SUPPORTING IEP SELECTION IN ITALY: A MATHEMATICAL DECISION-SUPPORT MODEL BASED ON SCREENING DATA

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ABSTRACT
In the Italian education system, the development of an Individualised Educational Plan (IEP) ensures that educational provision is aligned with students' profiles of functioning and support needs. Selecting the appropriate IEP requires considering multiple dimensions: cognitive, physical, sensory conditions, emotional and collaborative functioning. To address this challenge, the study introduces a decision-support model that formalises the IEP selection process through a mathematical formula embedded in dedicated AI-powered software. The model is based on a screening questionnaire developed from scientific, medical, educational, and social criteria. Answers are processed by the formula to guide teachers toward the most suitable IEP among the three options within the Italian framework. This paper describes the structure of the questionnaire, presents the mathematical formula, and examines its validity using data collected from a sample of 90 primary and lower secondary school teachers.

KEYWORDS
IEP; Individualised Educational Plan; Italian education system; PEI; decision-support model.

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1. Introduction

Inclusive education represents one of the central principles of contemporary educational systems and has progressively evolved from a paradigm of integration toward a broader biopsychosocial model focused on participation, accessibility, and personalised learning pathways (Ianes & Demo, 2017; Ianes et al., 2020; Zanazzi, 2018). Within the Italian educational framework, the inclusion of students with disabilities is, nowadays, managed by national legislation and has progressively evolved through reforms aimed at guaranteeing equal educational opportunities and individualised support practices. A fundamental element of this framework is the Individualised Educational Plan (IEP), known in Italy as the *Piano Educativo Individualizzato* (PEI), which constitutes the primary pedagogical and operational document designed to define educational objectives, support strategies, methodological adaptations, and inclusion pathways for students with disabilities. Recent regulatory reforms, particularly those associated with Legislative Decree 66/2017, Legislative Decree 96/2019, and Ministerial Decree 182/2020, introduced substantial transformations in the structure and implementation of the IEP, which continues to evolve, in order to foster real inclusive environments, practices, and qualified professionals. These reforms promoted a stronger alignment with the biopsychosocial model proposed by the World Health Organization through the adoption of the International Classification of Functioning, Disability and Health and established differentiated levels of educational support based on students' functioning profiles (World Health Organization, 2001; United Nations, 2006).

Despite the pedagogical and regulatory relevance of these innovations, the practical implementation of the IEP remains highly complex for many teachers, because of new students, experience, acquired competencies, and the possibility, in Italy, to choose among three different kinds of IEP, which would be selected according to the specific functioning of the student who requires an individualised plan. The selection of the most appropriate IEP model requires the simultaneous evaluation of multiple dimensions, including cognitive functioning, communication abilities, autonomy, sensory and physical conditions, social competencies, emotional regulation, participation in the educational context, and family background or living context. Such multidimensional assessment processes often generate uncertainty among teachers, particularly in cases where educational and clinical profiles present overlapping characteristics or ambiguous support needs.

Several studies (Amatori et al., 2021; Ianes & Demo, 2017) have highlighted how teachers frequently report difficulties in interpreting the current IEP framework and in translating regulatory indications into coherent educational decisions, but also difficulties in filling in the document itself. These challenges are further amplified by the increasing bureaucratic complexity associated with inclusive documentation and by the heterogeneous levels of training among both curricular and support teachers. Consequently, the absence of standardised decision-support procedures may lead to inconsistencies in IEP selection, completion, and educational planning processes across schools and educational contexts. In recent years, the growing development of new technologies, artificial intelligence, and decision-support systems has opened new possibilities for supporting teachers in complex pedagogical decision-making processes. Rather than replacing professional judgment, technological tools may provide structured analytical support capable of improving consistency, reducing interpretative uncertainty, and facilitating evidence-informed educational planning.

Within this context, the present study introduces an AI-powered application which contains a decision-support model designed to support teachers from the selection of the most appropriate IEP within the Italian inclusive educational framework to the full completion of the selected one (AI-powered process). The proposed model is based on a structured screening questionnaire developed through pedagogical, medical, educational, and social criteria derived from scientific literature and regulatory guidelines. Responses collected through the questionnaire are processed through a mathematical formula integrated into dedicated software capable of suggesting an indication regarding the most suitable IEP option. The study aims to describe the theoretical and methodological development of the screening instrument and its underlying mathematical model, as well as to examine their preliminary validity through a validation study involving 90 Italian primary and lower secondary school teachers. More specifically, the research seeks to investigate whether a structured support framework may contribute to greater coherence and support in the IEP selection process within inclusive educational practices, translating a subjective observation into an objective data report.

