

Individualization, Differentiation and Interactivity - Paradigms of Effective Learning

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Abstract

Keywords:

effective learning; individualization; differentiation; interactivity.

Centering on the student in the context of the instructional-educational action is achieved by generating both interactive/collaborative and differentiated/individualized learning situations, all the more so as the appropriate technological resources can be exploited to provide the feedback necessary for adjustment in learning. The present study presents an investigative analysis to decipher the understanding of the concepts of didactic and exploitative individualization, differentiation and interactivity, with the aim of identifying the contribution of differentiation/individualization and interactivity in achieving effective learning. The study revealed a common perception of the concepts of individualization, differentiation and interactivity at the level of teachers for preschool, primary and secondary education. Also, the academic performance of students in pre-university education (preschool, primary and secondary school) was influenced by interactive strategies and learning tasks based on individualization and differentiation to a comparative extent with their contribution to the development of the degree of socialization and positive interaction, of increasing the level social-emotional skills.

Zusammenfassung

Schlüsselworte:

effektives Lernen; Individualisierung; Differenzierung; Interaktivität.

Die Fokussierung auf den Studierenden im Kontext des lehr-pädagogischen Handelns wird durch die Generierung sowohl interaktiver/kollaborativer als auch differenzierter/individualisierter Lernsituationen erreicht, umso mehr, als die entsprechenden technologischen Ressourcen genutzt werden können, um das für die Anpassung erforderliche Feedback zu geben Lernen. Die vorliegende Studie stellt eine investigative Analyse zur Entschlüsselung des Verständnisses der Konzepte Individualisierung, Differenzierung sowie didaktische und ausbeuterische Interaktivität vor, mit dem Ziel, den Beitrag von Differenzierung/Individualisierung und Interaktivität zur Erzielung effektiven Lernens zu ermitteln. Die durchgeführte Studie verdeutlichte eine gemeinsame Wahrnehmung der Konzepte der Individualisierung, Differenzierung und Interaktivität auf der Ebene von Lehrkräften für Vorschul-, Primar- und Sekundarschulbildung. Auch die schulischen Leistungen von Studierenden in der voruniversitären Bildung (Vorschule, Grundschule und weiterführende Schule) wurden durch interaktive Strategien und Lernaufgaben, die auf Individualisierung und Differenzierung basieren, in vergleichsweise hohem Maße mit ihrem Beitrag zur Entwicklung des Sozialisationsgrades und positiv beeinflusst Interaktion, der Erhöhung des Niveaus sozial-emotionaler Fähigkeiten.

1. Introduction

Making learning more efficient is a constant concern in the school environment that arouses the interest of all educational actors, from trainers/teachers and students to society as a whole. The learning efficiency strategies have in mind both the capitalization of the individual and age potential of the students with their entire ensemble of experiences, as well as the putting into play the mechanisms of mental, communicational, physical individual and group action, which implies interaction/interactivity. School learning involves the assumption of responsibilities in the selection of contents and the organization/design of learning activities/sequences by teachers. (Manea & Stan, 2021; Albulescu et al., 2021; Albulescu et al., 2021).

The individualization of the didactic act at the level of the three links, teaching-learning-evaluation, is a pedagogical action that takes place under the conditions of education organized by school collectives and consists of measures that aim to adapt education to the intellectual possibilities of each child. It is achieved with the help of a differentiated instructional-educational content and various didactic techniques, adaptable to each child and each group of students (Crețu, 2003).

Differentiation in education can be seen as a means of responding to student diversity to fulfill the vision of a school for all. Differentiation has been widely addressed in a Western context and appears to be a versatile phenomenon, as it appears in different forms



and with a variety of terms and modes of operationalization: differentiation as individualization, differentiation as adaptation to specific groups, differentiation as adaptations within diverse classrooms and differentiation in a systems perspective illustrates the complexity of the phenomenon (Eikeland & Ohna, 2022).

In general, differentiation and individualization in pedagogy are associated with efficiency in the design of pedagogical interaction, which takes into account individual characteristics even in large groups of children (Engels-Kritidis, 2015). However, the research field on differentiation and interactivity suffers from inconsistent theoretical framing and definitions, especially as sometimes the terms differentiation, individualization and personalization are used synonymously (Bondi, et al. 2019; Makhamadjon, et. al., 2021; Heeter, 2000; Milinga, et.al., 2023).

