

# Exploration and Validation of Teacher Competency Models in Creating an Inclusive Learning Environment

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**Abstract.** This study is to investigate and validate a competency model for teachers in creating an inclusive learning environment. Inclusive teacher competencies are essential to address student diversity and ensure equitable access to education for all learners. The research employed the three-round *Delphi Technique*, involving experts in inclusive education and educational practitioners. The instruments consisted of validation questionnaires assessing both the substance and urgency of each competency indicator. The findings revealed that in the first round, ten competency indicators were validated with minor editorial revisions. In the second round, practitioners assessed most indicators as highly urgent, with an average score exceeding 4.50. The third round produced a final consensus with more than 93% agreement. These results established four main domains of inclusive teacher competencies: pedagogical, relational-affective, collaborative structural, and professional technological. This study concludes that the developed competency model is valid, urgent, and applicable, and it may serve as a reference for teacher training and inclusive education policy development.

**Keywords:** Teacher Competencies, Inclusive Education, *Delphi Technique*

## 1 Introduction

Inclusive education has become one of the main issues in the world of education in various countries, including Indonesia. The concept of inclusive education emphasizes the importance of providing equal learning opportunities for all students, including children with special needs (ABK) [1]. But on the other hand, one of the biggest problems faced by the world of education today is the fact that students with special needs are actually neglected and discriminated against in society as well as in schools. Conditions like this are certainly very uncomfortable for families and individuals of children with special needs who are neglected and discriminated against [2]. What is meant by students with needs are students who have different characteristics from children in general, whether mentally, emotionally, or physically, or in terms of sensory,

neuromuscular, or social behavior, emotional or communication skills, or a mixture of two or more of the above compared to normal children in general [3].

Based on data, the number of students with special needs enrolled in regular schools continues to increase every year. According to data from the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) in 2023, there are more than 200,000 students with special needs enrolled in inclusive schools. This increase requires strategic efforts to ensure that teachers have adequate competence in providing educational services in accordance with the needs of the students [4]. For children with special needs who receive education, or students with special needs, based on data released by the North Sumatra Provincial Education Quality Agency in 2024, from 33 districts/cities, Deli Serdang Regency occupies the highest position for students with special needs in schools ranging from early childhood education to elementary school, junior high school, and high school [5]. The number of students with special needs is spread across almost all schools, with the total number of students with special needs recorded in North Sumatra Province being 5,170 students spread across 1,543 schools, of which 816 schools are not included as inclusive education schools or BPPI [6].

Furthermore, it was found that in schools there are still students with special needs who do not receive special treatment due to the lack of competence of teachers in educating and learning from students with special needs. In addition, based on interviews with several principals of high schools and junior high schools, it is also known that teachers in schools are always the first people who will be the first place to be asked by parents and the community about students with special needs in schools. Despite the fact that this teacher also does not have in-depth knowledge of students with special needs. This factor is clearly an obstacle in the implementation of inclusive education in schools. In this case, inadequate teacher competence is a factor in the inhibition of inclusive education in their respective schools.

In addition, a survey by the Ministry of Education and Culture in 2023 revealed that only about 25% of teachers have participated in comprehensive inclusive education training, while the majority of teachers do not have sufficient knowledge about adaptive teaching strategies [7]. Research shows that more than 60% of teachers in inclusive schools in Indonesia do not understand the basic concept of assessment for ABK, so the learning provided is often not in accordance with the individual needs of students [8].

This condition causes many schools to fail to create a truly inclusive learning environment. As a result, students with special needs often feel marginalized, experience academic difficulties, and do not get the right education that they deserve according to their potential. This lack of success also hinders the development of the full potential of ABK, both in academic and non-academic aspects, so that they tend to experience low confidence and difficulty in interacting with their social environment [9].