2. Historical and Regulatory Background of Inclusion and IEP in Italy

The Italian educational system is internationally recognised as one of the earliest and most structured examples of inclusive schooling in Europe (Ianes et al., 2020; Zanazzi, 2018). The development of inclusion in Italy emerged through a long legislative and cultural process that progressively transformed

the educational approach toward a broader concept of inclusion based on participation, functioning, and equal educational opportunities.

Before the 1970s, students with disabilities were frequently educated in special schools or in separate classrooms characterised by a predominantly medical and assistive approach to disability (Ianes & Demo, 2017; Zanazzi, 2018). A fundamental turning point occurred with Law 118/1971, which recognised the right of these students to attend mainstream education whenever possible. However, it was Law 517/1977 that introduced the most significant structural transformation by abolishing most special classes and formally establishing the integration of students with disabilities within ordinary classrooms (Legge 4 agosto 1977, n. 517). This reform represented a radical pedagogical and social innovation because it shifted the educational perspective from separation toward coexistence, participation, and shared learning experiences. The Italian model of integration progressively became based on the principle that schools should adapt to students' needs rather than requiring students to adapt to rigid institutional structures. The role of specialised support teachers became central in facilitating educational participation and collaborative teaching processes.

The evolution of inclusive schooling in Italy was further consolidated by Law 104/1992, which established a broader framework for assistance, social integration, and rights of persons with disabilities (Legge 5 febbraio 1992, n. 104).

The concept of integration gradually evolved into a more comprehensive understanding of inclusion, focusing on a broader pedagogical perspective centred on participation, accessibility, social belonging, and the reduction of contextual barriers. This evolution was strongly influenced by international debates concerning disability rights and by the progressive affirmation of the biopsychosocial model promoted by the World Health Organization: the International Classification of Functioning, Disability and Health, published by the WHO in 2001 (World Health Organization, 2001; United Nations, 2006). The ICF framework introduced a multidimensional conception of disability in which functioning results from the interaction between health conditions, personal factors, environmental characteristics, and social participation (World Health Organization, 2001). This theoretical perspective significantly influenced the Italian educational system by promoting educational planning processes focused also on autonomy, participation, communication, relational competencies, and environmental facilitators. The transition toward an inclusive educational paradigm was further reinforced by the ratification of the United Nations Convention on the Rights of Persons with Disabilities (United

Nations, 2006), which recognised inclusive education as a fundamental human right. In the Italian context, this led to a progressive revision of educational policies and documentation procedures to ensure more personalised and interdisciplinary support for students with disabilities. As highlighted in several Italian studies on inclusive education and IEP development, the growing complexity of educational planning required schools to adopt more structured methodologies capable of integrating pedagogical, clinical, relational, and social dimensions (Ianes & Demo, 2017; Ianes et al., 2020; Amatori et al., 2021; Cesaro, 2021). The IEP progressively became the central operational instrument through which schools define individualised educational objectives, support strategies, participation pathways, and assessment procedures (Cesaro, 2021; Ianes & Demo, 2017). The IEP evolved from an administrative document into a multidimensional planning framework. At the same time, however, the increasing complexity of the Italian IEP framework introduced new interpretative and operational challenges for teachers, particularly in identifying the most appropriate educational pathway and support model for each student. This transformation reflected the broader shift from a medical-deficit model of disability toward a biopsychosocial perspective focused on functioning, participation, and contextual interaction. A decisive turning point in this process was represented by Legislative Decree 66/2017, later revised by Legislative Decree 96/2019, which redefined several aspects of school inclusion within the Italian educational system, introducing a substantial conceptual transformation of the IEP. Rather than focusing exclusively on impairment or clinical diagnosis, the IEP became centred on the student's overall functioning profile, including autonomy, communication, social interaction, learning processes, participation, and environmental facilitators or barriers. Consequently, educational planning required a broader interdisciplinary approach involving teachers, families, healthcare professionals, and educational institutions.

