still seen as significant and insurmountable. These include the physical structuring of the learning environment (e.g., the need for island desks or differently equipped stations), and the necessary collaboration with other teachers on the instructional team. In both cases, it seems that the enthusiasm for universal design is dampened, specifically with regard to this third principle, by a sense of powerlessness in the face of needed change. In the first case, concerning the structure of the classroom environment, trainees tend to feel like victims of a system increasingly lacking in infrastructure and tools. In the second case, regarding the formation of a collegial teaching community, the obstacles seem to relate to the instability and fragmentation that often characterize teaching teams, something the trainees themselves have frequently experienced.

The distribution of the total scores assigned to the submitted projects—calculated as the sum of the scores given for each of the three UDL principles—shows that, in most cases, the proposals were considered valid and appropriate in relation to the

intended objectives (Figure 7). If we group the course participants' results into three performance bands — low, medium, and high overall alignment with the principles of Universal Design for Learning — we can observe that approximately 50% of the projects fall into the high alignment category (scores ranging from 8.5 to 12).

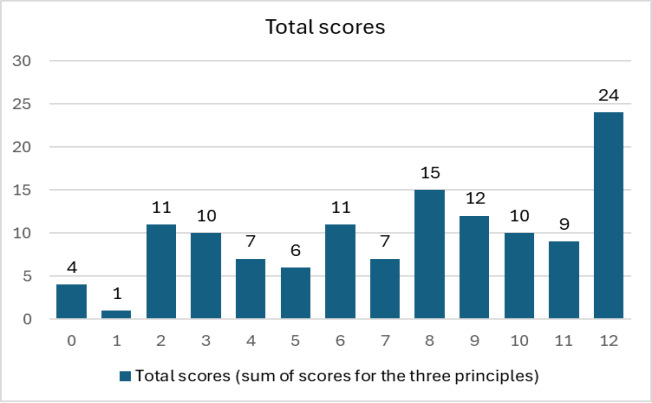

Figure 7. Distribution of total scores assigned

5. Conclusions

Didactic flexibility, although guided by ministerial regulations in the Italian school system, often results in impromptu practices and reactive rather than intentional interventions. What is needed instead is a foundational design that allows for the effective application of evidence-based findings from scientific research.

Designing is not always carried out correctly—and more importantly, it is not always well received: some trainees claim to possess sufficient interpersonal abilities that are "innate" to those who choose the teaching profession; others fear that following researchers' guidelines might reduce teachers to mere executors of procedural tasks. On the contrary, it is precisely in the most complex situations that the need for carefully designed and evidence-informed designing becomes most apparent. Such designing must then be adapted, knowingly, based on specific observations and the competencies of the teacher, but always capable of systematically identifying the most promising paths and potential pitfalls (Mitchell & Sutherland, 2020), before diversity turns into exclusion or disadvantage. The solution to such complexity cannot be reduced to a few success stories; it requires

the search for sustainable and transferable methods, the activation of appropriate conceptual tools that can be systematized, and a shift in perspective—one that begins with reflection on one's own beliefs and the willingness to step into others' shoes (EADSNE, 2012).

Scientific evidence has permanently discredited the notion of a “typical” learner (defined by a vague intersection of chronological age and typical development, sociocultural opportunities, and average life context), while strongly affirming that every member of a classroom group — regardless of certified impairments — has specific educational needs, that is, different learning preferences and requirements that must be acknowledged and respected. In this light, any designing that aims to be inclusive — that is, aimed at the academic success of every student — must necessarily be open, flexible, and adaptable to the different ways individuals may perceive and process information, demonstrate their knowledge and skills, and feel motivated to engage in learning. These assumptions form the foundation of the Universal Design for Learning (UDL) paradigm.

To support teachers in creating instructional proposals that respond to the wide range of educational needs in the classroom, these principles have been operationalized in Guidelines developed by CAST (2011; 2018; 2024). While these guidelines recommend concrete actions supported by implementation examples and coherent verification phases, many teachers—regardless of their level of training or professional experience—still perceive UDL as impractical. In fact, it is often viewed as a utopian ideal, to the point that the term “UDL-topia” has been coined (Murawski & Novak, 2021).

The introduction of a UDL-informed training intervention, combined with an active learning process guided by a facilitative tool, has shown that teachers can already achieve a good level of flexibility—particularly in terms of information acquisition and representation, and multiple means of action and expression. Less developed—i.e., less flexible and meaningful—was the range of options related to engagement and motivation.

One limitation of this study lies in the convenience sample on which the data was based. However, the sample's size, the variety of backgrounds from which the participants came, the diversity of the disciplinary areas they engaged in, and the fact that their participation was motivated by goals unrelated to UDL training already provide a solid foundation for research. The study can be replicated in other

contexts using the same methodology and could also be extended to different samples.

Looking ahead, the study opens two main paths for further development:

- There is a need to investigate more thoroughly why teachers find it difficult to address the principle of engagement (the third UDL principle). Following an open discussion held in class, some hypotheses were proposed in the previous paragraph that may serve as a starting point for this inquiry and could be explored first.
- It is important to assess areas for improvement in the implementation of UDL training and in the structure of the tool used. Still with the intention of moving beyond mere data collection (e.g., how much is UDL known or shared?), and instead aiming to implement effective methods and tools, it is necessary to evaluate the most appropriate timing and delivery methods to ensure high-quality teacher training.

In conclusion, the findings suggest that the systematic application of a flexible approach to instructional design cannot rely solely on training initiatives such as the one conducted in this study. Rather, it must be grounded in a broader rethinking of school as a physical and social environment for learning and sharing, thereby highlighting the need for structural action at the policy level.

Author contributions

In this paper, paragraphs 1 and 5 should be attributed to Laura Menichetti, and paragraphs 2, 3 and 4 to Silvia Micheletta.

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