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# An analysis of the educational material needs for children with special needs: perspectives from students and tutors of the preservice teacher program at Universitas Terbuka

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**Abstract**

This study investigates the expectations of students and tutors in the Primary School Teacher Education (PGSD) program at Universitas Terbuka regarding instructional resources for the Special Needs Children Education (ABK) course. A needs analysis was conducted through surveys and interviews to inform the development of adaptive and inclusive materials aligned with the PGSD curriculum. Results show that 88.77% of students and 84.5% of tutors emphasized the importance of inclusive education in ABK materials. Moreover, 78.56% of students and 81% of tutors agreed on updating previous resources. In terms of accessibility, 90% of students and 66.6% of tutors considered earlier materials conceptually rich. The visual presentation remained appealing to 55% of students and 61.9% of tutors, and grammar was deemed clear by 66.3% of students and 57.1% of tutors. Divergent views emerged on interactivity: 40.8% of students found older resources less engaging, while 61.9% of tutors disagreed. Interviews highlighted the need for materials based on Universal Design for Learning (UDL), integrating technology, and adaptable to diverse student needs. Thus, interactive multimedia-based resources are recommended to meet both academic and practical demands of PGSD students.

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## 1. Introduction

Education is increasingly recognized as a dynamic process that must respond to diverse learner needs while fostering holistic development. Student-centered learning and the accommodation of learner variability through adaptive pedagogical approaches are key components of modern educational reforms, such as those carried out in Indonesia (Waode Sitti Fatimah et al., 2026). Furthermore, education serves as a tactical tool to fortify national identity and mold character in addition to imparting knowledge (Rahma Ashari Hamzah et al., 2025). In this context, elementary education plays a pivotal role in shaping students' foundational character, cognitive development, and social awareness. This stage is crucial for the development of personality, emotions, and social skills because children are highly sensitive to values and experiences that shape their understanding of social realities and relationships with others (Daviq Chairilsyah & Rita Kurnia, 2025; Rosidah et al., 2026).

Given this crucial phase, classrooms inevitably encompass diverse student characteristics, including children with special needs, whose learning experiences must be meaningfully supported. Therefore, preservice teacher education programs in Indonesia need to equip future elementary school teachers with the knowledge, skills, and practical competencies to implement inclusive learning. Disability should be addressed as an integral dimension of equity-focused teacher preparation rather than as a peripheral topic (Boardman et al., 2024). Without adequate preparation, teachers may struggle to respond to diverse learning needs, potentially hindering optimal student development and inclusive classroom participation.

In line with these demands, the higher education curriculum in Indonesia has adopted the Outcome-Based Education (OBE) approach, as stipulated in the National Standards for Higher Education, which requires lecturers to design and implement student-centered learning aligned with intended learning outcomes across curriculum design, teaching strategies, and assessment. This approach affects all aspects of education, including instructional design, assessment methods, and the creation of supportive learning environments (Laili Rahmi et al., 2025). However, despite these policy efforts, the national education system continues to face challenges in achieving quality, relevant, and equitable learning for all students (Aryanti et al., 2026). This condition indicates a gap between curriculum expectations and classroom realities, particularly in addressing learner diversity.

This gap is especially evident in teacher education programs. Preservice training often emphasizes theoretical knowledge over practical application, leaving prospective teachers insufficiently prepared for real-world classroom situations (Matović & Spasenović, 2016; Tiwari, 2024). As a result, many teachers lack hands-on experience in inclusive classrooms, which is essential for developing confidence and competence(Nurmaganbetova et al., 2020; Tiwari, 2024). Given that primary school teachers serve as frontline providers of educational services, their ability to respond to diverse student needs becomes crucial.

Special Needs Education is one of the learning outcomes in the preservice teacher students' program curriculum. Understanding how to implement Special Needs Education learning is essential for preservice teacher students, in accordance with Law No. 20, particularly for those majoring in primary school teacher education. Inclusive education creates equitable learning environments that support all students regardless of ability, background, or need by promoting diversity, accessibility, and meaningful participation through responsive pedagogical practices (Rogahang et al., 2024) (Joaquina De Borba et al., 2024). Therefore, primary school teachers, as the key agents of education, are expected to develop comprehensive pedagogical competence and professional capacity to effectively address the diverse learning needs of students, including those with special needs.