The implementation of Ministerial Decree 182/2020 further consolidated this transformation through the introduction of new national IEP models and operational guidelines, establishing standardised IEP structures and introducing differentiated support pathways, divided into the three IEP models, based on the intensity and complexity of students' educational needs, requiring schools and teachers to determine the most appropriate pathway according to multidimensional assessment criteria. This innovation represented a significant advancement toward greater national coherence in inclusive educational planning. Nevertheless, several studies and pedagogical analyses highlighted important issues associated with the implementation of the new IEP framework: the complexity of the new documentation structure, the interpretative ambiguity of certain criteria, the increased bureaucratic

workload, and the difficulties in translating ICF terminology into concrete educational practices. Research on the implementation of the new IEP models has also underlined how many teachers perceive uncertainty when selecting the most appropriate educational pathway, particularly in cases of overlapping cognitive, relational, behavioural, or sensory conditions (Amatori et al., 2021; Ianes & Demo, 2017; Cesaro, 2021). The multidimensional nature of the framework requires the simultaneous interpretation of pedagogical, clinical, and contextual information.

There is a necessity of providing teachers with clearer methodological guidelines, interdisciplinary support, and decision-making frameworks capable of facilitating the interpretation of complex functioning profiles. In this perspective, structured screening instruments and AI-powered systems may represent useful tools for improving consistency in the IEP selection process while preserving the central role of teachers' professional judgment and pedagogical autonomy. In other words, within this scenario, the integration of structured assessment procedures and computational models may contribute to reducing interpretative variability and enhancing coherence between students' functioning profiles and the selected IEP pathway.

3. Teachers' needs and critical issues in IEP selection

As mentioned before, the progressive evolution of the Italian inclusive educational system has significantly expanded the responsibilities assigned to teachers in the field of individualised educational planning. Within the contemporary framework established by recent legislative reforms, teachers are required not only to guarantee the educational inclusion of students with disabilities but also to manage highly complex multidimensional assessment and planning processes involving pedagogical, relational, organisational, and contextual variables. This multidimensional approach undoubtedly represents an important advancement in inclusive educational planning; however, it also requires teachers to integrate heterogeneous sources of information that are often difficult to interpret consistently in everyday educational practice.

According to the nature of the entities behind this study, it has been possible to analyse a quite wide range of primary and lower secondary teachers, precisely 90 of them. The results highlighted that the selection among the different IEP models and the complexity of analysis and creation of a specific clinical-educational pathway generated uncertainty among teachers, particularly regarding the interpretation of functioning profiles and the identification of the most appropriate IEP pathway. In many cases, they report difficulties in translating regulatory indications and clinical documentation into coherent pedagogical decisions, especially when students present complex or

overlapping support needs. The absence of standardised operational procedures may consequently lead to heterogeneous decision-making processes across schools and educational teams.

Another critical issue concerns the progressive bureaucratic expansion associated with inclusive documentation. The completion of the new IEP models requires extensive data collection, interdisciplinary coordination, and continuous monitoring activities involving teachers, support professionals, healthcare services, and families, which are not always collaborative. Although these procedures aim to promote more personalised educational planning, they may also increase teachers' workload and contribute to perceptions of procedural complexity and operational uncertainty.

It is important to underline that not always teachers involved in IEP selection and structuring have a significant background that permits an easy analysis of the different areas of investigation; sometimes it happens that they may have difficulties in identifying relevant information and behaviours. Difficulties often emerge in areas such as the identification of educational priorities, the evaluation of contextual factors, the interpretation of clinical terminology, and the selection of the most suitable support intensity level. As can be understood, this process relies heavily on subjective interpretation and professional experience, potentially generating variability in educational planning procedures across different schools or territorial contexts.

This is the starting point that generates the question from which this study and tool's development started: how can a subjective observation be objectively analysed to help teachers identify the most suitable IEP and help them to build a tailored learning path?

New technological tools and AI-supported systems may provide structured analytical support capable of reducing interpretative uncertainty and improving consistency in educational planning procedures. Rather than replacing teachers' professional judgment, these technologies may facilitate the organisation and processing of complex information derived from educational observations, clinical documentation, and contextual assessments. In this perspective, a new technological tool can be understood as a supportive instrument aimed at enhancing reflective decision-making processes and promoting greater coherence between students' functioning profiles and educational interventions. By formalising assessment criteria through measurable indicators and a transparent formula and analytical procedures, decision-support systems may contribute to reducing variability in IEP selection processes and to supporting more evidence-informed educational planning practices.

