Proceedings of the 2nd International Conference on Islamic Education and Science Development (ICONSIDE)
Fakultas Tarbiyah dan Keguruan, Universitas Islam Negeri Mataram, Indonesia
Mataram, 11-12 June 2024 *Available online at* https://proceeding.uinmataram.ac.id/

Implementation of Learning Innovations in Quality Inclusive Education to Support SDG's 4 in Primary Education

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ABSTRACT

This research aims to analyze the application of learning innovations in inclusive education at the primary education level and how they can support the achievement of Sustainable Development Goals (SDGs) 4, which focuses on quality education. The method used in this research is a literature study, which involves collecting references from various websites and international journals. The basis of the discussion comes from the results of a literature review through several sources of scientific articles and relevant journals from previous studies that are in accordance with the topics discussed. The results show that the implementation of learning innovations, such as the use of educational technology, differentiated teaching methods and collaborative learning approaches, has had a positive impact on the engagement and learning outcomes of students with special needs. However, challenges such as limited resources, lack of teacher training and systemic barriers still hinder effective implementation. This research also found that by addressing these challenges, learning innovations can significantly contribute to achieving SDG 4 by improving the accessibility, inclusiveness and quality of primary education. Therefore, policy and practice recommendations are proposed to support the further development of inclusive education through learning innovations. Thus, this study emphasizes the importance of a shared commitment from various stakeholders to create inclusive and quality learning environments to achieve the goal of a more equitable and just education for all students.

KEYWORDS: Learning Innovation, Inclusive Education, Primary Education, SDGs 4, Quality of Education

INTRODUCTION

Inclusive education is a fundamental approach that aims to provide equal opportunities for all students, regardless of their background, abilities or special needs, to access quality education. The concept of inclusive education is gaining global momentum as it promotes equality and ensures that every child has an equal

opportunity to learn in mainstream classrooms. Inclusive education includes not only spatial inclusion but also the diverse needs of students, which can be challenging for teachers. Inclusive education is a fundamental right that guarantees equal opportunities, participation and progress for all students, and emphasizes the importance of offering high-quality education for children with special needs (Amanova & Amanova, 2023; Medina-García et al., 2020).

Inclusive education in Indonesia began in the 1980s with the aim of promoting social inclusion and providing equal educational opportunities for all students (Suryadi, 2023). Educational services that bring together students with special needs with regular students are expected to increase attitudes of tolerance, empathy and cooperation among all students. The readiness of primary schools to implement inclusive education for children with special needs is a key factor in the successful implementation of this program. By developing appropriate policies, adapting teaching, modifying the curriculum and fostering collaboration among various stakeholders in inclusive education schools, it is expected that learning can be tailored to the needs of all students. The whole person approach is a core feature of inclusive education and needs to be applied in learning in inclusive classrooms.

Research shows that inclusive education not only benefits students with diverse needs but also positively impacts all students by fostering a sense of belonging, participation and access to the general education curriculum (O'Sullivan et al., 2021). In line with the broader equality agenda, inclusive education aims to eliminate discriminatory practices and create learning environments that value diversity and promote social justice. By building schools that value diversity and uphold democratic principles, inclusive education contributes to building a more just and inclusive society.

Despite the challenges, inclusive education is recognized as a significant driver of change in education systems around the world, to meet the critical need for equity and inclusion in education. Sustainable Development Goal 4 (SDG 4) focuses on ensuring inclusive and equitable quality education for all individuals, while promoting lifelong learning opportunities (Chen et al., 2021; Kioupi & Voulvoulis, 2019; Lane, 2017; Nasution & Nusa, 2021; Saini et al., 2023; Tantranont & Sawatdeenarunat, 2023; Thomas, 2022). SDG 4 emphasizes the importance of providing high-quality education that is accessible to all people, regardless of their background or circumstances, to foster personal development and contribute to the progress of Society.

Quality education, as outlined in SDG 4, is considered a fundamental right and key driver for achieving sustainable development. It plays a critical role not only in improving individual learning outcomes, but also in advancing other interconnected goals such as gender equality, reducing inequality, economic growth and environmental sustainability (Chen et al., 2021; Nogueiro et al., 2022). Sustainable Development Goal 4 is critical in promoting inclusive, equitable and quality education for all individuals, which not only contributes to personal development but also to the achievement of broader sustainable development goals. By focusing on SDG 4,

countries can work towards creating a more just, prosperous and sustainable future for all.