The failure of schools to create an inclusive learning environment not only impacts students but also shows a lack of collective responsibility that must be borne by various parties. The main responsibility is, of course, on the school as an educational institution, but the role of teachers is also very crucial. Teachers should not only function as deliverers of learning materials but also as facilitators and companions who help students with special needs develop their potential optimally. [10]

Teachers must be able to create a classroom atmosphere that supports the active participation of all students, including ABK. They must also have skills in designing varied learning methods, making curriculum adjustments, and providing the emotional support needed by students. The mentoring provided by teachers will not only improve students' learning outcomes but also help them build confidence and independence. Therefore, the development of teacher competency models that are specific and relevant to inclusive education is imperative to ensure that all students, without exception, get a decent and meaningful education [11]. Teachers play an important role in creating an inclusive learning environment, where all students can feel accepted, valued, and empowered. However, the low competence of teachers in terms of understanding and learning skills for students with special needs is the main obstacle [12].

Ideally, teachers must have some competencies in carrying out their teaching profession. One of them is based on Permendiknas No. 27 of 2008 concerning Academic Qualification Standards and Teacher Competencies, it is stated that one of the competencies that teachers must possess is pedagogical competence which includes: understanding the characteristics of students from physical, social, cultural, emotional, and intellectual aspects; understand the backgrounds of families, communities, learners and learning needs in the context of cultural diversity; understand students' learning styles and learning difficulties; facilitate the development of students' potential; mastering the theories and principles of learning and educational learning; developing a curriculum that engages students in learning; designing educational learning; carry out educational learning; evaluate the learning process and outcomes, as well as; taking reflective action to improve the quality of learning [13].

For this reason, competence is a non-negotiable necessity if we want to improve the quality of learning, which is characterized by an increase in learning outcomes achieved by students. Furthermore, [14] stated that the acquisition of students' learning abilities is strongly supported by the qualifications and teaching style of teachers. This is in line with the opinion that one of the important factors in the learning system itself is the competence of teachers in organizing the learning they design [15].

Competence is a set of knowledge, skills, and behaviors that must be possessed and mastered by a person in carrying out his professional duties. Lecturers in this case must have a set of knowledge, skills, and behaviors in carrying out their duties as educators, teachers, supervisors, and directors. There are four competencies that a teacher must have. First, pedagogical competencies, which include the ability to create learning systems and materials; second, personality competencies in the form of attitudes and actions during the teaching and learning process; third, social competence, which includes the ability to interact and communicate; and fourth, professional competence, which sees the extent of mastery of learning materials. This competency is an important factor in the implementation of learning from home when the learning is carried out [16].

Related to some of the competencies above, [17] shows that the success of education for students with special educational needs requires the involvement of professionals. These professionals are expected to assist in identifying, providing referrals, diagnosing, and providing appropriate educational services [18]. The network built between inclusive education practitioners and academics at local universities is able to generate very strong collaboration as a means to build good inclusive education practices. The regular school system is increasingly challenged to practice an inclusive approach, although pressure from within schools, teachers'

associations, and the community often results in the policy direction being determined by each school [19].

Furthermore, universities as higher education institutions also have a strategic role in helping schools develop teacher competencies to create an inclusive learning environment. Universities can contribute through the implementation of training programs, the development of an inclusion-based teacher education curriculum, and research that supports the improvement of inclusive education practices. Colleges can also build partnerships with schools to provide ongoing training for teachers and provide a platform to share knowledge and best practices in inclusive education. Thus, the involvement of universities will be one of the keys to success in creating an inclusive and sustainable education system.

An inclusive learning environment is essential to ensure that all students can learn and develop optimally. This kind of environment not only improves students' academic results but also helps them develop social skills, empathy, and tolerance for diversity. By creating an inclusive learning environment, schools also support the creation of a more inclusive society, where every individual is valued regardless of differences. Therefore, an inclusive learning environment is not only the goal of education but also the foundation for the creation of a just and equal society [20].