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Inclusive education, which brings together children with special needs and their peers in the same classroom, requires specific skills in classroom management. Preservice teacher students need to understand how to create a supportive and welcoming learning environment for all learners. Programs should offer a curriculum that integrates both general education and special education components, fostering a holistic understanding of inclusive practices (Lawless Frank et al., 2024). By acquiring these competencies, future teachers will be better prepared to manage classroom diversity while reducing the risk of discrimination and exclusion of children with special needs.

The existence of government regulations regarding the provision of inclusive education services at the primary school level further highlights the importance of preparing competent teachers. This is mandated in Law No. 20 of 2003 on the National Education System. In addition, the government requires schools to admit at least 10% of students with special needs among new enrollments, which necessitates adequate preparation in terms of teaching personnel, facilities, and curriculum design (Arifin et al., 2023). This provision is further reinforced by Ministerial Regulation No. 70 of 2009, which governs the implementation of inclusive education for students with disabilities and/or those with special talents and giftedness. Therefore, prospective teachers must be equipped with competencies in inclusive education from the outset of their academic training, enabling them to manage classrooms effectively and respond to learners' diverse needs once they enter the teaching profession.

In addition, by understanding the needs of children with special needs, preservice teacher students can develop greater empathy, care, and patience. These values are essential in shaping teachers' professionalism and integrity, enabling them not only to teach with compassion but also to remain committed to giving their best to every learner. Learning inclusive education benefits prospective teachers by fostering positive attitudes towards diversity, enhancing their ability to accommodate various student needs, and equipping them with strategies for effective classroom management, ultimately contributing to a more just and equitable society (Margevica-Grinberga & Šūmane, 2021). Overall, studying special needs education for primary school teacher candidates is not only about strengthening technical competencies but also about reinforcing teachers' roles as agents of change who can create inclusive, fair, and equitable learning environments for all children. This need is particularly urgent in the preservice teacher program, where future educators are trained to work with a wide range of students. The development of interactive instructional materials specifically designed for children with special needs can significantly enhance their learning experiences and outcomes, while also preparing preservice teacher tutors and students to play a stronger role in inclusive educational settings in the future.

Teachers and parents of children with special needs often view technology as an important means of improving learning outcomes, particularly in accommodating diverse learning styles and increasing student engagement (Akdağ et al., 2022; Cagiltay et al., 2019). However, the effective use of technology in inclusive classrooms is still constrained by several challenges, including limited material resources, insufficiently trained personnel, and inadequate learning spaces. Stakeholders therefore emphasize the need to expand access to digital tools, provide specialized teacher training, and develop environments that support multisensory learning (Alcaraz et al., 2024).

In this context, the availability of appropriate teaching materials specifically designed for students with special needs becomes increasingly urgent, especially for preservice elementary school teachers. Well-designed instructional materials such as adaptive modules, interactive digital content, and assistive learning resources not only help bridge gaps in existing resources

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but also serve as practical tools for translating inclusive education principles into classroom practice. Engaging preservice teachers in real-world settings and instructional design projects further strengthens this effort by enhancing their understanding of assistive technologies and their ability to develop effective, inclusive learning materials (Başer & Arslan-Ari, 2023). Without the support of relevant and accessible teaching materials, prospective teachers may struggle to implement inclusive strategies effectively, highlighting the critical need to integrate such resources into teacher education programs.

In this situation, having the right teaching materials meant for students with special needs is becoming more important, especially for new elementary school teachers. Well-made teaching tools, like tailored lessons, engaging online content, and helpful learning devices, not only fill gaps in what is currently available but also serve as useful tools for putting inclusive education ideas into real, effective teaching methods. Following these points, identifying the needs of teachers and students is a key step toward determining which areas need improvement, the challenges upcoming teachers encounter, and the limitations of the available learning resources. By analyzing these needs, we can clearly see what both students and teachers require, enabling the creation of suitable and relevant teaching materials. This analysis focuses on pinpointing the main issues to address when developing modules, while ensuring the teaching tools created meet the standards for learning materials and the needs of educational services (Hadiarni et al., 2025).