One form of support for the implementation of SDG 4 is the creation of learning innovations. Learning innovations in inclusive education in primary education have evolved with a variety of approaches that aim to create an inclusive learning environment for all students. One innovation that has developed is the use of artificial intelligence (AI) technology in creating a more inclusive and accessible learning environment for students with disabilities (Adeleye et al., 2024). AI technology can help create more diverse and inclusive learning environments, which in turn can promote a culture of acceptance, respect and inclusion among all students.

Learning approaches that focus on developing 21st century skills, such as collaboration, problem solving and technology, have also been a growing innovation in inclusive education (O'Sullivan et al., 2021). Classroom practices that center on developing 21st century skills have the potential to positively impact the educational outcomes of students with special needs. In addition, the flipped learning approach has also been a growing innovation in inclusive education in primary education. Implementing flipped learning, where students acquire learning materials outside of class and use class time for discussion and application of concepts, can create a more inclusive learning experience for all students.

Seeing the importance of inclusive education as an effort to provide equal opportunities to all students, regardless of their backgrounds, abilities, or special needs, innovations in inclusive education in primary education urgently need to be developed with various approaches. From the integration of technology, such as gamification and flipped learning, which can improve the teaching and learning process, making education more interactive and engaging (Sánchez et al., 2020), collaboration between related institutions, the use of AI technology, to the implementation of flipped learning, which aims to create an inclusive learning environment for all students. Through the adoption of educational innovations, educators can advance equity, engagement and inclusivity in education, ultimately promoting a more inclusive and equitable learning experience for all students.

METHOD

This research adopts a literature study-based research method that involves collecting and analyzing various written sources relevant to the topic. The research focuses on theoretical and empirical reviews of journal articles, books, research reports and policy documents related to learning innovation and inclusive education. The main objective is to identify, evaluate and synthesize previous findings on innovative learning strategies that can improve the quality of inclusive education at the primary education level, thus supporting the achievement of Sustainable Development Goal (SDG) 4, which is to ensure inclusive and quality education and promote lifelong learning opportunities for all. Through this literature review, it is hoped that best practices and recommendations can be found to improve the effectiveness and efficiency of inclusive education and address the challenges faced in

its implementation in various primary education contexts.

Result and Discussion

Learning Innovation in Inclusive Education

Forms of learning innovation in inclusive education in primary education can vary depending on student needs and available resources. The following are some forms of learning innovations found by the author from several writings that discuss learning innovations in inclusive education.

A. Technology-based learning

- **Educational Software**

This is the use of computer applications and programs specifically designed to help students with special needs, such as screen reader software or interactive learning applications. Educational software specifically designed to assist students with special needs has grown rapidly in Primary Education. Examples of this form of software include the use of interactive learning applications and computer programs that support student learning.

For example, the development of Virtual Reality (VR)-based learning media has brought significant positive impacts in the world of education. The use of VR has been proven effective in improving the understanding of the material, such as in explaining the topic of the solar system to students. Research also highlighted the role of VR in building students' dialogical abilities in mathematics learning, with the aim of achieving complementarity between teaching staff and teaching materials, and providing more learning benefits to students.

In addition, the implementation of VR in learning can also make the learning process more interesting and motivate students to be more active in understanding and mastering the subject matter, as observed in a study by (Sani et al., 2023). VR technology support has also been proven effective in increasing the efficiency of self-learning, as shown by (Hastapatria, 2023), which allows users to experience being in a virtual world and conduct learning anywhere and anytime. The development of Virtual Reality-based learning media not only provides a more interactive and interesting learning experience, but also opens up opportunities to improve material understanding, build students' dialogic abilities, and increase the efficiency of independent learning.

In addition, the development of Android-based learning media without coding has become a significant breakthrough in the world of education. With the existence of learning applications that can be created without having to master programming languages, as mentioned by (Setiawan et al., 2020), it has enabled the creation of learning applications that can increase student motivation in the learning process. This is in line with the findings of several other studies that highlight the development of Android-based learning media to increase students' learning motivation and academic achievement, such as those conducted by (Lubis & Ikhsan, 2015; Yohanes Bare et al., 2021). Moreover, research by (Fitria et al., 2024;

Hidayat & Nur, 2022) showed that the use of Android-based animated games can also improve science knowledge in children.

In the context of learning in the digital era, Android-based interactive media, as studied by (Fitria et al., 2024; Yahya et al., 2023), are also able to increase students' interest and enthusiasm for learning. The use of Android-based learning media not only has an impact on student learning motivation, but can also improve learning outcomes. With various applications and development methods used, such as using Smart Apps Creator (SAC) as mentioned by (Tristanti & Iffah, 2022), it has been proven effective in improving learner learning outcomes.