2. Theoretical foundation

Differentiation is a complex idea that seems to be presented as either differentiating students or differentiating teaching. Differentiated treatment in learning, respectively the differentiation of learning has become a practice within didactic activities with an emphasis on differentiating contents and/or didactic strategies according to individual or group intellectual, aptitude/vocational particularities. So, the fundamental function of differentiation consists in adapting the contents to the level of certain categories of individuals and to the level of each individuality in such a way that it acquires at least the volume of knowledge, skills and abilities generally required, thus ensuring them a unitary base of culture, valued as socially useful. By this, the school, as an individual institution, is delegated to concretely apply the objectives of the general education reform to each individual student (Sălăvăstru, 2004). The individualized approach in harmonious solidarity with the principles of cooperation and collaboration facilitates interactivity and increases efficiency in learning. Thus, within the student-centered educational paradigm, individualized learning based on identifying the individual characteristics of students and meeting their requirements becomes feasible through careful design of learning tasks. For example, the integration of project-based learning technology in the educational process with relevant pedagogical and IT support involves specifying the progress stages of the project, set of tasks (both individual in accordance with the psycho-educational

possibilities of the student and group), deadlines for submitting the project (Katerina & Liya, 2016).

In addition to being a holistic educational approach, differentiation and individualization can be used in practice in various ways, from the educational goals/purposes pursued to the grouping of students in the classroom according to the skills/abilities possessed (Bondi, et al. 2019), using diversified pedagogical tools related to the application of the schooling and learning process focused/focused on the child/student. Centering on the student in the economy of mixed learning technology implies both the observance of the principles of systemic individualization, differentiation and creative activity of students, as well as the personalization of education in the orientation and further professional development (Levchuk, et.al., 2022).

Practicing differentiation and individualization approaches are constituted by training and professional development experiences. According to some specialized studies, the concepts of differentiation and individualization are surprised and understood by most of the teachers as an unusable principle, a statement that only tries to build the image of a formal education, which respects individual particularities, values individual potential, in time that many parents consider individualization and differentiation as discrimination (Petre & Vântu, 2013). Due to the loose terminology regarding the word "differentiation" to describe incompatible practices such as skill flow and segregation, it is difficult to know what is being implemented in the name of differentiation (Graham et.al., 2021, p. 162). Interactivity facilitates and enhances learning, especially as the individual learns when interacting with other people in specific socio-cultural contexts (Lyakurwa, 2019; Subban, 2006). In a context devoid of undue pressure yet marked by well-defined objectives, both educators and parents possess the capacity to instill within children tangible benchmarks for self-assessment and self-actualization (Simion & Stan, 2020). By actively involving students in the creation of their own learning, they become integral participants in the interactive learning process, collectively imparting meaning to their education and promoting a facilitative environment for knowledge.

Studies show that the use of interactivity ensures transfer (including online knowledge transfer) and significantly faster convergence between subjects involved in the learning process (Melo, et.al, 2018; Jhunjhunwala, et. al., 2020; Leszczyński, et.al., 2018;

Ansari, & Khan, 2020). The impact of teacher-student interactivity is objectified in the advantage of asking and answering questions, obtaining additional information about and from the student and increasing his motivation in processing the material to be learned, in ensuring deep learning (Kobayashi, 2019). Interactivity in teaching is facilitated by multimedia technologies, respecting the principles of the correct implementation of the interactive curriculum and specific methodologies (Pšenáková, 2018). In the use of the interactive whiteboard, for example, the capture of teaching videos must be complemented by non-verbal language (body language) so that the teacher can reveal the situation of problem solving and logical thinking (Chang, et.al., 2020). Moreover, electronic (e-)feedback practices could be more interactive through the use of technological tools (Saeed & Al Qunayeer, 2022). Studies measuring the multimedia interactivity of an e-textbook on student perceptions of learning, academic performance, and cognitive load have shown that students using the interactive e-textbook achieved higher cognitive and affective learning scores than those using the static e-textbook PDF (Weng et al., 2018). Systems in the field of augmented reality technology create an interactive experience that engages users and facilitates them to increase their interest in learning significantly (Tsai, et.al., 2020). Interactivity in learning also occurs between student-student. Thus, peer tutoring and small group activities have a positive impact on learning due to the fact that the learning material is processed generatively and constructively (for example, selecting, elaborating and organizing important information from the material to be - he teaches it as a tutor to his colleagues in the group, integrating the newly acquired information with previous knowledge and reflecting it on his own understanding) (Duran, 2017).