To address these challenges, the development of interactive teaching materials for preservice teachers at Universitas Terbuka (UT) that provide up-to-date, contextually relevant information has become essential. Materials designed based on current data and practices can help preservice teachers gain a deeper, more contextually grounded understanding of the needs of children with special needs. This approach can also encourage tutors to foster more analytical learning by using examples and non-examples drawn directly from real situations in inclusive educational settings.

## 2. Literature review

The Interactive Digital Teaching Material (*Bahan Ajar Digital Interaktif*) represents a transformation of Universitas Terbuka's printed teaching materials into a digital format that integrates information and communication technology (ICT), such as laptops, mobile phones, and personal computers. These materials combine text, video, networking, and edutainment elements with in-text activities to enhance students' physical and mental engagement in learning (Sadjati et al., 2023). Interactive multimedia content can prevent learning from becoming monotonous, keeping students alert and engaged in their learning. This not only enriches the learning experience but also equips future teachers with the reflective and adaptive skills essential for addressing learner diversity.

The development of these teaching materials must be based on a comprehensive needs analysis involving various stakeholders, including primary school teacher education students and tutors. Conducting a needs analysis is essential to determine the specific instructional materials students require (Malahayati & Zunaidah, 2021). Both students and tutors play a crucial role in this process, as they are directly involved in teaching and learning activities and possess in-depth insights into learners' needs.

Inclusive education promotes the idea that all children, regardless of differences, should learn together (Budiono et al., 2025). This is especially vital for students with special needs, necessitating adaptations to overcome barriers to their education. Despite challenges, these

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students often reveal exceptional abilities that merit attention (Hidir et al., 2025). Thus, integrating inclusive education into preservice teacher training is essential, and this should be supported by teaching materials such as interactive modules and case studies. Such programs should enhance awareness and focus on instructional differentiation, collaborative teaching, and behavior management (Majoko, 2017; Milovanović et al., 2011). The provision of these materials will facilitate the application of theory in practice, equipping teachers with adaptive skills to meet diverse student needs in inclusive settings.

To gain insights from teachers and other stakeholders, needs assessments frequently employ interviews, surveys, and content analysis (Cagiltay et al., 2019; Ferreira et al., 2014). Through needs analysis, the design of teaching materials can be adapted and aligned to meet the specific requirements of prospective teachers while also enabling tutors to tailor learning experiences to the unique needs and abilities of each child, particularly at the primary school level. Moreover, needs analysis aims to identify gaps in the existing teaching materials and to inform the development of more effective and inclusive resources. In this way, it is expected to improve the quality of education for children with special needs and to support the achievement of high-quality inclusive education.

## 3. Method

The method employed in this study was a descriptive, quantitative method. The measurement instrument used was a questionnaire administered to both tutors and PGSD UT students. Data collection was conducted over a period of three months. The tutor respondents were 21 PGSD tutors who taught the Introduction to Special Needs Education course, while the student respondents were 98 students. The needs assessment questionnaire was used to gather data on perceptions of the existing teaching materials and expectations for the new materials from both tutors and students. The questionnaire was structured around several key indicators, which are presented in Table 1.

Table 1. Indicators of the needs assessment questionnaire for PGSD tutors and students

| No | Indicator | Items |
|---|---|---|
| 1 | Content of Previous Teaching Materials | Overloaded content in the previous materials |
| | | There is a need to update the previous materials. |
| | | Inclusion education in the new teaching materials |
| 2 | Presentation and Language Use | Visualization of the previous materials |
| | | Poor grammar and language quality in the previous materials |
| 3 | Interactive Teaching Materials | Lack of interactivity in the previous materials |

Subsequently, the questionnaire results were analyzed using the percentage formula (Sugiyono, 2019): P = F/N, where P = Percentage of student scores, F = Frequency of student scores, and N = Total number of students.

## 4. Results

The data from the needs analysis questionnaire were grouped into three indicators: the content of previous teaching materials, presentation and language use, and interactive teaching materials. The indicator of content of previous teaching materials consisted of three items: (1) overloaded content in the previous materials; (2) the importance of updating the previous

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materials; and (3) inclusive education in the new materials. The indicator of presentation and language use consisted of two items: the visualization of the previous materials and the poor language quality of those materials. The indicator for interactive teaching materials consisted of one item: the lack of interactivity in the previous materials.