The integration of augmented reality technology in learning has brought about a paradigm shift in education. As mentioned by (Dasar et al., 2022), the use of augmented reality technology has proven effective in creating a more interactive learning environment and increasing student interest. Research by (Rachim et al., 2024) emphasizes that a good learning process should include interactive, fun, challenging, motivating aspects, and provide more space for students to develop creativity and independence according to students' talents and interests. In addition, highlights that the use of augmented reality in learning can improve learners' motivational factors, such as attention, relevance, confidence, and satisfaction.

This is in line with the concept that augmented reality combines two- or three-dimensional virtual objects and projects these virtual objects in real time. The implementation of augmented reality in learning has also been proven effective in making the learning process more interesting and motivating students to be active in understanding the subject matter. Thus, the use of augmented reality technology not only creates a more interactive learning environment, but also helps in increasing students' interest and learning effectiveness.

In the context of educational software development, it is important to pay attention to quality requirements as a key factor in successful software development. In addition, software quality testing by applying the ISO 9126 standard is also an important step in ensuring the quality of educational software, such as e-Books (Supriyono, 2019). Thus, through the development of various forms of innovative and interactive educational software, primary education can be further optimized to support the learning needs of students, including students with special needs.

- **E-Learning and Online Platforms**

Is the use of online platforms to provide learning materials that are accessible to all students, including those with physical or sensory impairments. In the context of inclusive education in primary schools, it is important to pay attention to the use of online platforms that support student diversity.

The use of mobile applications in learning management systems (LMS) has become an interesting focus of research, especially in an effort to improve learning effectiveness. For example, research by (Kartiko et al., 2022) highlighted the

integration of mobile apps into LMS as a strategy to improve learning effectiveness. This is in line with the findings from other studies that emphasize the importance of technology utilization in education, such as who discussed the strategies of special mentor teachers to improve the executive function of students with autistic special needs. In the context of primary education, the application of technology such as mobile applications in the LMS can provide better support for students with special needs, as emphasized in the study by (Jamaluddin et al., 2022) on the implementation of inclusive education in Islamic Religious Education subjects.

In addition, research by (Utama, 2021) highlights the design model of inclusive education implementation that has been implemented in the form of digitization or learning media based on technology and information. This shows that the use of mobile applications in the LMS can not only improve learning effectiveness, but also support efforts to create an inclusive and supportive learning environment for all students, including those with special needs. Therefore, the integration of mobile apps into LMS in Primary Education can be an important step in improving the quality of learning, expanding accessibility, and supporting inclusive education for all students.

Another form of LMS that can be used in schools is the use of the Edmodo application. The use of Edmodo apps in primary schools has become a concern in an effort to improve learning effectiveness. For example, research by (Sefriani et al., 2021) shows that Edmodo is able to provide features that support teachers in managing teaching materials, creating assignments, and supporting the learning process. In addition, research by (Nur, 2021) highlights the importance of socializing the Edmodo application as an alternative online learning media in Madrasah Ibtidaiyah, which allows easy access and exploration of learning materials, and provides flexibility in the learning process.

The use of Google Classroom apps in primary schools has also been a significant innovation in education. A number of studies have highlighted the benefits of using this application, as mentioned by (Hartadi et al., 2019), who emphasized the importance of implementing online learning in primary schools. In addition, research by (Diana & Yatri, 2021) showed that Google Classroom facilitates assignment delivery and learning management between teachers and students through a web platform. The features of Google Classroom, such as time saving, quick organization, and increased cooperation, have helped in improving learning effectiveness.

The implementation of Google Classroom in elementary schools has also been proven effective in supporting online learning, as observed in a study by (Aulia et al., 2022), which highlighted the ease of managing assignments without the use of paper. In addition, Google Classroom also enables interaction between teachers and students inside and outside the classroom. With Google Classroom, learning can be more effective and structured, allowing teachers and students to stay connected in online learning in the digital era.

In addition to the three applications mentioned, the author also found an online

platform commonly used in learning, namely Microsoft Teams for Education. The use of Microsoft Teams for Education in elementary schools has been a breakthrough in education. A number of studies have highlighted the benefits of using this application, as mentioned by (Rahayu & Subagyo, 2022), who emphasized the effectiveness of Microsoft Teams application in increasing students' learning motivation in online learning. With the Microsoft Teams application, the interaction between teachers and students can be well established, learning becomes clearer and easier to understand, and there are more activities that students and homeroom teachers can do in online learning. This is in line with the findings of research which states that the use of Microsoft Teams in online learning in elementary schools can improve student understanding and efficiency in the learning process.

