

Evidence of Universal Design for Learning in a Didactic Proposal on Bullying in Mathematics Education

Article

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Abstract

This article proposes a didactic sequence to address the topic of bullying in Mathematics classes. The sequence consists of ten moments, distributed across twenty fifty-minute lessons. The aim is to make the lessons critical, dynamic, and reflective, exploring content such as rational numbers, percentages, probability, statistics, and their relationship with bullying in the school environment. Additionally, the article emphasizes the importance of using Universal Design for Learning (UDL) to enhance the learning process in Mathematics Education. It is hoped that this work will assist and encourage teachers to implement this approach in their classes, providing students with an engaging, contextualized learning experience that enables them to understand the world around them.

Keywords: Mathematics Education. Bullying. Didactic Situations. Universal Design for Learning.

Indícios do Desenho Universal para Aprendizagem em uma Proposta Didática na Educação Matemática sobre Bullying

Resumo

Este artigo propõe uma sequência didática para abordar o tema do *bullying* nas aulas de Matemática. A sequência é composta por nove momentos, distribuídos em vinte aulas de cinquenta minutos cada. O objetivo é tornar as aulas críticas, dinâmicas e reflexivas, explorando conteúdos como números racionais, porcentagem, probabilidade, estatística e sua relação com o *bullying* no ambiente escolar. Além disso, o artigo destaca a importância de utilizar o Desenho Universal para Aprendizagem (DUA), buscando melhorar o processo de aprendizagem na Educação Matemática. Espera-se que esse trabalho auxilie e estimule professores a desenvolverem essa abordagem em suas aulas, proporcionando aos estudantes uma aprendizagem interessante, contextualizada e que lhes permita compreender o mundo ao seu redor.

Palavras-chave: Educação Matemática. *Bullying*. Sequência didática. Desenho Universal para Aprendizagem.

1 Introduction

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This article is based on discussions held in the Didactics of Science and Mathematics course, linked to the Postgraduate Program in Science and Mathematics Education (PPGECM) at the Federal University of Paraná. The discussions initially focused on providing a broad understanding of the teaching of science and mathematics. This approach was multifaceted, starting with identifying the challenges faced in teaching these subjects. In addition, emphasis was placed on analyzing these challenges, leading to a deeper understanding of the difficulties encountered. At the same time, emphasis was placed on practical strategies that could be developed in the classroom. In the context of this subject, one of the aims was to provide students with a solid and comprehensive foundation in both the theory and practice of teaching science and mathematics, in relation to the conceptual aspects and challenges encountered during teaching. It was against this backdrop that the idea of developing a teaching proposal arose.

The didactic proposal developed has a specific direction. Its aim is to deal with the issue of bullying in the mathematics educational environment, a critical and current problem. This approach was chosen in order to bring a new perspective to the treatment of bullying through Mathematics Education.

This research involved selecting Google Scholar as the main search platform, using the search terms "bullying at school" and "mathematics", with no time limit. The advanced search filter was applied to include only articles published in "Journals". From this search, 80 articles were selected that provide information for understanding the problem and present ways to address the challenges of contemporary education.

By systematically reading the titles and abstracts of the articles found, studies were identified that addressed bullying in the school environment, with the aim of minimizing cases of violence in students' daily lives. This analysis highlighted relevant research,

directing the focus towards the development of educational strategies that contribute to a more in-depth understanding of how the issue of bullying is dealt with in schools.

An illustrative example is the study by Martins (2015), who presents an experience report describing a training workshop held with students from grades 6 to 9. This initiative is relevant because the aim of this training was to provide students with a space to discuss and reflect on the negative and positive aspects of school, as well as defining concepts related to the words "bullying" and "violence". The focus of the workshop was the creation of a slogan that summarized desirable behaviour in relation to bullying in everyday school life, aimed not only at the students, but also at their families and the institution's educators.

This approach is complemented by studies such as those by Albernaz, Seixas and Madeira (2017) who investigated the occurrence of bullying throughout the school career of Biology students at the Federal Institute of Brasília. Using questionnaires and semi-structured interviews, they collected data to understand the presence and impacts of bullying in this specific context. On the other hand, Cotia, Melo and Carvalho (2021) analyzed teachers' conceptions of bullying during classes in Basic Education. The study involved surveying and analyzing dialogues with the aim of identifying strategies to prevent this practice in Physical Education classes. Collectively, these studies broaden the understanding of bullying in different educational contexts.

Considering the prevalence of bullying, it is recognized that it is recurrent in society, especially in the school environment, manifesting itself in various forms, including verbal, physical and psychological aggression, often occurring simultaneously. Children and adolescents, usually between the ages of 11 and 14, are commonly responsible for these aggressions, using nicknames and various types of aggression based on physical characteristics, habits, sexuality and personality. Given this reality, the guiding question of this article arises: how can a didactic sequence that combines mathematical content with an approach to bullying contribute to students' learning and awareness?