The present study proposes the development of a decision-support model specifically designed to assist teachers in selecting the most appropriate IEP pathway within the Italian educational system. The proposed approach aims to combine pedagogical, educational, social, and functional criteria within a structured screening process capable of supporting inclusive educational planning while maintaining the central role of teachers' professional expertise and interdisciplinary collaboration.

4. Methodology

The idea behind the development of this application was to support teachers throughout the necessary steps required to complete the selected official IEP model, ensuring the most appropriate outcome for students in terms of accuracy, personalisation, pedagogical and clinical appropriateness, as well as the definition of objectives and procedures that are achievable and suitable for the student. But in-depth observations, together with a review of the literature and discussions with teachers, highlighted that the path towards truly inclusive and personalised education should begin even before the completion of the IEP itself. In fact, the first challenge teachers face is the correct selection of the most appropriate IEP model among the three options available within the Italian educational framework.

The needs analysis led to the development of a screening questionnaire to be completed before selecting the IEP model. The purpose of this tool is to provide teachers with suggestions, both in graphical and value-oriented formats, regarding the most appropriate choice among *PEI curricolare*, *PEI per obiettivi minimi*, and *PEI differenziato*.

In addition, the screening home page provides a description of the three IEP models (Fig.1). In summary:

1. PEI curricolare is selected when the student follows the same curriculum as their classmates. This implies that any disability or impairment does not significantly affect the student's cognitive abilities and their capacity to achieve the learning objectives established for the class.
2. PEI per obiettivi minimi is selected when the student, according to their personal and cognitive abilities, is able to achieve the minimum learning objectives required in each school subject, as well as the expected social, behavioural, and personal competencies.
3. PEI differenziato is selected when the student, according to their personal and cognitive abilities, is unable to achieve the educational, social, behavioural, and

personal objectives required by the standard curriculum. In such cases, the student requires highly personalised educational pathways, practices, and objectives. It is important to note that, under the current Italian educational framework, students following a *PEI differenziato* do not obtain the standard qualification awarded at the end of the course of study.



Figure 1: Descriptions and use of the three different IEPs in the Italian educational framework.

4.1 Questionnaire development

To support the selection of the most appropriate IEP model, the questionnaire was structured into five categories investigating the main clinical, educational,

and personal domains relevant to the decision-making process. The categories included are:

- Cognitive competences, comprising 6 questions;
- Linguistic and communicative competences, comprising 8 questions;
- Social and personal autonomy, comprising 7 questions;
- Educational competences and skills, comprising 12 questions;
- Executive functions, comprising 5 questions.

The questionnaire was designed to provide the most accurate screening possible in order to suggest the most appropriate IEP model for each student. The selected domains investigate key aspects of student functioning and provide a comprehensive overview of the student's profile. The observational nature of the questions makes the instrument easy to complete, as teachers can answer the items based on their direct observations of the student and, when available, by consulting clinical documentation.

The selection of the domains and the formulation of the questions resulted from an in-depth analysis of the three IEP models currently available within the Italian educational framework. Considering their specific aims and characteristics. The choice of these domains was also informed by recent Italian legislation concerning school inclusion, which reflects the transition towards a biopsychosocial perspective (World Health Organization, 2001; Ianes et al., 2020; Ministero dell'Istruzione e del Merito, 2020). In particular, Ministerial Decree 182/2020 consolidated this transformation through the introduction of standardised IEP structures and differentiated support pathways based on the intensity and complexity of students' educational needs (Ministero dell'Istruzione e del Merito, 2020). The decree requires schools and teachers to identify the most appropriate educational pathway according to multidimensional assessment criteria (Ministero dell'Istruzione e del Merito, 2020). Subsequently, Ministerial Decree 153/2023 further revised the framework by eliminating the possibility of complete exclusion from curricular subjects and strengthening the inclusive nature of educational planning (Ministero dell'Istruzione e del Merito, 2023).

In addition, the latter decree introduced further modifications concerning the role of families, reduced attendance hours, and assessment procedures, promoting greater inclusion and continuity within students' educational pathways (Ministero dell'Istruzione e del Merito, 2023).