B. Differentiated Teaching Methods

- **Individualized Learning**

This is adjusting the curriculum and teaching methods according to the needs and abilities of each student. One approach that has been studied is the use of the Team Assisted Individualization (TAI) learning method to improve students' creative thinking skills in certain materials. This research highlights the importance of creative thinking skills in the context of education, which can be improved through an individualized approach (Muhali, 2019). This shows that education needs to pay attention to aspects of creativity in the learning process to meet the demands of an ever-changing era.

The individualization approach in learning can also be applied through strengthening character education. Character education is considered an important element in the education process to form positive values in each generation. Thus, the integration between individualized learning and character education can provide a solid foundation in creating a holistic learning environment. In addition, learning management also plays an important role in supporting the individualization approach. Effective learning management, especially in the context of inclusive schools, can assist teachers in aligning the curriculum and teaching methods with the needs of individual students (Fuadi et al., 2023). Teachers' experience in planning, implementing and evaluating learning for learners with special needs is key in ensuring that every student gets an education that fits his or her capacity.

- **Multisensory Approach**

Multisensory approaches to learning, which use multiple senses to help students understand concepts, have been the focus of research in various educational contexts. One study highlights the use of visual, audio and kinesthetic teaching aids in primary schools as part of this approach. This approach aims to provide a more thorough and in-depth learning experience for students, by utilizing the various senses available (Muhali, 2019).

In addition, other research shows that realistic and scientific learning approaches

can also have a positive impact on learning achievement, mathematical reasoning ability, and students' interest in learning. This shows that the use of approaches that involve various sensory aspects in learning can improve overall student learning outcomes (Wibowo, 2017). In the context of strengthening character education in elementary schools, the contextual approach has also been proven effective in shaping students' character. The integration between multisensory approach and character education can provide a solid foundation in creating a holistic and sustainable learning environment. So, it can be concluded that the multisensory approach in learning, especially in elementary schools, is an effective strategy in helping students understand concepts thoroughly and deeply.

C. Flexible and Adaptive Curriculum

➢ Inclusive Curriculum

An inclusive curriculum is an approach that allows for adaptation to different levels of student ability, thus ensuring equal access to learning materials. Curriculum adjustments are not only limited to content but also to learning objectives (Widiyawati et al., 2022). Schools that provide inclusive education are required to adjust the curriculum to meet the needs of diverse students. Curriculum implementation in inclusive schools requires appropriate methods, such as qualitative and descriptive approaches, which can help in adjusting learning to the characteristics of learners.

Research on inclusive curriculum also highlights the importance of adaptation in emergency situations, such as during the Covid-19 pandemic. Implementing an emergency curriculum during this time requires qualitative methods and interview and observation techniques to ensure learning continues. In addition, in the context of inclusive education, curriculum modifications are also needed to accommodate student needs with an integrative holistic approach (Nurjannah & Hermanto, 2023).

In implementing inclusive education, curriculum management plays an important role. The implementation of curriculum management in inclusive education requires the active participation of all relevant parties, such as school stakeholders (Hairit, 2024). The impact of inclusive education can also be seen in the increased participation and achievement of students with special needs, which can be measured through a mixed methods research design that combines quantitative surveys and qualitative interviews.

Thus, through curriculum adjustments, implementation of appropriate learning methods and effective education management, inclusive education can provide equal access to learning for all students, without exception.

➢ Project-based Learning

Project-based learning is an approach that allows students with various abilities to work together and contribute according to their expertise. This learning model encourages students to actively participate, create, and collaborate in completing learning projects. Research shows that project-based learning can improve

students' collaboration skills, allowing them to work together in achieving learning objectives (Ulhusna et al., 2020). In addition, project-based learning can also improve students' learning activities and outcomes, especially in developing skills according to the needs of learning content (Vidyastuti, 2022).

The implementation of project-based learning requires careful planning and clear stages, such as socialization, planning, monitoring, evaluation, and reflection. It can also be integrated with synchronous and asynchronous online methods to expand the collaboration space between students and enrich their learning experience. In addition, project-based learning can also be developed by utilizing information technology, such as the use of e-portfolios, to support collaborative assessment and adaptive learning (Rahardja, 2022). Therefore, project-based learning not only facilitates students in developing collaborative skills, but also enables them to apply knowledge and expertise in a relevant and meaningful learning context.