Based on questionnaire responses from PGSD students and tutors regarding the overload of content in the previous materials, the majority of respondents agreed that the content was excessive. More detailed results are presented in Figure 1.

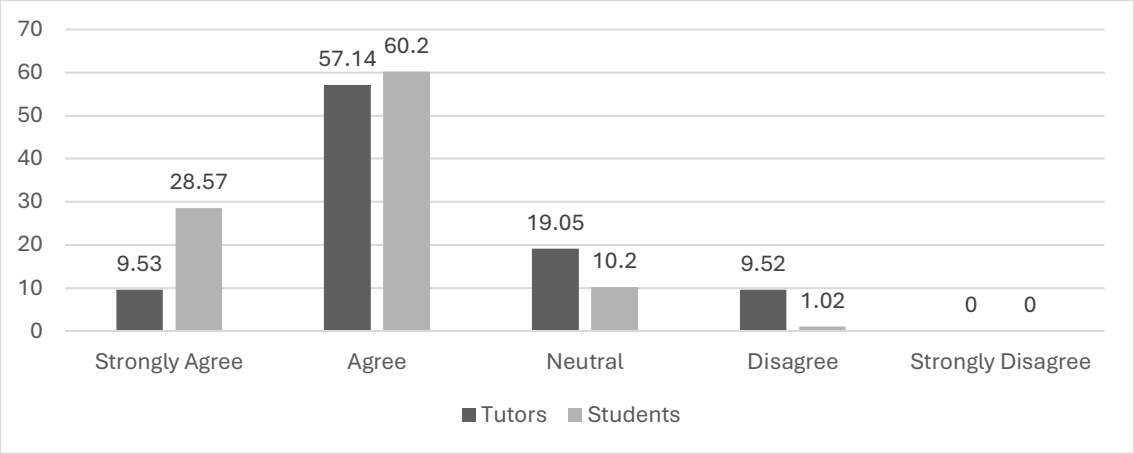



Figure 1. Overloaded content in previous teaching materials

Figure 1 shows that 9.52% of tutors and 28.52% of students strongly agreed that the content in the previous teaching materials was overloaded. Furthermore, 57.14% of tutors and 60.2% of students also agreed that the content was quite dense. In contrast, 19.05% of tutors and 10.2% of students responded neutrally to the statement, while a small proportion—9.52% of tutors and 1.02% of students—disagreed that the materials were overloaded.

Similar results were also found in the indicator concerning the need to update the content of the previous teaching materials. The questionnaire results showed that both tutors and PGSD students agreed on the importance of revising and updating the content. More detailed data are presented in Figure 2.

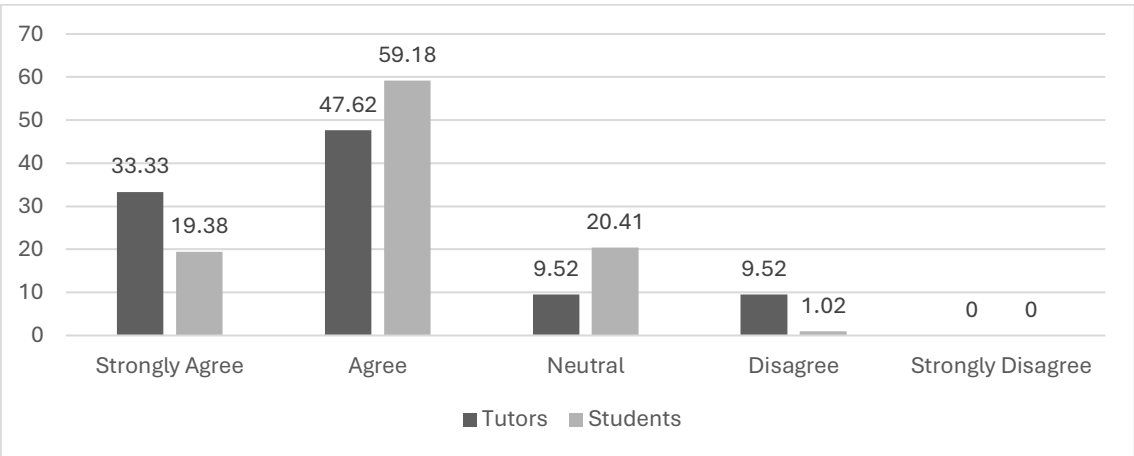



Figure 2. Analysis of content updates in previous teaching materials

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Figure 2 shows that 33.33% of tutors and 19.38% of students strongly agreed on the need to update the content of the previous teaching materials. Similarly, 47.62% of tutors and 59.18% of students agreed with this statement. Meanwhile, only 9.52% of tutors and 1.02% of students disagreed on the need for content updates. In addition, 9.52% of tutors and 20.41% of students responded neutrally.