Based on this question, the article sets out to develop a didactic sequence based on the approach described by Zabala (1998), analyzing its approach to Universal Design for Learning (UDL). In this context, the aim is to analyze activities that make math classes

more critical, dynamic and reflective, while at the same time providing students with an in-depth reflection on bullying. Through these activities, students will be able to understand how mathematical issues relate to real and socially relevant situations. This article is organized as follows: theoretical background, methodology, moments of the didactic sequence on bullying and conclusions.

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2 Didactic sequence proposed by Zabala

The significant challenge in teaching mathematical knowledge is not just limited to mastering definitions and theorems, but extends to the ability to apply them properly. It is necessary to engage with problems in a broad way, which includes asking good questions and seeking solutions. In this scenario, the teaching sequence proposed by Zabala (1998) is vital. The author emphasizes that the specificity of the didactic proposals is determined by the way in which the mathematical activities are articulated. The approach of these didactic proposals through activities must be carefully planned to promote the development of mathematical thinking, encouraging exploration, experimentation and logical reasoning.

In the classroom, the teacher has the opportunity to (re)think the structure and organization of mathematical activities, considering the interaction between those involved and the teaching resources used. According to Zabala (1998), didactic sequences take the form of a series of actions, such as the presentation of topics, debates and exercises. The effectiveness of these sequences depends on the role assigned to the teachers, students and materials used. Identifying the components of a didactic sequence and the relationships between them is fundamental to understanding the educational value of this process.

By analyzing these sequences, their effectiveness is assessed and the reasons behind the choices made are justified. In addition, it is important to consider that, when we adopt this proposition about the sequence of the traditional model, we must also apply it to other models, such as the "study of the environment". The latter includes distinct phases: (i) motivating activity related to a conflicting situation; (ii) the students' experiential reality; (iii) explanation of the questions or problems posed by this situation; (iv) intuitive responses

or "hypotheses"; (v) selection and outline of information sources and planning of the investigation; (vi) collection, selection and classification of data; (vii) generalization of the conclusions drawn; and (viii) expression and communication.

The diversity of teaching proposals, which goes beyond the traditional expository model, reflects the growing complexity of contemporary educational practices. In this context, Zabala (1998) highlights didactics as a fundamental variable, proposing four distinct didactic units. Each of these units, analyzed from various aspects such as content, learning, attention to diversity, sequence and typology of content, reveals the depth and breadth of the approach. These units symbolize a significant advance over the traditional teaching model, marking an evolution in the way teaching is conceived and practiced.

To illustrate these theories in a practical way, Table 1 shows the Didactic Organizations proposed by Zabala (1998), divided into four distinct units. Each unit reflects a specific aspect of the approach, demonstrating the concrete application of his theories in teaching practice. Thus, it not only reinforces Zabala's theoretical ideas, but also serves as a practical guide showing how his didactic proposals can be effectively implemented and redesigned to different educational needs and contexts.

In particular, Unit 4 is a concrete example of this approach. It begins with the teacher presenting a problematic situation, which encourages students to actively engage in learning by posing problems and identifying and selecting sources of information. The process culminates in student assessment, from the introduction of concepts to their practical application. This script not only exemplifies the practical application of Zabala's theories, but also aligns with the UDL, which will be discussed in the next section. This alignment highlights the relevance of Unit 4 not only within the context of Zabala's proposals, but also in a broader, more inclusive educational scenario.

Table 1 - Didactic Organizations Developed by Zabala (1998)

UNIT 1	UNIT 2	UNIT 3	UNIT 4
Communicating the lesson	Presentation by the teacher of a problematic situation	Presentation by the teacher of a problematic situation related to the topic	Presentation by the teacher of a problematic situation related to the topic

UNIT 1	UNIT 2	UNIT 3	UNIT 4
Individual study of the textbook	Searching for solutions	Dialogue between teacher and student	Proposal of problems or questions
Repetition of the content learned	Presentation of the concept or algorithm	Comparison of the different points of view	Proposed sources of information
Repetition of the content learned	Generalization	Conclusions	Searching for information
Assessment	Application	Generalization	Drawing up conclusions
	Exercise	Memorization exercises	Generalization of conclusions and summaries
	Test or Exam	Test or Exam	Memorization exercises
	Assessment	Assessment	Test or Exam
			Assessment

Source: The authors (2023), based on Zabala (1998).