The teacher competency model for inclusive education is one of the reliable solutions. This model will also not only include aspects of the necessary knowledge, skills, and attitudes but also contain specific indicators that are relevant to the needs of students with special needs in schools. However, until now, the competency model used in Indonesia is still generic and has not accommodated specific needs to support inclusive education effectively. Therefore, it is necessary to explore and validate teacher competency models specifically designed to create an inclusive learning environment.

## **2 Methods**

This study applies the three-round Delphi method as a systematic approach to explore and validate teacher competency models in creating an inclusive learning environment. The Delphi method was chosen because of its excellence in gathering, clarifying, and synthesizing the opinions of experts to reach a reliable consensus. The research stage begins with a literature study and a review of education regulations to formulate an initial framework for competency indicators, which is then validated through a series of questionnaire-based panel discussions in three consecutive rounds.

The research panelists consisted of five inclusive education experts, five psychologists, ten teachers from inclusive schools, and five parents of students with special needs who were purposively selected based on their expertise and direct involvement in inclusive education practices. In the first round, the panelists were asked to assess the relevance of the indicators and provide development proposals. The second round was carried out by assessing the urgency level of the indicator using a Likert scale of 1–5. The third round aims to strengthen consensus by reviewing a summary of the results of previous rounds so that indicators that do not meet the agreement can be eliminated or revised.

Data were analyzed using descriptive statistical techniques using convergence and consensus measures, including standard deviation ( $<1.5$ ) and interquartile range ( $<2.5$ ). Competency indicators that meet the consensus criteria are ranked based on the highest average score, then compiled into the final model of inclusive teacher competence. Thus, the Delphi procedure applied not only produces validated instruments but also ensures that the model obtained is applicable, representative, and can be used as a reference in improving teacher professionalism and developing inclusive education policies.

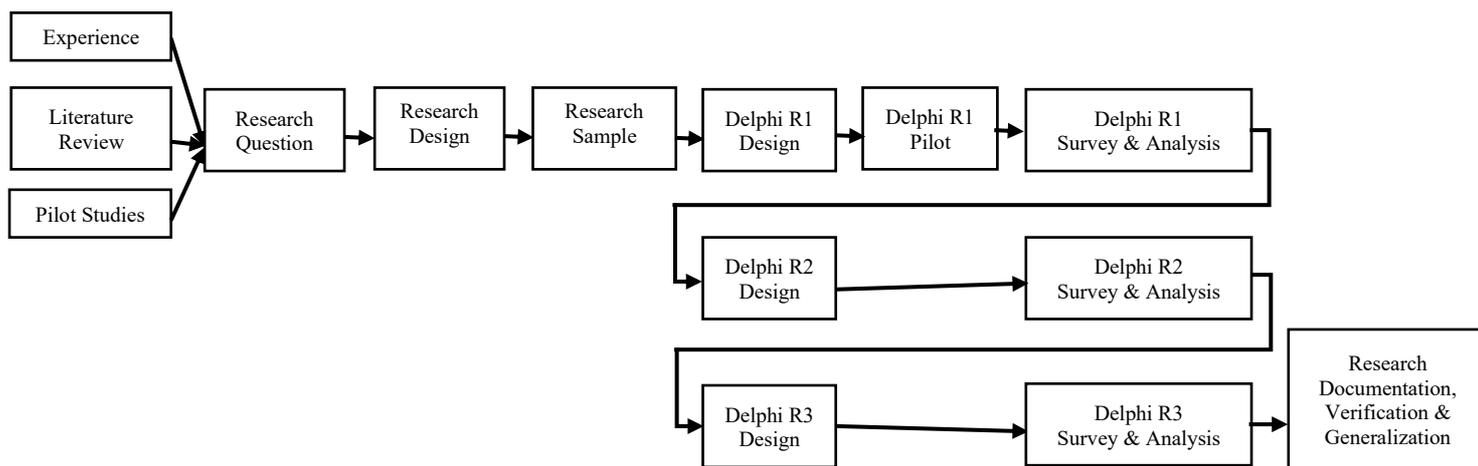


Fig. 1 *Delphi Three Round Design Method* [21]

### 3 Result and Discussion

This research aims to explore and validate teacher competency models in creating an inclusive learning environment. The model is designed to respond to teachers' needs in dealing with the diversity of students, including social backgrounds, differences in abilities, and special needs. The research process was carried out through three stages, namely the preparation of initial indicators based on literature and inclusive education policies, substance validation through Delphi Round 1 with experts, and assessment of the urgency of indicators in Delphi Round 2 involving inclusive education actors.