Furthermore, the results from the inclusive education indicator revealed that most respondents agreed on the importance of including inclusive education in the new teaching materials. A total of 42.86% of tutors and 27.55% of students strongly agreed with its inclusion, while 47.62% of tutors and 61.22% of students agreed that inclusive education should be integrated into the newly developed materials. The complete results are illustrated in Figure 3 below.

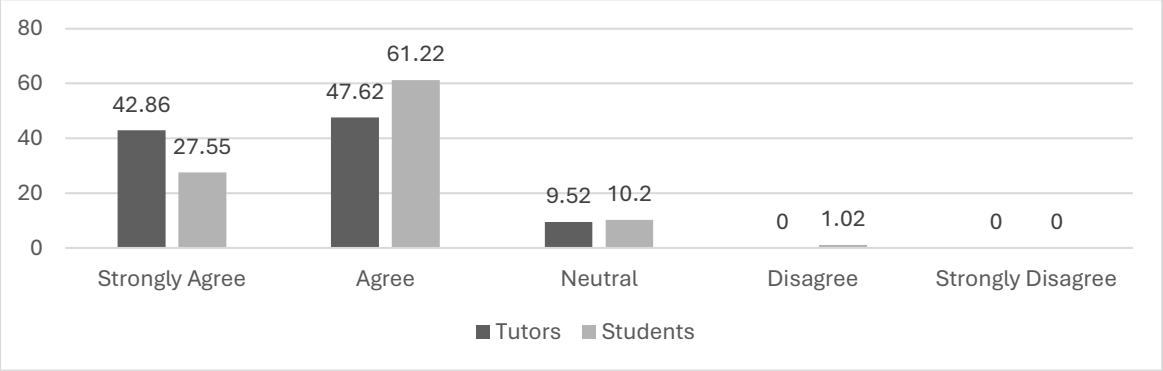



Figure 3. Inclusive education in the new teaching materials

Figure 3 shows that only a small proportion of students and tutors selected neutral or disagreed regarding the inclusion of inclusive education content in the new teaching materials. These results indicate that both students and tutors strongly support the integration of inclusive education into the newly developed materials. It was also noted that inclusive education had not been fully or comprehensively addressed in the previous teaching materials.

In line with the needs analysis results on the content of the previous teaching materials, the findings for the language use and presentation indicator also revealed similar trends. The first item, related to the attractiveness of the visualization of the previous teaching materials, showed that 61.9% of tutors and 50% of students agreed that the materials were still visually appealing. These findings are illustrated in Figure 4.