Recognizing the didactic sequence as an ordered and articulated series of activities within a didactic unit, the importance of careful planning on the part of the teacher becomes evident. This planning is guided by the learning objectives that the students want to achieve. The clarity of these objectives is crucial for both the teacher and the students, as it guides the entire educational process and contributes to effective teaching. In addition, critical analysis of these didactic sequences is fundamental, as it allows educators to understand the educational intentions behind each activity and make adjustments as necessary, ensuring constant reflection on classroom practices.

This strategic and reflective approach is exemplified in a practical way in Zabala's Unit 4 (1998), as shown in Table 2. In this table, each moment of the didactic unit is described in detail, from the teacher's introduction of a problem situation to the students' final assessment. The course includes proposing problems, identifying and selecting sources of information, collecting and analysing data, formulating conclusions and generalizing these conclusions into broader principles or models. Memorization and evaluation exercises are also incorporated to ensure that the knowledge acquired is consolidated and tested.

Table 2 - Moments of Didactic Unit 4, organized by Zabala (1998)

Moment		Action
1	Problem presentation	The teacher introduces a problematic or challenging situation related to the topic under study.
2	Proposing problems	Problems or questions are presented for students to reflect on and seek solutions.
3	Identification of sources	Students suggest appropriate sources of information to obtain answers or relevant data.
4	Searching for and selecting information	Students collect and select data and information from the identified sources.
5	Drawing conclusions	Students formulate conclusions or answers based on the information collected.
6	Generalization and synthesis	The teacher and students establish laws, principles or general models based on the conclusions.
7	Memorization exercises	Students carry out activities to memorize concepts, results or principles covered.
8	Test or exam	Students are assessed by means of a test or exam that tests their knowledge.
9	Assessment	The teacher assesses the students' learning, taking into account observations and results.

Source: The authors (2023), based on Zabala (1998).

Table 2, by detailing each step of Didactic Unit 4, not only illustrates the practical application of the concepts discussed above, but also demonstrates how this approach aligns with UDL, which will be explored in the next section. This alignment reinforces the importance of well-planned and redesignable teaching structures that meet the needs of each student and promote effective and inclusive learning.

3 Universal Design for Learning

UDL is an approach that seeks inclusion and accessibility, recognizing the diversity of abilities, learning styles and needs of students, with the aim of optimizing learning for each of them. Based on scientific evidence about how people learn, UDL redesigns to the individual characteristics of students to promote a more inclusive education (Góes; Costa, 2022).

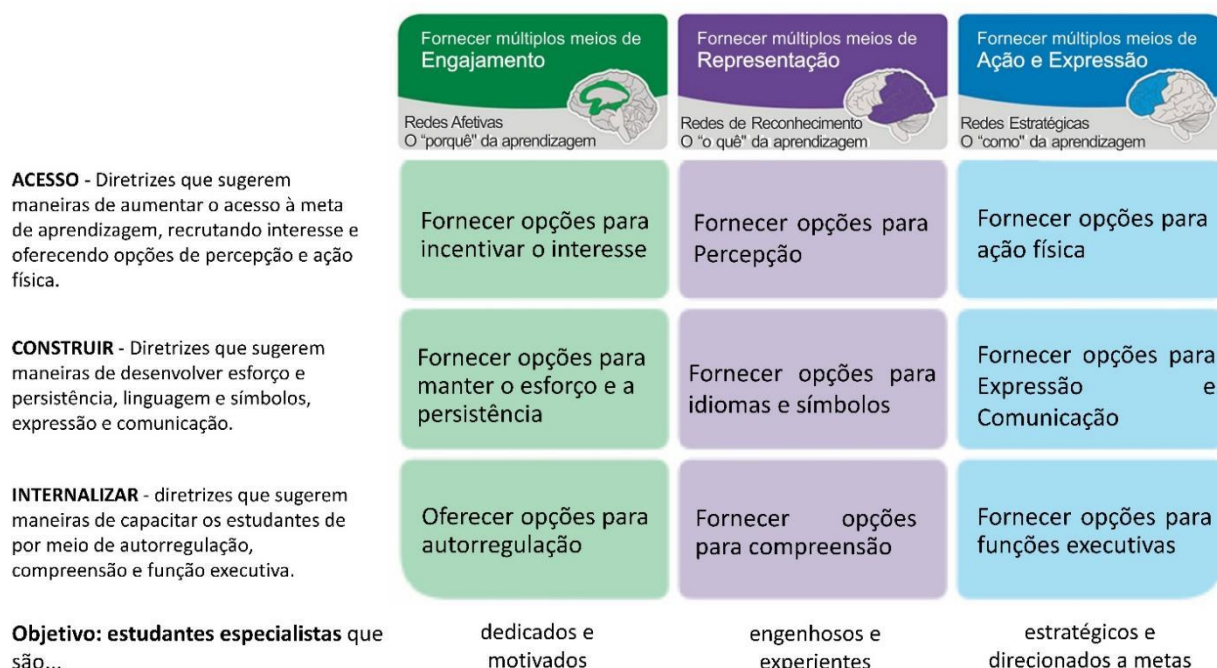
UDL allows teachers flexibility in planning their educational actions, minimizes barriers in the teaching and learning process and promotes the construction of knowledge for each student. This approach involves flexible and customizable proposals, allowing students to progress from their own starting points (CAST, 2018).