3. Methodology

The research question aims at teachers' perception of the concepts of interactivity, individualization and differentiation in learning, identifying the contribution of differentiation/individualization and interactivity in achieving effective learning in preschool, primary and secondary school students.

The survey was used based on a questionnaire administered to a number of 687 teaching staff from pre-university education. The questionnaire administered in google-forms concerned 16 items with questions of identification and opinion regarding the concepts of differentiation, individualization,

interactivity as well as the efficiency of their use in instructive-educational practice.

The sample of subjects was chosen randomly, the distribution according to seniority in education being the following: 18 - 24 years: 4.8%, 25 - 34 years: 16.4%, 35 - 44 years: 27.8%, 45 - 54 years: 34.1%, 55 - 64 years: 16.9% (see Figure 1). Regarding the level of teaching, we have the following distribution: teachers active in preschool education: 42.5%, from primary education: 23.1% and secondary school level: 34.4%. (See Figure 2.). From the point of view of seniority in education at the level of the sample of subjects, we have a fairly balanced distribution, respectively: 1-6 years: 16.4%; 7-12 years: 13.1%; 13-18 years: 15.9%; 19-25 years: 24.6%; 26-32 years: 17%, over 33: 13%. (See Figure 3).

Figure 1. Sample of subjects in the study

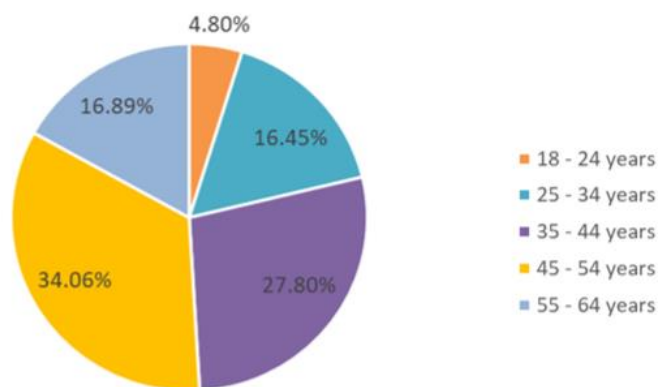


Figure 2. Level of teaching

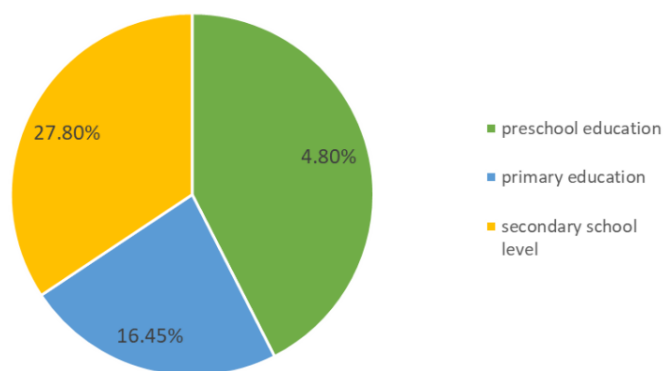
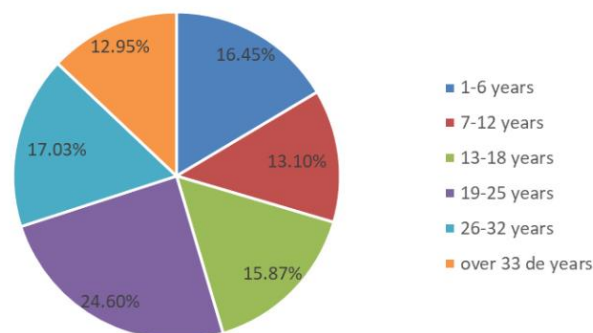


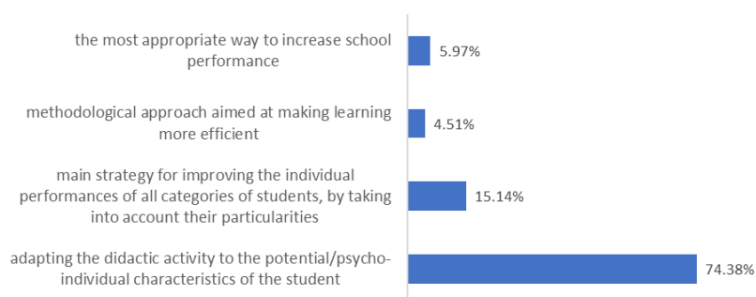
Figure 3. Seniority in education at the level of the sample of subjects



4. Results

Answers were recorded in tabular and graphical form. We present the recorded results in analytical form. Thus, the first item concerns the concept of individualization and its operationalization (Figure 4).