D. Use of Learning Assistants

- **Assistive Technology**

The use of assistive technology such as tablets, computers with special accessibility, or augmentative and alternative communication (AAC) devices has been shown to make a positive contribution in helping students communicate and learn. Various studies have highlighted the importance of technology integration in inclusive education.

Research by (Ilham et al., 2024) discusses assistive technology assistance for students with special needs in inclusive schools, highlighting the importance of technology integration in supporting the learning of students with special needs. Assistive technology assistance for students with special needs in inclusive schools requires the involvement of both teachers and students to become familiar with assistive devices and software available in their schools that can be used to provide accommodations, substitutions, modifications, adjustments, and adaptations needed to help students with special needs access the existing environment, curriculum, instruction, or assessment practices.

The integration of assistive technology in the teaching and learning process aims to address the challenges faced by students with disabilities in educational institutions. In this context, assistive technology not only acts as an assistive device, but also as a means for students with special needs to access the general education curriculum. In addition, emphasizes that with assistive technology, students with special needs can have better access to education and daily life.

- **Companion Teachers and Classroom Helpers**

In the context of inclusive education, highlights the role of special mentor teachers in providing optimal services for children with special needs in inclusive schools. Mentor teachers and classroom assistants play an important role in providing extra attention to students with special needs in an inclusive school environment. They work closely with the school community, including teachers, parents, students, the school administrative team and the rest of the school community, to

maximize teacher performance and ensure that each student gets the attention and assistance appropriate to their needs. In addition, assistant teachers also play a role in assisting classroom teachers in identifying and determining appropriate actions for students with special needs, so that the learning process can run more effectively and inclusively (Nur Rahmi et al., 2024).

E. Inclusive Learning Environment

➢ Accessible Classroom Design

Universal Design for Learning is an approach that aims to create learning environments that are inclusive and accessible to all individuals, without exception. The principles of universal design, also known as inclusive design, accessible design, and barrier-free design, aim to remove barriers and create a comfortable environment for all individuals (Mansoori et al., 2024). The universal design approach offers negotiation between the demands of the user and the environment to maintain full inclusion by removing barriers.

Universal Design for Learning (UDL) is a research-based framework that helps educators plan learning to meet the diverse and variable needs of learners, design flexible learning environments, while identifying and minimizing hidden barriers to learning ("Technology from the UDL Perspective Enhances the Effectiveness of Teaching and Learning Processes", 2022). UDL principles are based on three main aspects, namely providing multiple ways for engagement, representation, and action and expression (Moffat, 2022).

Universal Design for Learning also includes Universal Design of Instruction (UDI), Universal Instructional Design (UID), and Universal Design for Learning (UDL). Through the application of UDL principles, learning environments can be designed in such a way that all students have an equal opportunity to succeed. By utilizing the UDL framework, educators can create learning environments that are inclusive, flexible and accessible to all individuals.

Thus, Universal Design for Learning is an important approach in creating inclusive learning environments, where all individuals, including those with special needs, can learn effectively and feel supported in the learning process.

➢ Learning aids

An inclusive learning environment can be enhanced by the presence of learning aids such as braille, audio books or interactive whiteboards that can be used by all students. The use of assistive technology in special education has been shown to provide significant benefits in improving the accessibility and participation of students with special needs in the learning process (Tanrıkulu, 2023). For example, technologies such as Braille printers, text-to-voice technology and screen magnification software can help students with visual impairments to access learning materials more effectively.

The application of these learning aids can also include the use of screen reader software, voice recordings, podcasts, e-books, and digital Braille devices, all of which aim to increase the accessibility and engagement of students with special

needs in the learning environment. With appropriate learning aids in place, such as interactive whiteboards that allow for multiple ways of presenting information, teachers can create inclusive and engaging learning experiences for all students.
Through the integration of diverse learning aids, schools can create learning environments that support diversity and ensure that all students have equal access to learning materials. Thus, the use of assistive technology and other learning aids can strengthen the principle of inclusion in education and provide fair opportunities for all students to succeed in the learning process.

F. Teacher Training and Development

➢ Inclusive Training

Inclusive training is a program aimed at teachers to improve their understanding of implementing inclusive education strategies and recognizing students' special needs. In this context, it is important for teachers to be well qualified and prepared in inclusive education practices. Research shows that specialized training, seminars and training sessions on children with disabilities can increase teachers' positive perceptions of inclusion and agreement on the importance of inclusive education (You et al., 2019). In addition, inclusive training in the context of education is a program that aims to provide teachers with the understanding and skills to implement inclusive education strategies and recognize students' special needs. This training can take the form of workshops, seminars and specialized training sessions designed to increase teachers' understanding of inclusion, improve skills in providing reasonable accommodations and strengthen inclusive education efforts in creating a learning environment that supports student independence and values diversity as a positive asset (Rofiah et al., 2024; Vania & Rizal, 2024).