In the initial indicator preparation stage, the researcher formulated ten aspects of competencies that were considered relevant to inclusive learning practices. These indicators were then substantively tested by a panel of inclusion education experts through Delphi Round 1. The instrument used is in the form of a content validation questionnaire to ensure the clarity, relevance, and suitability of indicators with the principles of inclusive education. After obtaining full approval from experts, the indicator is used at a later stage to measure the level of urgency through the involvement of teachers, educational psychologists, and parents of students with special needs.

### 3.1 Results of Exploration of Teacher Competency Indicators through Delphi Round 1

Delphi Round 1 involved five experts with academic backgrounds and inclusive education practitioners. All indicators obtained 100% approval, which indicates a very high level of consensus on the relevance of the ten competencies submitted. Nevertheless, experts provided a number of inputs, such as the affirmation of technical terms in the use of assistive technologies, the integration of Universal Design for Learning (UDL) principles, and the explicitness of actors in collaboration (e.g. counsellors, psychologists, and therapists). The comment is then accommodated in the form of editorial improvements without changing the substantive meaning.

The final results of Delphi Round 1 identified ten indicators of inclusive teacher competency that have been refined. The indicators include four main domains, namely (1) UDL-based differential pedagogics, (2) relational and ethical, (3) multiprofessional collaborative, and (4) technology-adaptive professionals. These ten indicators were then used as instruments in Delphi Round 2 to assess the level of urgency based on the perspective of inclusive education actors. Thus, the exploration stage not only confirms the suitability of the indicators, but also strengthens the construction of a more comprehensive and applicable inclusive teacher competency model.

### 3.2 Delphi Round II Results

The results of the second round of Delphi show a narrowing level of consensus on the indicators of teacher competence in creating an inclusive learning environment. At this stage, respondents gave a relatively stable and consistent assessment, as reflected in the average scores of all indicators in the "Very Urgent" and "Urgent" categories. Table 1. presents a detailed picture of the ten indicators assessed, where the results confirm that all aspects of the competencies proposed are relevant to be used as a basis in formulating an inclusive teacher competency model.