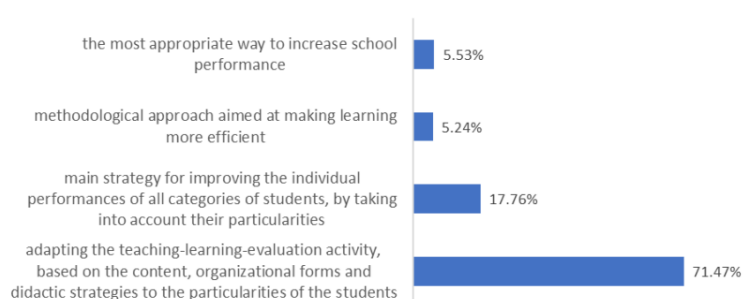
Figure 4. The concept of individualization and its operationalization



The majority of the 687 respondents, namely 74.38%, state that they understand individualization as an adaptation of the didactic activity to the potential/psycho-individual peculiarities of the student. 15.14% of the respondents are of the opinion that individualization is a main strategy for improving the individual performances of all categories of students, by taking into account their particularities. Some of the teachers, namely 5.97%, consider individualization to be the most appropriate way to increase school performance, and 4.51% appreciate individualization as a methodological approach aimed at making school learning more efficient.

Figure 5 shows the results of the second item, which aims at the teachers' perception of understanding the concept of differentiation.

Figure 5. The teachers' perception of understanding the concept of differentiation

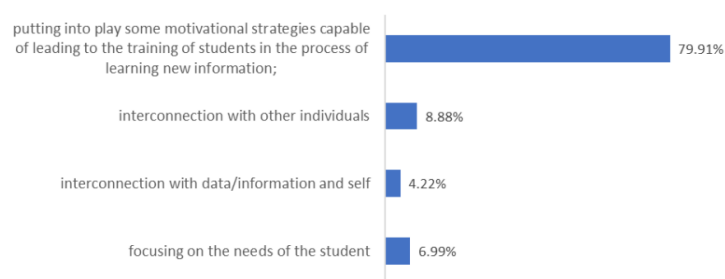


Regarding the understanding of the concept of differentiation, similar answers were recorded, in the sense that 71.47% of the respondents appreciate the fact that differentiation implies the adaptation of the teaching-learning-evaluation activity, in relation to the content, the forms of organization and the didactic strategies to the particularities of the students. 17.76% of the investigated teaching staff support the fact that

differentiation is the main strategy through which it is possible to improve the individual performances of all categories of students, by taking into account their particularities. At the same time, 5.53% consider differentiation to be the most suitable way to increase school performance and approximately in the same small percentage of 5.24% of respondents appreciate differentiation as a methodological approach aimed at making learning more efficient in the school environment.

In the investigative approach of deciphering the meaning of the concept of interactivity in the administered questionnaire, one of the items involved the indication of data from its theoretical and practical perspective.

Figure 6. The concept of interactivity among the participants of the study



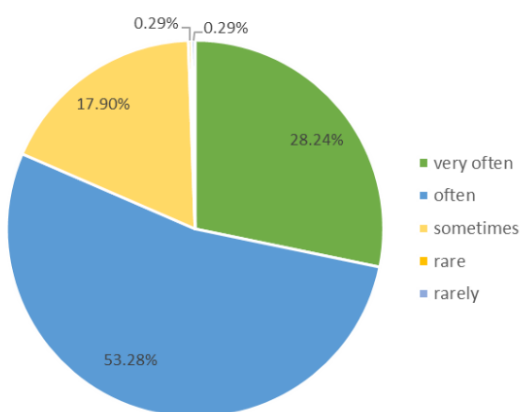
The answers are presented in figure 6. and indicate that for the vast majority of teachers, 79.91% of the respondents, interactivity is operationalized by putting into play some motivational strategies capable of leading to the training of students in the process of learning new information. At the same time, 8.88% of respondents claim that interactivity occurs only when there is interconnection with other individuals or interconnection with data/information and oneself (4.22%), in 6.99% of teachers claim that interactivity is also a substitute teaching strategy the principle of student-centeredness, a way of action that meets and satisfies the student's needs.