There are three fundamental methodological principles in UDL:

- principle of engagement: seeks to motivate students by arousing interest, persistence and self-regulation;
- principle of representation: makes content more accessible and understandable, using different sensory modalities and organizational strategies;
- principle of action and expression: encourages active student participation through physical actions, expression and communication.

These principles, along with their guidelines and checkpoints, offer a variety of suggestions for the school environment, promote students' autonomy and knowledge and establish connections with their reality (Costa; Góes, 2021). Figure 1 illustrates the ways of accessing, constructing and internalizing content and provides a framework for applying UDL in the educational context (Coelho; Góes, 2021).

Figure 1 - UDL guidelines and principles



Source: Coelho and Góes (2021, p. 13).

Each UDL principle is divided into three guidelines that emphasize the construction of knowledge. The Engagement Principle offers guidelines to promote motivation. (i) The first guideline, encouraging interest, is key through its checkpoints allowing choice and autonomy and minimizing distractions. (ii) The second guideline focuses on sustaining effort, with checkpoints such as setting goals and promoting collaboration with constructive feedback. (iii) The third guideline, self-regulation, involves developing personal coping skills and self-evaluation. By following these guidelines, an environment is created that encourages intrinsic motivation and personal growth (CAST, 2018).

Moving on to the Principle of Representation, there are guidelines for effective communication. (i) The first guideline, relating to perception, includes verification points such as selecting appropriate formats and ensuring clarity and accessibility, choosing representations that are redesigned to the target audience and context. (ii) The second guideline, relating to languages and symbols, suggests organizing information logically and

intuitively. (iii) The third guideline, comprehension, guides the use of precise language, avoiding ambiguities and aligning with knowledge of the context. Following these guidelines promotes the successful transmission of information, ideas and concepts (CAST, 2018).

The Action and Expression Principle, in turn, provides essential guidelines for communicating effectively. (i) The first guideline covers the choice of actions and expressions appropriate to the context. (ii) The second guideline, expression and communication, emphasizes the importance of synchrony and authenticity. (iii) The third guideline, related to executive functions, highlights the importance of adjusting pace and style to audience reactions. These guidelines favor impactful and genuine communication (CAST, 2018). These nine guidelines aim to offer a more engaging and autonomous education to students, as detailed in section five, where the activity proposals are presented. In these activities, the UDL principle, guideline and checkpoints involved are indicated.

The Principle of Engagement helps students to become more motivated and autonomous, the Principle of Representation improves their ability to assimilate information, and the Principle of Action and Expression enables them to be more strategic in their learning. UDL's methodological guidelines, which are applicable in a variety of educational contexts, aim to cater for every student, regardless of whether they have disabilities or not (CAST, 2018). The methodology used in this educational context is discussed below.

4 Methodology

The methodology proposed in this didactic sequence follows the structure of Zabala (1998) and is divided into ten distinct stages. These stages are: (1) initial problematization, (2) initial research, (3) summarizing the results, (4) drawing up the questionnaire for the field research, (5) carrying out the field research, (6) reviewing content and drawing up tables, (7) reviewing content and constructing graphs, (8) using software to construct graphs and tables, (9) carrying out a technical visit, and (10) presenting and evaluating the results.

In each of these stages, proposals that align with the three principles and nine guidelines of UDL are incorporated, complemented by practical suggestions derived from the UDL checkpoints. This approach ensures that the UDL theory is not only understood, but also applied effectively, promoting inclusive and comprehensive learning. The integration of the UDL principles and guidelines into each moment of the didactic sequence reinforces the importance of an education redesigned to the needs of each student, guaranteeing a rich and accessible educational experience.

This didactic sequence is planned to take place over 20 lessons of 50 minutes each and its main objective is to provide students with a contextualized and problematized study of the consequences of and approaches to bullying, with a focus on the school context. This approach allows students to explore the topic in an in-depth and reflective way, relating knowledge to real and relevant situations.

Within the scope of the sequence, various mathematical concepts and content will be covered, including rational numbers, percentages, angles, probability and statistics. These topics not only reinforce essential mathematical skills, but are also important for a broader and more quantitative understanding of the phenomenon of bullying. Integrating these mathematical elements into the discussion on bullying contributes to a deeper and more multidimensional understanding of the subject.