**Table 1.** Descriptive Statistics for Validating the Urgency of Teacher Competency Indicators

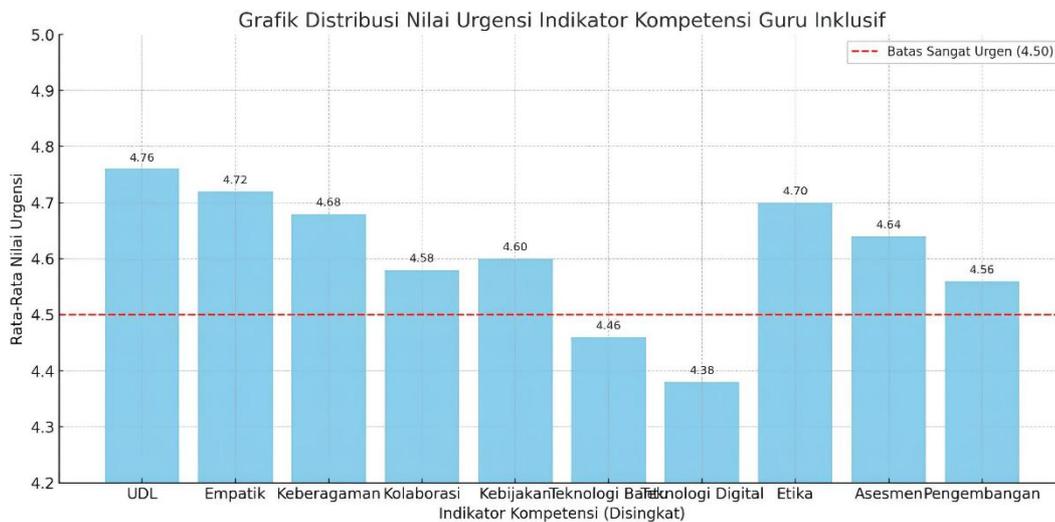
No	Inclusive Teacher Competency Indicators	Average	SD	Urgency Category
1	The ability of teachers to design learning that takes into account differences in students' abilities, backgrounds, and needs.	4.76	0.41	Very Urgent
2	Teachers' ability to build positive, supportive, and empathetic relationships with all students.	4.72	0.45	Very Urgent
3	An open attitude towards diversity (disability, gender, ethnicity, socio-economic, etc.).	4.68	0.49	Very Urgent
4	Ability to work with parents, other teachers, and support staff (counselors, therapists, etc.).	4.58	0.51	Very Urgent
5	Inclusive policies in schools are supported by responsive leadership, resource availability, and a school culture that values diversity and inclusion."	4.60	0.47	Very Urgent
6	The availability of assistive technology to support the needs of students with special needs.	4.46	0.59	Urgen

7	The use of technology in learning includes the use of assistive technology for students with special needs, digital platforms for material differentiation, and innovations that support various learning styles.	4.38	0.61	Urgen
8	Teachers' understanding of inclusion policies, the implementation of teaching practices in accordance with the code of ethics and protecting the rights of students	4.70	0.43	Very Urgent
9	The ability of teachers to design flexible and individual learning and assessments according to the needs and abilities of students.	4.64	0.44	Very Urgent
10	Self-development is carried out by teachers through training, participation in learning and research communities, and acceptance of input and field experience.	4.56	0.48	Very Urgent

The indicator with the highest score was the teacher's ability to design differentiated learning based on Universal Design for Learning (UDL) with an average score of 4.76. These results confirm that the UDL approach is seen as very important in providing equal access to learning for all students, including those with special needs. Furthermore, the ability to establish empathic and supportive relationships obtained a score of 4.72, which emphasizes the central role of the teacher's affective dimension in building a safe, friendly, and respectful classroom atmosphere. Another indicator that also ranks high is the understanding of professional ethics and the protection of students' rights (4.70), which reflects the urgency of the legal and moral aspects of teachers in protecting children's rights, especially students with vulnerabilities. In line with that, an open attitude towards diversity obtained a score of 4.68, indicating that acceptance of student heterogeneity is seen as the main foundation for creating an inclusive climate in schools.

The indicators with relatively lower scores were the use of assistive technology (4.46) and the use of digital technology in learning (4.38). Although both are still in the "Urgent" category, the scores obtained are lower than other indicators. It can be interpreted that respondents view the technological aspects as important, but not as prioritized as pedagogic, ethical, and relational aspects. The factors of limited facilities, the affordability of devices, and the readiness of teachers in operating technology are likely to also influence this perception.

Thus, the results of the second round of Delphi through Table 1. shows that the indicators of teacher competence that are considered the most essential in creating an inclusive learning environment are adaptive pedagogic competence, the ability to build empathic relationships, and understanding of professional ethics, while the technological aspect is seen as an important supporting factor, but not the main core. These results confirm that the quality of human interaction and professional sensitivity remain top priorities in the development of inclusive teacher competency models.