From the analysis of the answers regarding the three concepts (individualization, differentiation and interactivity) it can be deduced that they are put into play by the vast majority of teaching staff, being appreciated as effective ways of valuing the student, of activating him in achieving learning efficiency. This statement is reinforced by the answers recorded to another item of the questionnaire, which concerned the frequency with which individualization and differentiation are called upon in the didactic activity.

The responses recorded and presented in figure 7 indicate that out of the total of 687 teachers investigated, more than half in the organization of

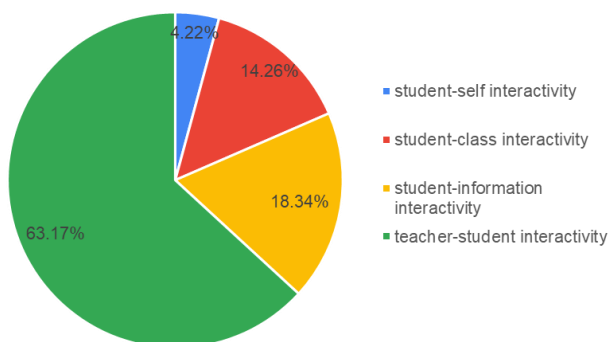
learning frequently call on individualization and differentiation, respectively often 53.3% and very often, 28.2%. The fact that only 17.9% of teachers only sometimes resort to a didactic approach based on individualization/differentiation can be explained by the particularity of the class group they lead, its homogeneity and/or unitary academic performance. The reasons given by the teaching staff for the appeal to learning based on individualization/differentiation relate primarily to the increase in school performance (44.7%). Also, it is aimed at increasing learning efficiency for students in special educational situations (36.7%), as well as increasing the level of internal motivation and self-esteem of students (18.5%).

Figure 7. Instances of time teachers call on individualization and differentiation



The teachers' perception of the effectiveness of interactivity in learning is represented in figure 8.

Figure 8. Teachers' perception of the effectiveness of interactivity in learning

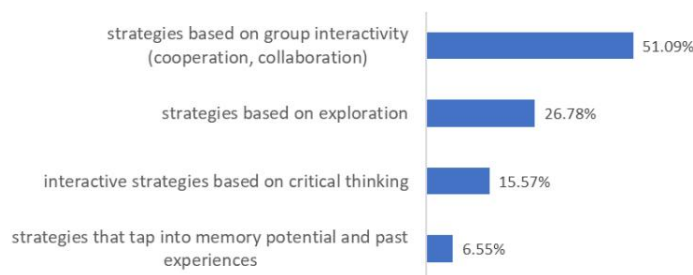


Regarding the type of interactivity appreciated as being responsible for generating maximum efficiency in learning, the vast majority of teachers (63.17%) appreciate teacher-student interactivity as generating increased efficiency in the act of learning. Of course, the fact that the student can use a lot of sources and interact in the online or physical environment with various information is appreciated by 18.34% as being

the central element in making learning more efficient, all the more so since the element of self-efficacy is also put into play in self-directed learning. Therefore, student-information interactivity is doubled by student-self interactivity in the opinion of 4.22% of teachers. Student-class interactivity is a source of intra- and intergroup learning with an emphasis on working in cooperation and collaboration, which for 14.3% of teachers represents the type of interaction that, by capitalizing on the similarities, of the educational group of students can generate the highest quality learning degree.

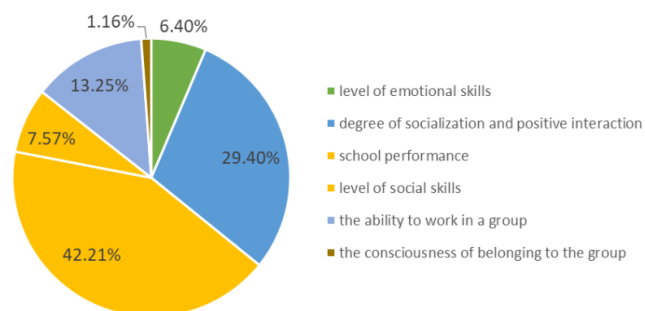
The teachers' perception of the effectiveness of different strategies in learning (strategies based on group interactivity, interactive strategies based on critical thinking, strategies that capitalize on memory potential and previous experiences) is represented in figure 9.