To facilitate the learning and application of these concepts, a wide range of teaching resources will be used. This includes resources such as compasses, rulers, squares, protractors, cardboard, graph paper and pencils, as well as the use of computers for more interactive and modern activities. The use of these resources not only enriches the educational experience, but also promotes a practical and engaging approach to learning.

In the next section, the specific moments of the didactic sequence focused on bullying will be detailed. Each moment is designed to build on the previous one, ensuring a cohesive and integrated learning experience. By exploring the topic of bullying through these planned activities, students will be able to apply the mathematical concepts they have learned in a meaningful social context, developing not only academic competencies, but also social awareness and critical thinking skills.

5 The Moments of the Teaching Sequence on Bullying

Within the framework proposed by Zabala (1998), this didactic sequence on bullying, aligned with the principles of UDL, aims to explore and address this problem in the school and social context through the teaching of mathematics. This didactic sequence, structured in nine key moments according to Zabala's (1998) approach, is designed to engage students in a multifaceted learning journey about bullying. At each stage, students have the opportunity to reflect, research, analyze data and apply mathematical concepts, all while exploring the various facets of bullying. This approach not only promotes knowledge building and the development of analytical skills, but also fosters empathy and the ability of students to relate learning to their everyday experiences. By integrating the principles of UDL, each moment of the didactic sequence is carefully designed to be meaningful and relevant in the students' educational context.

5.1 First Moment: problematization

The beginning of the didactic sequence on bullying, based on the ideas of Zabala (1998), involves presenting a problematic situation related to the topic. In this first moment, students are invited to reflect on bullying, starting with questions that explore their personal understandings and experiences. Guiding questions include: What is bullying? How would you define this term? What are the different types of bullying you know about? What are the consequences of bullying for the people involved? Have you ever witnessed or been a victim of bullying? How did you feel?

In this initial moment of the didactic sequence, following Zabala's guidelines (1998), students have the opportunity to share their intuitive perceptions, experiences and assumptions. This sharing is crucial for fostering engagement and delving deeper into the topic, allowing students to explore issues emerging from their experiences and investigations. Zabala (1998) stresses the importance of involving students in discovering and exploring topics that are meaningful to them, establishing a connection between academic content and their personal realities.

It is essential to emphasize that this exploration takes place mainly in the first moment of the didactic sequence. Here, the initial questions are formulated with the aim of engaging students in reflection on the topic. According to Zabala (1998), the purpose of this moment is not just to gain knowledge of a specific topic, but also to answer questions that the students find interesting and relevant. This process aims to involve students in getting to know their school environment and associating mathematical content with everyday life.

In this context, UDL plays an important role, encouraging the creation of enthusiasm and curiosity in students to learn content that relates to their personal experiences. According to the first guideline of UDL, which is to offer options to encourage student interest, checkpoints are applied (CAST, (2018). These points include promoting individual choice and autonomy, ensuring the relevance, value and authenticity of content, and minimizing threats and distractions, thus strengthening engagement and motivation in the learning process.

5.2 Second moment: initial research

After the initial problematization about bullying, the students move on to the initial research phase, where they deepen their understanding of the topic. This stage represents a transition from dialogue and personal reflection to more systematic and detailed research.

At this point, the central task is to carry out comprehensive research into bullying. Students are encouraged to explore various aspects, including the definition and characteristics of bullying, its different types (such as verbal, physical and psychological), the consequences for victims and aggressors, and the identification of real examples. This investigation aims to cover not only the school context, but also other spheres of life where bullying can occur.

The aim of this phase is to expand students' understanding of bullying, giving them a more complete and multifaceted view of the subject. The research encourages students to go beyond their initial perceptions, engaging them in a deeper and more critical analysis of the phenomenon of bullying in different contexts.

Thus, it is suggested that students use digital technologies, which can be accessed both in the classroom and in the school's computer lab. In addition, the research can be extended to the home environment, allowing students to use the internet outside the school context, as part of a homework assignment. This methodological flexibility resonates with the UDL guidelines which emphasize the importance of providing multiple options to maintain effort and persistence. Allowing students to conduct their research in different environments caters for the diversity of learning styles, as suggested by CAST (2018). Checkpoints include increasing the relevance of goals and objectives, varying demands and resources to optimize the challenge, as well as promoting collaboration and providing constructive feedback. This approach not only aligns with the first moment of problematization, but also broadens students' understanding of bullying by encouraging in-depth exploration of the topic.

5.3 Third moment: summarizing the results

After the initial research and analysis of the data collected in the second stage of the didactic sequence, we move on to the third stage, where summarizing the results becomes essential. At this stage, the teacher organizes a round table discussion with the students to discuss the information found, with the aim of consolidating and broadly conceptualizing bullying. This discussion is enriched by taking into account all previous knowledge, allowing for a deeper and more integrated understanding of the topic.