➢ Interprofessional collaboration

Interprofessional collaboration is an important approach to providing comprehensive support to students. In this context, collaboration between various parties such as psychologists, therapists and other experts is key in providing holistic educational services that meet students' needs. This collaboration allows professionals to share knowledge, skills and experiences to provide integrated and effective support to students.
Research shows that collaboration between professionals, especially in the context of health education, can improve the quality of services and care provided to individuals, as in the case of Covid-19 patient care. In addition, interprofessional collaboration can also strengthen the implementation of education and health service policies, and ensure that various aspects of students' or patients' needs can be met as a whole (Arifin, 2017; Fikri et al., 2023).
In practice, interprofessional collaboration requires effective communication, mutual understanding, and solid teamwork. Professionals must be able to work together synergistically, appreciate each other's contributions, and focus on joint efforts to provide the best service to students or patients. Thus, interprofessional

collaboration not only enriches educational and health care practices, but also ensures that the needs of individuals can be met in a comprehensive and holistic manner.

Supporting Factors and Inhibiting Factors

With the various types of learning innovations in inclusive education in primary education, there

will be several supporting factors and inhibiting factors in the implementation of these innovations. From the findings of several articles, the author concludes as below:

A. Supporting Factors

1) Education Policy

- **Government regulations and support**

The existence of clear policies and government support for inclusive education, as guaranteed in the Education Law, provides a strong foundation for the implementation of inclusive education (Jamaluddin et al., 2022). This suggests that the existence of supportive regulations and government commitment are crucial in ensuring that every child, including those with special needs, has equal access to education that suits their needs. The law on the education system also emphasizes that inclusive education applies not only to children with physical needs but also to children with different social, cultural, geographical and linguistic needs. Thus, inclusive policies cover not only physical but also social, cultural and linguistic aspects so that every child can receive education services that suit their needs.

- **Funding**

Funding plays an important role in inclusive education at the primary level. The allocation of adequate funds for inclusive education programs, including resources and training, is key in ensuring the sustainability and effectiveness of such programs. With adequate funding, schools can obtain the necessary resources to support the success of the inclusive program, such as inclusive facilities, training for teachers and curriculum development according to the needs of students with special needs. Adequate funding is an investment in creating an inclusive learning environment for all students, including those with special needs.

2) Infrastructure and Resources

- **School facilities**

Infrastructure and resources play an important role in supporting the implementation of learning innovations. School facilities, as part of the infrastructure, play a crucial role in improving the accessibility of education. According to (Siswanto & Hidayati, 2020), educational facilities and infrastructure are crucial to improving the quality of teaching and learning

processes in schools. Adequate infrastructure support, such as disability-friendly classrooms, can create an inclusive and supportive learning environment for all students, including those with special needs.

In addition, (Kurniati et al., 2019) showed that infrastructure also plays a role in supporting access to resources, market information, financial services and technology. This shows that infrastructure includes not only physical buildings, but also other aspects that support the smooth learning process and innovation in the educational environment.

- **Education Technology**

Educational technology plays an important role in supporting learning innovation, especially in creating inclusive accessibility for all learners. Advances in Information Communication Technology (ICT) can be used to create innovative educational concepts that build platforms for learning activities. In this context, access to technological devices such as computers with accessibility software, tablets, and hearing aids is crucial to support inclusive learning.

3) Teacher Training and Development

A comprehensive teacher training program is essential in preparing educators to understand and implement inclusive learning strategies, especially in addressing students' special needs. Various studies show that training programs that involve face-to-face sessions and cover topics on attitudes, knowledge and teaching strategies related to special education needs can have a positive impact on teachers.

It is important for policymakers and program directors to develop pre- and in-service training programs that enhance teachers' knowledge and skills in teaching all students and facilitate the development of positive attitudes and beliefs. In addition, intensive and evidence-based training can help create inclusive and interactive learning environments to support students' special education needs (Rodríguez-Oramas et al., 2021).