Each question was designed to have the same weight within the questionnaire structure. The available response options are always: Yes, Partially, No, and Not Applicable. Guidance regarding the interpretation of each response option is provided below every question (Fig. 2):

- Yes: selected when the student demonstrates the indicated ability, characteristic, or competence to an appropriate and satisfactory extent.
- No: selected when the student does not demonstrate the indicated ability, characteristic, or competence, or demonstrates it to an insufficient extent.
- Partially: selected when the student demonstrates the indicated ability, characteristic, or competence only partially or to an extent that is below what would generally be expected for their age or school level.
- Not Applicable: selected when the ability, characteristic, or competence cannot be associated with the student. Examples include objectives not yet addressed within the curriculum, disabilities that completely prevent the achievement of a specific objective, activities not implemented within the school context, or educational tools that are not used.

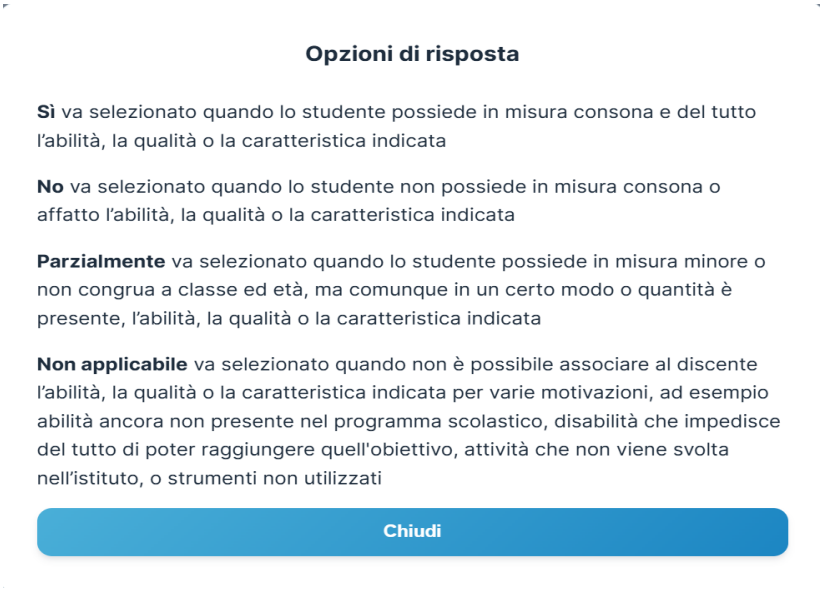


Figure 2: Answers description provided under each question.

According to the scoring system adopted, the responses Yes, Partially, and No are assigned scores of 3, 2, and 1, respectively, with only a few modifications that the formula takes into consideration, while Not Applicable is excluded from the calculation. Consequently, this option effectively removes the

corresponding item from the final score calculation used by the decision formula.

4.2 Decision formula

After the questionnaire has been completed, the application automatically applies a formula developed to identify the most appropriate IEP model for the student. The formula is embedded within the application and does not require artificial intelligence at this stage. The IEP selection process is based on a rule-based decision model, whereas artificial intelligence functionalities are integrated into subsequent phases of the software to support teachers during the completion and personalisation of the selected IEP.

The model is based on the sum of the scores assigned to each questionnaire item. The resulting total score is then classified into predefined ranges corresponding to the three IEP models.

The formula generates a score ranging from a minimum of 0 points to a maximum of 114 points. In designing the scoring system, it was decided not only to distinguish among the three IEP models but also to introduce transitional score intervals, or *grey zones*, to account for borderline cases. Some students may present characteristics that make them suitable candidates for more than one educational pathway, depending on the level of personalisation required. For example, within the Italian framework, a student may follow a *PEI curricolare* while requiring personalised objectives in only one or a limited number of subjects. For this reason, two transitional score intervals were intentionally introduced. When a student's score falls within one of these intervals, the software suggests two possible IEP models, leaving the final decision to the professional judgment of the educational team. To further support teachers during this process, the application continuously provides descriptions of the characteristics and intended use of each IEP model. More specifically:

- scores from 0 to 67 suggest a *PEI differenziato*;
- scores from 68 to 71 indicate a transition area between *PEI differenziato* and *PEI per obiettivi minimi*;
- scores from 72 to 90 suggest a *PEI per obiettivi minimi*;
- scores from 91 to 95 indicate a transition area between *PEI per obiettivi minimi* and *PEI curricolare*;
- scores from 96 to 114 suggest a *PEI curricolare*.