During this discussion, the teacher asks the question: "What is bullying?". This question is strategic, as it aims to cover the types, examples and consequences of bullying in the school environment. The answer to this question is a way of triggering reflection and active participation by the students, taking into account their perspectives and previous experiences. The teacher, acting as a mediator, guides the students in exploring the different types of bullying that can happen in the school environment, encouraging a critical and constructive analysis. As Zabala (1998) points out, it is important for students to demonstrate activity, but within a context that is not limited to passively following orders and

instructions. Actions should encourage the mental process required for learning, promoting a deeper and more reflective understanding.

This moment is aligned with the UDL guideline that seeks to provide options for self-regulation, which starts from the principle of providing multiple means of engagement (CAST, 2018). The activities are designed to develop students' emotions and motivation towards learning. Suggested checkpoints include promoting expectations and beliefs that optimize motivation and facilitating personal coping skills and strategies, self-assessment and reflection.

5.4 Fourth moment: preparation of the questionnaire and field research

In the fourth stage of the didactic sequence, the students have to prepare a questionnaire on bullying to be applied in the school environment. This stage, part of Zabala's (1998) third phase, focuses on analyzing sources of information, encouraging students to deepen their understanding of the topic. In this way, they are encouraged to formulate questions and raise hypotheses, applying the theoretical knowledge already covered.

The teacher's role as mediator is essential at this stage. He or she guides the students in creating effective questions that are fundamental to the success of the field research. This practical approach not only deepens learning, but also stimulates the development of critical and analytical skills in students. It is worth noting that this activity offers students the opportunity to design the questionnaire using technological resources such as Google Forms, which facilitates the creation of digital forms.

The introduction of technological tools, such as Google Forms, to design the digital questionnaire is a practical example of the application of the Universal Design of Learning (UDL) guidelines. This illustrates, in particular, the physical action guideline and the principle of offering multiple forms of action and expression, facilitating access to assistive technologies and promoting inclusive learning.

To carry out this moment, it is recommended that students collect data through interviews with other students in the school. One suggestion is to use the break as an

opportunity to conduct the survey. In this scenario, students should carry the questionnaire and materials for taking notes, such as a clipboard, pen, pencil, eraser, etc. It is important to instruct them to avoid interviewing the same person twice, in order to ensure a diverse sample of participants. If there are time constraints or other limitations that prevent research during the break, viable alternatives should be considered. One option is to obtain authorization from the management team, teaching staff and head teacher to conduct the interviews in the classroom. In this way, students can interview their classmates, ensuring that relevant information is collected. If conducting the research in the classroom is not feasible, it is possible to organize the students into teams and distribute them among the different classrooms in the school. This will allow them to interview students from other classes, increasing the amount of data collected.

This part of the didactic sequence, which represents a continuation of the previous activities, is based both on Zabala's (1998) proposal for sources of information and on the UDL guidelines, ensuring the integration and practical application of these concepts in the educational process.

5.5 Fifth: reviewing content and drawing up tables

In this phase, the teacher revisits the topics already covered and guides the students in organizing the data collected, with an emphasis on constructing tables and solving exercises involving rational numbers and percentages.

This activity, which uses basic tools such as a ruler, paper and pencil, guides the students in analyzing the results obtained in the field research on bullying. The aim is to develop skills related to organizing data, interpreting tables and applying mathematical concepts in real contexts. This establishes a practical link between the topic of bullying and the subject of mathematics.

At this point in the didactic sequence, following the fourth stage of the organization proposed by Zabala (1998), which is the "search for information", the content related to the idea of fractions and their conversion to decimal numbers is resumed, using the calculator.

This moment seeks to broaden students' knowledge of fractions and develop calculation skills, promoting a deeper understanding of the subject.

In addition, at this point in the didactic sequence, the UDL guidelines are applied with regard to language options and symbols, covering the principle of means of representation. The checkpoints focused on here include clarifying vocabulary, syntax, decoding text, promoting language comprehension and using illustrations through various media. These strategies aim to ensure that students have access to different ways of representing and understanding the content, taking into account their varied needs and learning styles. In this way, the step is aligned with both the didactic objectives and the inclusive principles of the UDL, reinforcing the commitment to an accessible education redesigned for each student.

5.6 Sixth moment: reviewing content and building graphs

Continuing with the didactic sequence after the fifth moment, which involved reviewing content and drawing up tables, we come to the sixth moment: resuming content and constructing graphs. This moment is crucial, as it builds directly on the previous work, taking advantage of the tables drawn up to transform the data into graphical representations.

Mediated by the teacher, this phase involves revisiting the content through a series of exercises prepared by the teacher, involving the construction and interpretation of bar and sector graphs. The teacher should show the students practical examples of these graphs, using teaching resources such as a square, compass, ruler, pencil and eraser. The aim is to reinforce and expand the students' knowledge of graphical data representation, improving their analytical and graph construction skills.