**Fig 2.** Distribution Chart of Urgency Scores of BK Teacher Competency Indicators

### 3.3 Delphi Round 3 Results

After going through the stage of validating the substance of the indicators by experts in Delphi Round I and assessing the level of urgency by inclusive education practitioners in Delphi Round II, the Delphi Round III stage was carried out to strengthen the final consensus on the indicators that have been declared valid. At this stage, 15 of the 20 respondents who participated in the previous round were re-engaged. They were given a summary of the results of the previous analysis (average, standard deviation, and score distribution), then asked to reassess with two main focuses, namely: (1) the level of agreement on each indicator using a scale of 1–4 (Disagree to Strongly Agree), and (2) the feasibility of the indicators to be included in the final model of inclusive teacher competence.

The results of the analysis show a very high level of consensus. All ten indicators obtained a minimum agreement rate of 93% of respondents in the "Agree" and "Strongly Agree" categories. No indicators were rejected, and there were only 1–2 respondents who chose the "Disagree" category on certain indicators. Indicators such as UDL-based differentiated learning, empathic and supportive relationships, flexible and individualized assessments, as well as professional ethics and the protection of students' rights obtained a perfect agreement rate (100%). Meanwhile, the indicators of assistive technology and digital learning technology obtained a lower percentage (86.6%), although it was still included in the highly agreed category.

In addition to the quantitative assessment, the respondents also provided reflective comments that enriched their understanding of real needs in the field. First, some respondents emphasized the importance of UDL-specific training and flexible assessments in primary schools, considering that these two approaches are still rarely understood by teachers, especially in public schools. Second, in the auxiliary technology indicators, teachers are considered to have

a lack of understanding of the types and applications, so it is recommended that there be practical modules and real case studies. Third, the multi-stakeholder collaboration indicator is seen as very strategic, but its implementation still faces challenges, both in coordination with parents, psychologists, and other service institutions. Respondents recommended the formation of an inclusive service team in schools and the strengthening of the managerial capacity of teachers and principals. Finally, in the indicators of professional ethics and inclusive culture, respondents reminded that there are still practices that do not pay attention to the protection of personal data and the rights of ABK students, as well as the resistance of school culture to diversity. Therefore, aspects of regulation, advocacy, and school culture transformation need serious attention.

Based on the overall results, Delphi Round III emphasized that the ten indicators of inclusive teacher competency are not only theoretically valid (substance), but also practical urgency and agreed upon by inclusive education stakeholders. Thus, these indicators can be set as the final model of inclusive teacher competence, which can then be used as a basis for the development of teacher education curriculum, professional training programs, and policies to improve the quality of inclusive education in Indonesia.

### **3.4 Structure of the Inclusive Teacher Competency Model**

The teacher competency model in creating an inclusive learning environment is the final result of a series of exploration processes, validation of substance by experts (Delphi Round I), assessment of the level of urgency by inclusive education actors (Delphi Round II), and strengthening the final consensus (Delphi Round III). This model is designed to represent the set of competencies that teachers need to deal with the diversity of students, while supporting the creation of equitable, adaptive, and participatory educational practices. Thus, this model is not only normative, but also has a strong empirical basis from the consensus results of academics and practitioners.

Conceptually, this model consists of ten main competency indicators which are further grouped into four core domains. The grouping is carried out based on the proximity of the substance and dimensions of competencies identified throughout the Delphi process, as well as aiming to facilitate implementation in teacher capacity development and education policies. The four core domains include: (1) inclusive pedagogic competence, (2) relational and affective competence, (3) collaborative and structural competence, and (4) professional and technological competence.

First, inclusive pedagogic competence emphasizes the ability of teachers to design learning and assessments that are adaptive to the diversity of student characteristics. This domain includes *differentiated learning design indicators based on Universal Design for Learning (UDL)* as well as *flexible and individualized assessments*. Both indicators were awarded the "very urgent" category and received full approval in three rounds of Delphi.

Second, relational and affective competence is related to the interpersonal dimension of teachers, especially in building a safe, supportive, and open classroom atmosphere to differences. Indicators in this domain include *the ability to build empathic, positive, and supportive relationships* as well as *an open attitude towards diversity of disabilities, genders, ethnic backgrounds, and socio-economic backgrounds*. The validation results show the high urgency of these two indicators in creating a psychosocially inclusive learning climate.