This classification model allows the software to generate a recommendation while preserving flexibility in situations where students present profiles that are not easily attributable to a single educational pathway.

The formula that allows the selection of one of the three IEPs can be expressed as follows: $S = \sum_{i=1}^{38} w_i$

This means that (Fig.3):

$$PEI(S) = \begin{cases} PEI_D & 0 \leq S \leq 67 \\ PEI_{D/M} & 68 \leq S \leq 71 \\ PEI_M & 72 \leq S \leq 90 \\ PEI_{M/C} & 91 \leq S \leq 95 \\ PEI_C & 96 \leq S \leq 114 \end{cases}$$

Figure 3*:* explanatory scheme of the mentioned formula

After completing the questionnaire, teachers can visualise the result through a clock-shaped diagram (Fig. 4), which is divided into three coloured sectors separated by white bands representing the transitional areas. Conceptually, the diagram functions as a scale ranging from 0 to 114 points. The indicator is positioned according to the total score obtained by the student, visually identifying the most appropriate IEP model and providing an indication of the degree of personalisation required. When the score falls within a transitional interval, the indicator is positioned on the white band separating the two potentially appropriate IEP models.

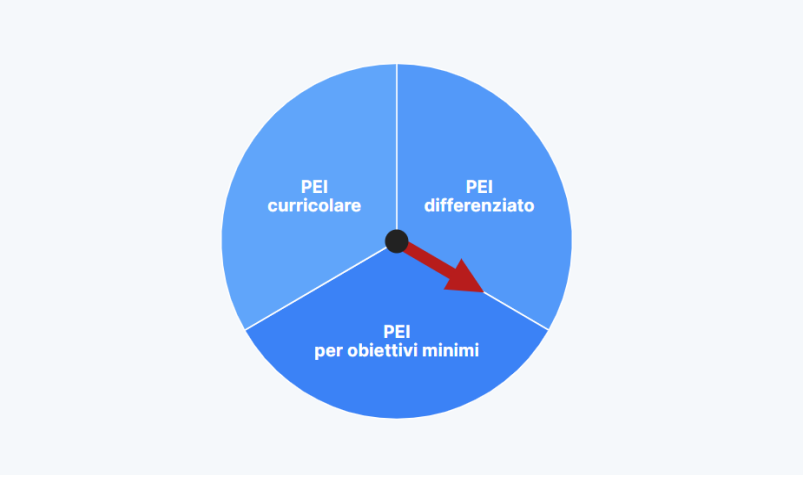


Figure 4: Clock-shaped diagram which indicates the most suitable IEP after the questionnaire.

During the initial development phase of the application, the score ranges were not organised as described above. The total score was originally divided into three equal sections without the introduction of transitional areas. Before the release of the beta version, a test was conducted to investigate the correspondence between the recommendations generated by the formula and real student cases provided by support teachers.

The test involved 90 primary and lower secondary support teachers. The results highlighted the need to revise the score thresholds and introduce transitional intervals between adjacent IEP categories. This iterative calibration process led to a more accurate distribution of the score ranges and improved alignment between the software recommendations and teachers' evaluations. The final thresholds were established on the basis of both the test results and the observed frequency of use of the three IEP models within the collected cases.

Despite the encouraging level of agreement observed during validation, the software should be considered a decision-support tool, whose purpose is to assist teachers in the PEI selection process and not to replace professional educational judgment, multidisciplinary assessment, or collaborative decision-making procedures.

4. Formula testing

To test the questionnaire, the weighting system assigned to the answers, and the score ranges defined by the formula, the selected sample consisted of primary and lower secondary school teachers. This choice was necessary because the AI-powered application was specifically developed for these educational levels, in accordance with the Italian national curriculum. The inclusion criteria were being either an in-service or a trainee support teacher, regardless of gender, age, or years of professional experience. This decision was made because the tool was intended to support all teachers, including, and perhaps especially, those at the beginning of their professional careers.