Figure 9. Teachers' perception of the effectiveness of different strategies in learning



Learning strategies valued as the most suitable for achieving school performance in the opinion of 51.09% of the preschool, primary and secondary school teachers studied are the strategies based on group interactivity that value cooperative and collaborative work, followed by strategies based on exploration (26.78%). It is surprising that interactive strategies based on critical thinking are valued by only 15.57% of respondents as generating and supporting effective learning, while strategies that capitalize on memory potential and previous experiences are valued by an even smaller number of teachers (6.66) as responsible for effective learning. We appreciate these data as a reflection of the results obtained in educational practice, all the more so when we consider the broad polarization of the sample of subjects investigated from the perspective of seniority and representativeness at the level of pre-university education, the preschool-primary-secondary cycles when the child forms and develop learning capacities and skills.

Figure 10. The benefits of interactivity



The benefits of interactivity as shown in figure 10 are indicated by the respondents as primarily in the sphere of increasing the degree of socialization and positive interaction (46%) and improving school performance (42.2%). The development of group work skills is appreciated by 13.2% of respondents as the most important benefit of interactivity, while 6.4% of respondents indicate the sphere of emotional skills as the one in which the main changes occur as a result of interactivity. We have only 1.2% of the respondents who indicate another variable, that of the consciousness of belonging to the group, on which the interactivity would act directly. At the same time, as a result of the use of individualization and differentiation, there are changes in the sense of optimizing school performance in the opinion of 45.4% of the respondents. Figure 11 shows the benefits of using individualization and differentiation.

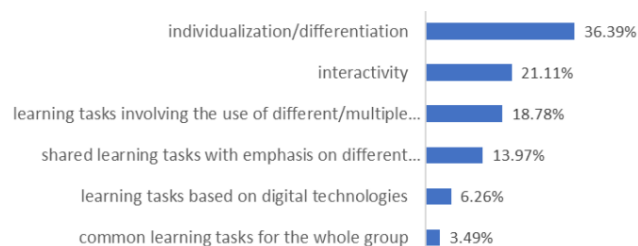
Figure 11. The use of individualization and differentiation



The range of benefits indicated by our respondents as a result of the use of differentiation and individualization include: real-time detection and stimulation of children's interests and skills (20.1%); preventing and reducing situations of failure in school integration (16.16%); developing emotional control skills (5.24%); enhancing students' cognitive capacities (4.8%); prevention and elimination of overload or underload phenomena (4.51%); the formation of personality traits (3.78). At the same time, we derive from the teachers' answers the

essential contribution of interactivity, individualization and differentiation in the didactic activity embodied in the exploitation of the intellectual and experiential potential of each child (66.8%), the development of socio-emotional skills (23.9%), the increase in academic performance (5/5%), control and management of emotions (3.8%).

Figure 12. The essential contribution of interactivity, individualization and differentiation



From the analysis of the answers of the investigated teachers, shown in figure 12, it follows that individualization and differentiation are valued as essential by 36.39% of the respondents, followed by interactivity, according to the opinion of 21.11% of the interviewees. At the same time, the realization of learning tasks that involve the use of different/multiple tools is estimated by 18.78% of the respondents as being the direction of success in achieving quality education, doubled by the development of learning tasks based on digital technologies (6.26%). It is surprising that the traditional is still valued as a valid solution for a desirable future. In the opinion of 13.97% of the teachers, learning tasks with the same content but different levels of solving, as well as the organization of learning tasks for the whole group (according to 3.49% of the respondents) are intended to eliminate discrimination, which also coincides with the results other studies in the field.

5. Conclusions

In achieving quality education for all students, differentiation, individualization and interactivity seem to be desirable solutions. From the analysis of the answers received as a result of the surprisingly administered questionnaire, we find that, although the reasons underlying approaches to differentiation/individualization in learning are aimed at increasing school performance and making learning more efficient for students in special educational situations, in educational practice there is a real increase in performance academic in a rather small percentage, others being instead the benefits of individualization, differentiation and interactivity; we mean increasing the degree of socialization and positive interaction, capitalizing on the intellectual and

experiential potential of each child, developing socio-emotional skills.

Differentiated training is aimed at adapting to the student's own pace and learning style, thus facilitating/determining the increase in the ability to understand new material and its integration into the informational/experiential baggage held. In this context, we can speak of individualized teaching that is completed with learning and evaluation carried out through specific strategies, respectively an adaptation of the didactic activity to the potential/psycho-individual peculiarities of the student..

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