This moment is aligned with the "drawing conclusions" phase in Zabala's (1998) framework, focusing on the presentation and interpretation of the data collected in the previous stages of the didactic sequence. Here, students are encouraged to use the information collected to formulate solutions and reflections, maintaining the engagement and interest that were carefully cultivated in the previous moments. The methodology

applied at this point reflects the guideline of understanding the principle of UDL representation. Methodological checkpoints include activating or providing prior knowledge, highlighting patterns, critical features, big ideas and relationships, as well as guiding the processing and visualization of information and maximizing transfer and generalization (CAST, 2018). These strategies aim to involve students in new opportunities, in addition to generating and building knowledge, connecting learning to their reality. For this moment, it is suggested to allocate three hours/class.

5.7 Seventh moment: reviewing content and building graphs

Continuing the learning path established in the sixth stage, in which the students have already begun to revisit content and work on making tables, the seventh stage of the didactic sequence provides an even deeper insight. At this stage, students are encouraged to return to the computer lab, a familiar learning environment, where they will have the opportunity to use graphing software, such as Excel Library, to create graphs and tables. This activity allows students to apply and visualize previously learned mathematical concepts in a practical and interactive way.

For example, they can use bar graphs to compare different categories, while line graphs can show trends over time. The choice of graph type is determined by the aim of visually representing data in a way that makes it easy for students to understand. This is in line with Zabala's (1998) recommendation for a stage of "memorization exercises". At this stage, students have the opportunity not only to fix mathematical concepts, but also to explore the possibilities offered by digital technologies. The approach proposed by Zabala suggests an organization in two distinct moments. The first is dedicated to deepening the memorization of mathematical concepts and the second to the practical application of these concepts in the creation of visual representations of data. This process helps students consolidate their knowledge and develop memorization skills. As Zabala emphasizes, the diversity of techniques and skills for learning how to learn is crucial, depending on the different types of instruments or sources of information (Zabala, 1998, p. 75).

In line with the UDL guidelines, this moment emphasizes the importance of providing options for perception, a principle that aligns with the aim of offering various means of representation. Using UDL checkpoints, such as personalizing the display of information and offering alternatives for auditory and visual information, makes it easier to adapt the activity to the varied needs of students (CAST, 2018). In this way, applying the UDL guidelines enriches the learning experience, ensuring that every student has access to an inclusive and effective education.

5.8 Eighth moment: technical visit

Continuing in the didactic sequence, the eighth moment is characterized by a technical visit, which, in this proposal, translates into a talk on bullying with the presence of a specialist. This activity, involving every student in the school, is designed to create a space for open dialog, exchange of experiences and guidance on the subject. In line with the UDL guideline on expression and communication, and following the principle of offering multiple means of action and expression, it is recommended to use different forms of communication during the talk. This can include the use of visual aids, interactive activities and diverse composition tools, as well as providing graduated practice and performance opportunities for students (CAST, 2018). In this way, the technical visit is not limited to a passive experience, but becomes an active platform for learning and engagement. The suggested duration for this moment is two hours, allowing for adequate immersion in the topic and meaningful interaction with the expert.

5.9 Ninth moment: presentation and assessment

After the experience of the technical visit, the ninth stage focuses on presenting and evaluating the students' learning. In this phase, they are organized into teams of up to five members to develop and share through creative campaigns, such as creating posters and motivational phrases. The students present the results of their research and the knowledge they have acquired, using various tools, including videos for dynamic expression, among other options. The teacher's role is fundamental at this point, providing

feedback at every stage of the process. This continuous assessment, taking into account development and clarity in the construction of knowledge, is in line with Zabala's (1998) proposal for formative assessment. The teacher's feedback not only helps to improve the students' work, but also guides them in reflecting on their own learning process.

In addition, the UDL guidelines are fully applied at this stage. The guidelines that offer options for executive functions and the principle that provides multiple means of action and expression are particularly relevant. The UDL checkpoints suggest practices such as guiding goal setting, supporting planning and strategy development, facilitating the management of information and resources, and increasing the ability to monitor student progress (CAST, 2018). These aspects are vital during assessment, helping students to achieve a deeper understanding of the concepts developed throughout the didactic sequence. The discussions and exchanges of experiences between the students, driven by the feedback received, further enrich this learning and assessment process.

This final stage of the didactic sequence proposed by Zabala (1998), focused on the subject of bullying, exemplifies the integration of the principles of Universal Learning Design (ULD) in the educational process. From the initial problematization to the presentation and evaluation, each stage was designed with the principles and guidelines of UDL in mind. This results in an inclusive and stimulating learning environment for each student.