The test was administered through a Google Form. Before completing the screening questionnaire, participating teachers were asked to indicate whether the presented case was a real or an imagined one and to specify which IEP model they had selected or would have selected for that student. After these preliminary questions, the screening questionnaire began. The form settings allowed only one response per participant.

Initially, a small group of teachers already known to the authors was contacted through personal and professional networks and asked to share the questionnaire link with colleagues. The sample was therefore recruited through a snowball sampling process. A total of 90 teachers participated in the study, and all responses were collected in November 2025.

Participation was voluntary and anonymous. No personal or sensitive data were collected.

After the first four responses had been collected, it became evident that a more detailed explanation of the three IEP models was necessary. For this reason, these four responses were excluded from the analysis. Consequently, the initial dataset consisted of 86 participants.

Once all responses had been collected, a data-cleaning process was conducted. Analysis of the questionnaires revealed that five responses were not suitable for inclusion because they contained a high number of "Not Applicable" answers, most of which were inconsistent with the educational levels under investigation. As a result, the sample size was reduced to 81 cases.

Based on the total scores obtained through the screening questionnaire, 29 results did not correspond to the IEP model indicated by the teachers. The initial agreement between the indicated IEP and the model's recommendation was 64% (52 out of 81 cases). This finding highlighted the need to introduce transition areas between adjacent IEP categories. Considering borderline scores falling within the grey zones, the agreement increased to 69% (56 out of 81 cases), adding four additional matching results.

As highlighted by the needs analysis, teachers may encounter difficulties in selecting the most appropriate IEP for a variety of reasons. Indeed, a detailed examination of the responses revealed that 11 proposed cases had been associated with an inappropriate IEP model according to ministerial guidelines, WHO recommendations, and the biopsychosocial model. Excluding these cases, the sample was reduced to 70 cases, of which 56 corresponded to the model recommendation, resulting in an agreement rate of 80%. Furthermore, one additional case fell within a grey zone, increasing the agreement to 81.4% (57 out of 70 cases).

Excluding the five imagined cases from the calculation reduced the sample from 81 to 76 cases. Considering only exact matches, the agreement rate was 67% (51 out of 76 cases). When the four cases falling within the grey zones were included, the agreement rate increased to 72% (55 out of 76 cases). Finally, after excluding the 11 cases considered inappropriate, the sample was reduced to 65 cases. Within this subgroup, 52 cases corresponded to the

recommendation generated by the model, resulting in a final agreement rate of 80%. (Tab.1 and 2)

Table 1*:* Sample selection and data cleaning process.

Step	Description	N
Initial responses collected	Total questionnaires received	90
Excluded responses	Missing information and unclear IEP descriptions	4
Initial valid sample	Responses included in the first analysis	86
Further excluded responses	Excessive "Not Applicable" and incoherent school-grade profiles	5
Final analysed sample	Responses used for validation	81
Real cases	Real student profiles	76
Imagined cases excluded	Hypothetical profiles created by teachers	5
Appropriate IEP cases	Cases consistent with ministerial and biopsychosocial criteria	70
Appropriate real cases	Real cases with appropriate IEP selection	65

Table 2*:* Agreement between teachers' IEP selection and the proposed decision model.

Analysis condition	Sample (N)	Matching cases	Agreement (%)
Full analysed sample	81	52	64.0%

Full sample including grey zones	81	56	69.0%
Appropriate IEP cases only	70	56	80.0%
Appropriate IEP cases including grey zones	70	57	81.4%
Real cases only	76	51	67.0%
Real cases including grey zones	76	55	72.0%
Real and appropriate cases only	65	52	80.0%

The matchings have been calculated starting from the expected expertise of teachers who participate in the trial, and what has been taken into account was the coherence in the IEP selection teachers have chosen in the beginning and the result obtained after the screening. In other words, the criterion validity of the model was evaluated by comparing the suggested IEP with the IEP independently identified by support teachers. An internal expert in the field of school intervention for SEN students' inclusion has done the selection and exclusion of sample responses, which allowed for considering only truly realistic and correct responses.

4.1 Limitations

Some limitations should be considered when interpreting the findings of the present study.

The proposed decision-support model was developed specifically for the Italian educational framework and is therefore strongly dependent on the current legislative and pedagogical structure of the Italian *Piano Educativo Individualizzato* (PEI). Since the classification into *PEI curricolare*, *PEI per obiettivi minimi*, and *PEI differenziato* does not exist in the same form in other educational systems, the direct applicability of the model outside the Italian context is limited.