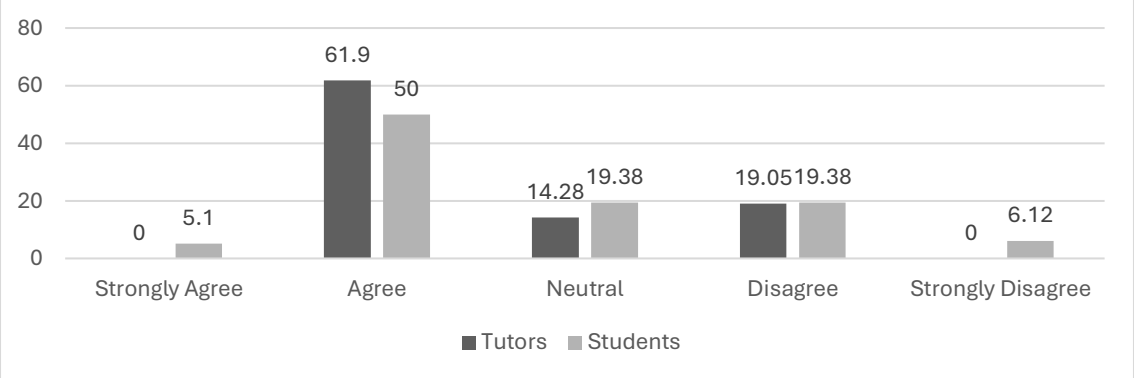



Figure 4. The attractiveness of visualization in the previous teaching materials

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Figure 4 shows that only a small proportion of tutors and students disagreed or strongly disagreed with the statement that the visualization of the previous teaching materials was attractive. Specifically, 19.05% of tutors and 9.38% of students disagreed, while 6.12% of students strongly disagreed with the statement that the visualization of the old teaching materials was appealing. These results indicate that although most respondents found the visualization adequate, a small proportion of tutors and students expressed a need to improve the visual aspects of the teaching materials to make them more engaging.

Conversely, the questionnaire results for the second item, regarding the language use of the previous teaching materials, revealed that the majority of tutors and students disagreed or strongly disagreed that the language in the old teaching materials was inadequate. This finding demonstrates that, in terms of language quality, the previous teaching materials were generally considered acceptable. The detailed results are illustrated in Figure 5.

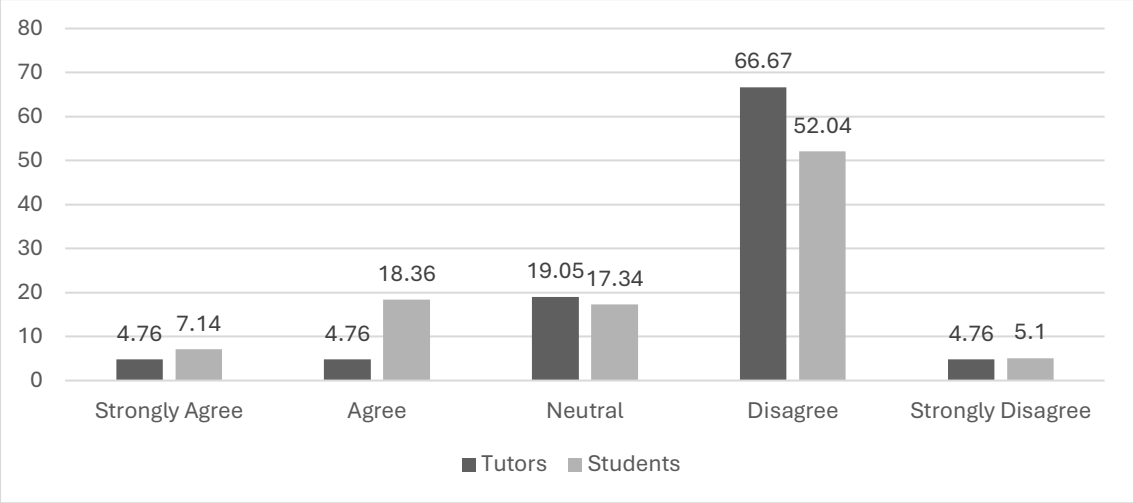



Figure 5. Language use in the previous teaching materials was considered inadequate

The questionnaire results presented in Figure 5 indicate that only a small proportion of tutors and students strongly agreed or agreed that the language used in the previous teaching materials was inadequate. Meanwhile, 19.05% of tutors and 17.34% of students selected the neutral option. Most respondents, comprising 66.67% of tutors and 52.04% of students, disagreed that the language in the old teaching materials was poor. These findings suggest that, overall, the language quality of the previous materials was regarded as acceptable by both tutors and students.

Moving on to the final indicator, namely the interactivity of the previous teaching materials, the questionnaire results showed a noticeable difference between tutors and students. A total of 61.9% of tutors disagreed that the interactivity of the old teaching materials was lacking. In contrast, only 28.6% of students disagreed with this statement. The results concerning the interactivity of the previous teaching materials are presented in Figure 6.