Throughout the sequence, various stages have been designed to engage students and offer different forms of representation and expression. For example, the initial problematization and initial research arouse students' interest and propose options for involvement. The synthesis of results and discussions aim to maximize the transfer of knowledge, while the creation of questionnaires and field research emphasize expression and physical action. Reviewing content and drawing up tables and graphs focus on offering multiple forms of representation, allowing students the freedom to choose how to interact with the content. Similarly, the technical visit and the presentation of results provide varied forms of communication and progressive opportunities for practice. In this way, student teams are encouraged to develop campaigns and present their results, exploring different

means of action and expression, as well as applying planning and information management skills. This phase is important for demonstrating the practical application of the knowledge acquired.

Below is Table 3, which details the moments of the proposal associated with Zabala's (1998) unit, showing the application of the UDL principles. This reinforces the importance of offering choices, varied representations and opportunities for involvement, guaranteeing an inclusive learning environment for each student. By integrating choices, varied representations and opportunities for involvement, the methodology not only meets students' individual needs, but also promotes a richer and more diverse educational experience.

Table 3 - Association between Zabala's (1998) units and signs of UDL

Proposal Moments	Zabala (1998)	UDL
1. Problematization	Based on the suggestion of presenting a problematic situation related to the topic.	Proposing alternatives to arouse interest, diversity of presentation and engagement.
2. Initial research	Conducting research to explore the topic of bullying.	Proposing alternatives to cultivate effort and persistence, stimulating collaboration, targeted feedback and diversity in resources.
3. Summary of results	Organizing a round table discussion to consolidate and conceptualize bullying.	Proposing alternatives for perception, optimizing transfer and application, stimulating self-assessment and reflection.
4. Questionnaire design and field research	Building a questionnaire to map bullying and conducting field research.	Proposing alternatives for carrying out physical action, exploring different means of action and expression.
5. Retrieval of Content and Preparation of Tables	Revision of concepts, preparation of tables and mathematical exercises.	Presenting alternatives for representation, clarifying vocabulary, incorporating illustrations and media.
6. Retaking Content and Making Graphs	Reviewing content, constructing and interpreting graphs.	Proposing alternatives for representation, redesigning the display of information, providing choices for auditory and visual information.
7. Retaking Content and Building Graphs (Computer Lab)	Use of software to create graphs.	Proposing alternatives for representation, providing multiple means of expression.
8. Technical visit	Holding a talk on bullying with a specialist.	Proposing different forms of communication, progressive opportunities for practice and realization.
9. Presentation and Evaluation	Organizing teams to develop campaigns and present results.	Proposing alternatives for executive functions, explore various means of action and expression, goals, planning and information management.

Source: The authors (2023), based on Zabala (1998).

The analysis presented in Table 3 leads us to reflect on the effectiveness of these strategies in promoting truly accessible and engaging education.

6 Conclusions

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This article proposes an innovative didactic sequence focused on the theme of bullying, linking mathematical content to the reality experienced by students. Inspired by Zabala's (1998) framework and the principles of UDL, we developed a methodology that not only addresses a socially relevant issue, but also enriches mathematics teaching, making it more dynamic and meaningful. This approach has been carefully designed to develop skills such as argumentation, research, activism, discussion and understanding, highlighting the relevance of mathematical knowledge in the students' daily context.

Throughout this work, it has become clear how each stage of the didactic sequence, in line with Zabala's Unit 4 (1998), incorporates the elements of the UDL. This integration guarantees didactic flexibility, allowing for adjustments according to the specific needs and realities of each classroom. Such flexibility is essential to meet the diversity of learning styles and student needs, reflecting the inclusive and comprehensive nature of the UDL.

It is important to note that the proposed didactic sequence is aligned with the specific competences for primary education in the final years of the 2017 Common National Curriculum Base (BNCC). In particular, the proposal reinforces the development of logical reasoning, the spirit of investigation and the ability to argue, using mathematical knowledge as a tool to understand and act in the world. Thus, this didactic sequence not only meets the curriculum requirements, but also contributes to the holistic development of students. It is designed to promote broad skills and abilities, but it is up to the teacher to integrate the proposed activities into their pedagogical planning, redesigning them to the specific needs and contexts of their class. This redesigning process ensures that the didactic sequence is applied in an effective and relevant way, providing a rich and meaningful learning experience for each student. This didactic sequence proposal stands out for its flexibility

and focus on inclusion. Through UDL, it offers detailed guidelines for creating diverse activities, catering for a wide range of needs and learning styles. This promotes deeper and more inclusive engagement, ensuring active and meaningful learning. Thus, we conclude that the application of this methodology has the potential to transform the educational experience, making it more relevant, engaging and effective for students.

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