In this context, teacher training programs should also pay attention to increasing teachers' self-efficacy and their effectiveness in collaborative educational interventions for their students. In addition, research shows that teacher training in inclusion programs has been shown to be effective, appropriate and timely in improving teachers' understanding and skills in implementing inclusive education (Ritter et al., 1999). Thus, a comprehensive and continuous teacher training program is essential to ensure that teachers are prepared to meet the challenges of meeting the needs of all students, including students with special needs.

4) Support from Community and Parents

In implementing innovative learning approaches in inclusive education at the elementary school level, the support from both the community and parents plays a crucial role. Research by (Sari & Saleh, 2020) emphasizes the importance of building a positive perception among teachers, parents, and the school community when introducing inclusive education within the Muhammadiyah

institution in Indonesia. This positive perception is vital for the successful implementation of inclusive practices. Additionally, highlight the significance of parents' attitudes towards inclusive education and their perceptions of inclusive teaching practices and resources. Positive parental attitudes and perceptions can greatly influence the effectiveness of inclusive education programs.

Furthermore, delve into the perceptions of parents towards inclusive education in Indonesia, shedding light on the differing viewpoints between parents of regular students and parents of special needs students. Understanding these perspectives is essential for tailoring support mechanisms that cater to the diverse needs of students in inclusive settings. Additionally, the study by (Mumpuniarti et al., 2019) explores the perspectives of parents towards student diversity in inclusive education, providing insights into the acceptance and support levels within the community.

Moreover, community involvement and outreach programs, as highlighted by (Kartono et al., 2024), are instrumental in establishing inclusive education networks and resource centers. Collaborative efforts between schools, foundations, and communities can create a supportive environment conducive to the successful implementation of inclusive practices. This collaboration fosters a sense of belonging and support for all students, including those with special needs, within the educational ecosystem.

B. Inhibiting Factors

1) Budget limitations

Budget constraints are one of the main factors hindering the implementation of inclusive learning innovations in basic education. In this context, limited funding can limit schools' ability to adopt changes in inclusive learning approaches (Declara, 2024). This can impact on the availability of resources, teacher training and supporting infrastructure needed to effectively introduce inclusive learning innovations. In addition, budget constraints can also affect efforts to improve the quality of learning and education services for students with special need.

2) Lack of teacher training

Teachers who do not receive adequate training related to inclusive learning approaches may have difficulty adapting new strategies needed to support the success of students with special needs. In this context, the importance of training for teachers to improve their understanding of diverse student needs and inclusive learning strategies cannot be overlooked (Tua Siregar et al., 2024). Lack of training can also impact the quality of teaching and teacher-student interactions, hindering the overall teaching and learning process.

3) Inadequate Infrastructure

Inadequate infrastructure conditions, such as lack of access to technology and appropriate learning tools, can hinder the effectiveness of implementing inclusive learning strategies (Wiyani, 2020). This can affect the availability of resources and facilities needed to create an inclusive learning environment for all students,

especially those with special needs. The lack of adequate infrastructure can also hinder schools' ability to provide an inclusive learning environment and support student diversity.

4) Time Limitations and Teacher Workload

Teachers often face challenges in allocating sufficient time to plan and implement adequate inclusive learning (Rahma & Setyaningsih, 2021). High workloads can also prevent teachers from giving sufficient attention to each student, especially those with special needs. In addition, lack of time and heavy workloads can affect the quality of teaching, teacher-student interactions and teachers' ability to develop inclusive learning strategies.

Contribution to SDG 4

In this modern era, inclusive education is a crucial element in building a just and equal society. The implementation of inclusive learning innovations in basic education is not only an urgent need, but also a strategic step to achieve Sustainable Development Goal (SDG) 4. From the findings above, the author concludes that there are six SDG 4 indicators that contribute to the title of this research, namely:

- **SDG 4 Indicator 4.1: Equitable Access to Education**

The implementation of inclusive education learning innovations in basic education can make a significant contribution to equitable access to education, which is indicator 4.1 of Sustainable Development Goal (SDG) 4. Through the development of learning curricula, it can improve the quality of education and create a more inclusive and equitable education system, which in turn can contribute to equitable access to education.

In addition, the implementation of inclusive education as a strategy to provide access to education to all children, including children with functional difficulties/disabilities, can also expand access to education equally. In this context, it is important to create an inclusive learning environment, as expressed by (Riswari et al., 2021), to ensure effective inclusive practices in meeting the needs of all students. As discussed, adhering to the philosophy of equity, justice and non-discrimination can also make a significant contribution to equitable access to education. Thus, through these efforts, the implementation of inclusive education learning innovations in primary education can directly support the achievement of equitable access to education in accordance with indicator 4.1 of SDG 4.