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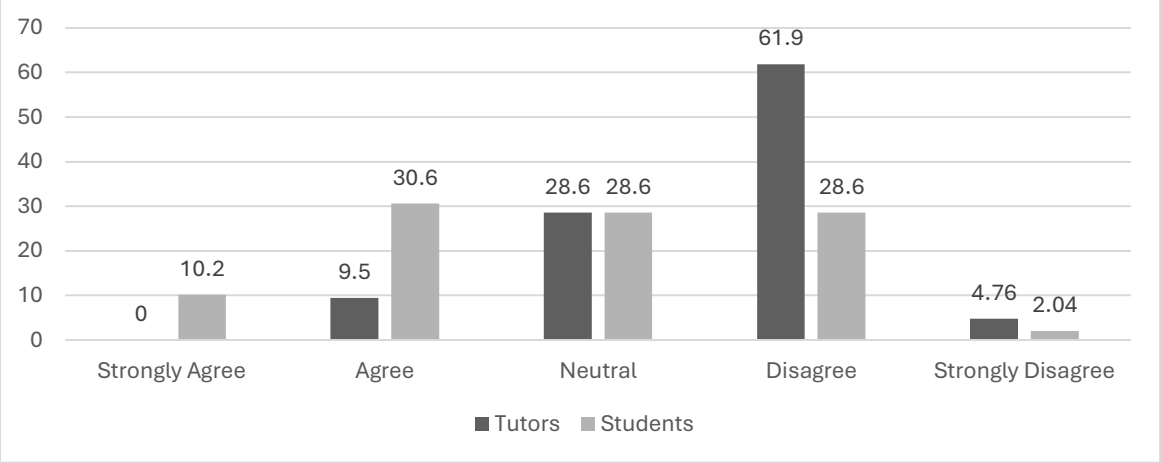



Figure 6. Lack of interactivity in the previous teaching materials

Figure 6 illustrates that 10.2% and 30.6% of students strongly agreed and agreed, respectively, that the interactivity of the previous teaching materials was insufficient. Meanwhile, 28.6% of both tutors and students selected the neutral response for this indicator. These findings indicate that most students perceived the interactivity of the old teaching materials as inadequate, whereas most tutors considered it sufficient.

## 5. Discussion

The needs analysis of the previous teaching materials was carried out by grouping data into three main indicators: the content of the old materials, language and visual presentation, and interactivity. The findings confirm that developing teaching materials for the Special Needs Education (ABK) course is necessary to align with current learning needs and ongoing curriculum development, which demand continuous renewal.

For the first indicator, most students and tutors found the old materials overly dense. This highlights the need to simplify and reselect content to make the materials more practical and accessible. By breaking down complex texts into more digestible formats, learners are more likely to engage with the content effectively, leading to better retention and understanding (Garbacea et al., 2020). Respondents also indicated that while the materials were generally clear, they lacked sufficient concrete examples for classroom application.

About content revision, most respondents agreed on the need to update the materials. The existing content does not fully reflect recent scientific developments or learner needs. Adaptive materials are essential as they adjust to changing student interests and contexts, ensuring relevance and engagement (Maulana & Wiyono, 2024). Students expressed the expectation of more applicable content accompanied by classroom-based examples. A strong consensus also emerged in favor of integrating inclusive education into the new materials. This underscores the importance of embedding inclusive values in primary education, as it promotes social development by enabling students with and without disabilities to interact, fostering understanding and tolerance (Gniazdowska, 2019). For the second indicator, visual presentation of the old materials was considered attractive by most respondents, though some expressed the need for improvement to enhance engagement. In contrast, the language in the old materials was generally deemed sufficient, indicating that the linguistic quality met academic standards.

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The third indicator, interactivity, revealed different perspectives between tutors and students. While many tutors felt the materials were interactive enough, students largely perceived them as lacking interactivity. This gap underscores the importance of considering learners' perspectives in developing new materials. Interactive learning designs that encourage learner-content interaction and participation can foster student ownership of the learning process (Tsang, 2008; Yang, 2022). Compared to printed materials, Universitas Terbuka's Digital Interactive Teaching Materials (BA Digital Interaktif) are distinguished by four integrated characteristics: multi-representation, interactivity, in-text activity, and edutainment (Sadjati et al., 2023). Such materials should also feature a user-friendly interface to support both independent and collaborative engagement (Azman et al., 2022). This approach is expected to address students' needs for more engaging and interactive learning experiences.