Then, the validation study involved a relatively small sample of teachers (N=90) recruited through snowball sampling procedures. Although the sample included both primary and lower secondary school teachers from only one Italian region (Campania), it cannot be considered representative of the entire

Italian teaching population. In the future, there will be an implementation for upper secondary schools considering *licei*, *istituti professionali* and *istituti tecnici*, and a national testing.

Furthermore, all questionnaire items were assigned the same weight within the scoring system. Although this choice was made to ensure transparency and ease of implementation, it is possible that some domains may have a greater influence on IEP selection than others. Future studies could investigate alternative weighting systems based on empirical evidence or expert consensus.

Finally, the proposed model is closely linked to the current Italian legislative framework, particularly Ministerial Decrees 182/2020 and 153/2023. Future regulatory modifications may therefore require updates to both the questionnaire structure and the decision formula.

5. Conclusions

The increasing complexity of inclusive educational planning within the Italian school system requires teachers to make educational decisions based on multiple dimensions of students' functioning profiles. The introduction of the new IEP framework, inspired by the biopsychosocial model of disability, has significantly improved the personalisation of educational pathways while simultaneously increasing the complexity of the decision-making process for IEP selection.

Starting from the needs identified through literature analysis, legislative examination, and teachers' feedback, this study developed a decision-support model aimed at supporting teachers in the preliminary selection of the most appropriate IEP among the three pathways available and, thanks to the already developed AI-powered system, to complete it in all its parts. The described model consists of a multidimensional screening questionnaire investigating cognitive, communicative, social, educational, and executive-function domains, combined with a transparent rule-based formula capable of transforming teachers' observations into a structured recommendation.

The validation study conducted with primary and lower secondary school teachers showed encouraging results. The agreement between teachers' IEP selection and the recommendation generated by the proposed model progressively increased after the refinement of the score ranges and the introduction of transition areas between adjacent IEPs. In particular, the highest agreement level reached 81.4% when considering cases aligned with ministerial guidelines and the biopsychosocial perspective; this suggests that the model is capable of supporting teachers in identifying an appropriate IEP

while preserving professional decision-making autonomy. These findings suggest that the proposed model may represent a useful support instrument capable of reducing uncertainty during the IEP selection process and increasing consistency in educational decision-making. The introduction of grey zones emerged as a particularly relevant element of the model. Rather than forcing a rigid classification, the transition areas acknowledge the complexity and variability of students' profiles, allowing teachers to maintain professional autonomy while benefiting from a structured decision-support process.

Furthermore, to the authors' knowledge, this is among the first attempts within the Italian educational context to formalise the IEP selection process through a structured screening instrument and a transparent computational decision model.

6. Future developments

The present study represents a preliminary step toward the development of more advanced decision-support systems for inclusive educational planning. Several directions for future research and technological development can therefore be identified.

First, further validation studies involving larger and more geographically representative samples of Italian teachers are needed to strengthen the reliability and generalisability of the proposed model, considering that at this stage the involved sample was from only one region (Campania). Future investigations should also include upper secondary school teachers, school leaders, educational psychologists, and multidisciplinary teams involved in the IEP development process, because the AI-powered tool, thanks to which it is possible to write the selected IEP, is now subject to an implementation for upper secondary schools (*licei, istituti tecnici* and *istituti professionali*).

Second, additional research could focus on the psychometric validation of the screening questionnaire. Statistical analyses such as internal consistency measures, factor analysis, and test–retest reliability could provide further evidence regarding the robustness of the instrument and the contribution of each domain to the final recommendation.

Third, future versions of the software may adopt more sophisticated weighting systems capable of assigning different relevance levels to specific dimensions of functioning according to empirical evidence and expert consensus. This could further improve the precision of the recommendation process while preserving transparency and interpretability.

Finally, future research should investigate the practical impact of the proposed system on educational outcomes, teacher satisfaction, decision-making confidence, and the overall quality of individualised educational planning. Longitudinal studies examining the relationship between the suggested IEP model and students' educational participation, inclusion, and achievement would provide valuable evidence regarding the effectiveness of the approach in real school contexts.

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