Third, collaborative and structural competencies focus on teachers' ability to build multistakeholder synergies and understand policy structures and inclusive cultures in schools. Indicators included in this domain are *collaboration with parents, other teachers, counselors, and support staff* as well as *an understanding of inclusion policies and a responsive school culture*. Although implementation on the ground still faces challenges, the panel's consensus confirms that this aspect is fundamental to the sustainability of inclusive practices.

Fourth, professional and technological competence refers to the capacity of teachers to uphold ethical values and adapt to technological developments. Indicators in this domain include *professional ethics and the protection of students' rights, commitment to sustainable self-development, the use of assistive technology, and the use of digital technology in learning*. Although technology-related indicators scored relatively lower, the final consensus still affirmed the importance of this aspect in facing the challenges of 21st century learning.

Thus, the structure of the inclusive teacher competency model can be represented as a framework of four main pillars that complement each other. Each domain contributes to the creation of a learning environment that is participatory, equitable, and adaptive to the needs of all learners, especially those with special needs. This model is comprehensive, contextual, and flexible so that it can be used as a basis for the development of teacher professional education curriculum, professional training design, and inclusive education policies at the school and regional levels.

### **3.5 Discussion**

The results of this study show that the process of exploration and validation of teacher competency models in creating an inclusive learning environment has been carried out systematically through three stages of the Delphi method. These findings are in line with the characteristics of the Delphi method which emphasizes the achievement of expert consensus gradually through repeated cycles of validation and feedback. Thus, the resulting competency model is not only conceptual, but has gained academic and practical legitimacy from experts and inclusive education actors.

In the first stage (Delphi Round 1), a panel of experts provides validation of the substance of the proposed indicators. The high level of approval indicates that the indicators compiled have a strong conceptual basis and are relevant to the inclusive education framework. The editorial improvements made at this stage indicate a commitment to ensure clarity of meaning, accuracy of terms, and readability of indicators, so that they can be applied more effectively in the context of learning practices. This shows that the process of substance validation not only strengthens academic legitimacy, but also increases the usefulness of the model.

Furthermore, in the second stage (Delphi Round 2), inclusive education practitioners provide an assessment of the urgency of the previously agreed indicators. The high average urgency score indicates a strong consensus on the importance of mastery of indicators by teachers in supporting the success of inclusive learning. The fact that the majority of indicators obtained a score above 4.50 indicates that the proposed competencies are not only theoretically ideal, but are seen as essential by actors in the field. These results confirm the relevance of the model to the real needs in inclusive education practice.

In the third stage (Delphi Round 3), consensus strengthening was carried out to ensure a final agreement on the indicators that had been validated. Very high approval rates (more than 93% for all indicators) indicate that these indicators have strong consensual validity. Reflective feedback from respondents, such as the importance of Universal Design for Learning (UDL)-based training, the integration of assistive technologies, and strengthening cross-sector collaboration, provided added value to model development. This indicates that the competency model does not only stop at the normative aspect, but also pays attention to the practical implementation strategies needed in schools.

Overall, the results of this study affirm that teachers' competencies in creating an inclusive learning environment need to be grouped into four main domains: inclusive pedagogic competence, relational-affective competence, collaborative-structural competence, and professional-technological competence. The four domains reflect a balance between teaching skills that are responsive to the needs of students, skills to build healthy interpersonal relationships, the capacity to collaborate with various parties, and the ability to use technology to support inclusive learning.

Thus, the model resulting from this study not only has academic relevance, but also has great potential to be used as a reference in teacher professional development programs, inclusive education policy formulation, and teacher competency evaluation. These findings reinforce the view that inclusive education requires teachers with multidimensional competencies who are able to bring justice and equality in the teaching and learning process.

## **4 Conclusion**

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