These results indicate that modernizing instructional materials requires not only content revision but also more engaging and innovative approaches. This shift is essential, as innovative learning media can enhance students' motivation and understanding (Rudi Hermansyah Sitorus et al., 2025), particularly for preservice teachers who often struggle to apply theoretical knowledge in practice (Evitasari et al., 2025; Sari et al., 2026)

However, although Open Educational Resources (OER) such as textbooks, slides, and videos are widely used (Pitt, 2023), many lack interactivity, which is crucial for active learning (Suwanwong & Jamiat, 2026). This highlights the need for more engaging OER, especially digital interactive textbooks that integrate video, audio, illustrations, and embedded learning activities. Such features enhance engagement, support self-directed learning, and improve outcomes (Verkuyl et al., 2021), while also enabling innovative approaches like project- and problem-based learning and supporting differentiated, inclusive instruction (Jovkovska, 2023; Subrahmanyam, 2025). Additionally, they foster digital literacy among preservice teachers, preparing them to integrate technology effectively (Paskevicius, 2023).

Therefore, developing interactive, media-rich teaching materials is a strategic step toward more inclusive, engaging, and practice-oriented learning.

## 6. Conclusion and implications

Based on the needs analysis of the existing teaching materials in the PGSD study program, the findings confirm the urgency of transforming the materials into a digital interactive format that is more relevant, inclusive, engaging, and participatory. The old materials were generally perceived as overloaded and in need of revision, as their content was not fully aligned with current learning demands. Respondents strongly supported integrating inclusive education into the new materials, emphasizing the need to embed inclusivity to broaden access and promote equity in learning.

In terms of design, while the visualization of the old materials was still considered sufficiently attractive, there was a clear expectation for an enhanced presentation that better suits the preferences of the digital-native generation. The linguistic quality of the materials was judged to be adequate, indicating that language is not a primary concern for revision. However, a discrepancy emerged in perceptions of interactivity: students found the old materials lacking in interactive elements, whereas tutors generally considered them sufficient. This contrast highlights the importance of developing interactive features that are responsive to learner needs and encourage active engagement.

Overall, the analysis demonstrates that the new interactive teaching materials should prioritize streamlined content, updated and inclusive material, improved visual appeal, and

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enhanced interactivity. These elements are essential for preparing PGSD students to become future educators who are reflective, adaptive, and responsive to the diversity of learners in inclusive educational settings.

## 7. Limitation

This study has several limitations. First, the research was conducted in a single institutional context, namely the PGSD program at Universitas Terbuka, which may limit the generalizability of the findings to other teacher education settings. Second, the data relied on self-reported questionnaires and interviews, which participants' subjective perceptions may influence. Third, this study focused on needs analysis and did not examine the development or effectiveness of the proposed interactive digital teaching materials. In addition, the number of tutor respondents was relatively limited. Despite these limitations, the findings provide valuable insights for developing inclusive and interactive teaching materials.

**Credit authorship contribution statement**

**Monika Handayani** contributed to conceptualization, methodology, instrument development, data collection, formal analysis, writing – original draft; **Uliya Khoirun Nisa** contributed to the methodology, data curation, validation, writing, review & editing; **Andayani** contributed to the resources, supervision, writing, review & editing; **Rif'at Shafwatul Anam** contributed to the project administration, funding acquisition, formal analysis; **Ika Tri Yuanika** contributed to the proofreading, supervision, writing, review & editing.

**Declaration of competing interest**

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

**Data Availability Statement**

Data supporting this study can be obtained from the corresponding author upon reasonable request. Access is limited to ensure the privacy and confidentiality of human participants.

**Ethical Declaration**

This study involved human participants (preservice teacher student tutors and preservice teacher students) and was conducted in accordance with the principles of the Declaration of Helsinki. Prior to data collection, all participants were informed about the study's purpose, procedures, the voluntary nature of participation, and their right to withdraw at any time without consequence. Written informed consent was obtained from all participants. To protect confidentiality, no personally identifiable information was collected; all records were anonymized at the time of collection, stored securely, and access was restricted to the research team. The study protocol was reviewed and approved by the relevant institutional review process.

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**Declaration of AI Statement**

AI tools were used only to refine wording and strengthen the presentation of ideas in this manuscript, not to generate the article itself. The authors independently developed all content, reviewed and revised it in

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full, and are fully responsible for its accuracy and integrity. No AI was used for data generation, analysis, or decision-making related to the findings.

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