- **SDG 4 Indicators 4.2 and 4.6: Quality of Learning**

As indicators 4.2 and 4.6 of the Sustainable Development Goals (SDGs) show, implementing inclusive education innovations in primary schools can also improve the quality of learning. Based on research, placing emphasis on inclusion and diversity in teacher education can contribute to the achievement of SDG 4 by ensuring that all learners, regardless of their background, ability or identity, have equal access to education.

Additionally, the implementation of Education innovations as highlighted by (Hosman et al., 2020), such as the implementation of solar-powered digital libraries in rural

schools, can improve the quality of learning by providing innovative and relevant learning resources, which in turn can improve students' understanding of issues such as climate change. The application of information and communication technologies in inclusive learning processes, can also improve the quality of learning by providing individuals with opportunities to learn effectively, receive new information, and communicate through devices that enable control of computer equipment.

- **SDG 4 Indicator 4.a: Supportive Education Infrastructure**

Referring to indicator 4.a of the Sustainable Development Goals (SDG 4), the implementation of inclusive education innovations in basic education can make a significant contribution to a supportive education infrastructure. In this context, the preparation and improvement of educational infrastructure, such as teachers' knowledge and skills, supporting facilities, curriculum modifications and the involvement of related parties such as parents, government and communities, are crucial to support the successful implementation of inclusive education.

Strong collaboration between stakeholders, non-governmental organizations, training for professional teachers in special needs education and appropriate budget allocations are also needed to realise effective inclusive education implementation. Adequate facilities and budgets are key factors in the success of inclusive education, suggesting that a supportive education infrastructure is essential (Vania & Rizal, 2024). In addition, improving supporting facilities, strong collaboration between stakeholders and adequate budget allocations are efforts that can be made to support the improvement of supportive education infrastructure in accordance with indicator 4.a of SDG 4.

- **SDG 4 Indictor 4.c : Teacher Training**

In this context, teacher training is crucial in preparing them for the challenges of inclusive education. The knowledge and skills gained through training can help teachers design and implement inclusive learning, understand the needs of students with diverse backgrounds and create a supportive learning environment for all students.

Strong collaboration between stakeholders, non-governmental organizations and the training offered for professional teachers in special needs education is also an important factor in strengthening character education for primary school students. Appropriate training can provide creative ideas for teachers in developing local wisdom-based character education materials, motivate teachers and parents to guide students to become smart and cultured individuals and encourage all parties to preserve local cultural wealth.

In addition, increased teacher training, development of contextualized teaching materials and application of participatory learning methods are recommended to improve the implementation of human rights education in primary schools (Declara, 2024). Teachers need to be equipped with adequate knowledge and skills to deal with the needs of students with diverse special needs and to provide an inclusive and supportive learning environment for all students.

conclusion

The paper "Learning Innovation in Inclusive Education" provides a comprehensive overview of various learning innovations aimed at enhancing inclusive education in primary schools. These innovations are tailored to meet the diverse needs of students, particularly those with special needs, through technology-based learning, differentiated teaching methods, flexible curricula, the use of learning assistants, inclusive learning environments, and teacher training and development.

Technology-based learning encompasses the use of educational software, e-learning platforms, and online tools to create engaging and accessible learning experiences. Virtual Reality (VR) and Augmented Reality (AR) are highlighted as effective tools for improving material comprehension and student engagement. Android-based applications also play a crucial role in enhancing motivation and learning outcomes. Differentiated teaching methods, such as individualized learning and multisensory approaches, are essential for addressing the unique abilities and needs of each student. These methods ensure that all students receive appropriate support, fostering creativity and improving overall learning outcomes.

A flexible and adaptive curriculum, including an inclusive curriculum and project-based learning, is crucial for providing equal access to education. This approach allows students to engage in meaningful projects that enhance collaboration and practical application of knowledge. The use of learning assistants, such as assistive technology and classroom helpers, provides essential support to students with special needs. These tools and personnel help bridge the gap in accessibility, enabling students to participate fully in the learning process.

Creating an inclusive learning environment involves the implementation of Universal Design for Learning (UDL) principles and the integration of various learning aids. This ensures that all students, regardless of their abilities, can access and benefit from the educational content. Finally, teacher training and development, focusing on inclusive training and interprofessional collaboration, are critical for the successful implementation of inclusive education. By equipping teachers with the necessary skills and knowledge, and fostering collaboration among professionals, schools can provide comprehensive support to all students. In conclusion, the paper underscores the importance of innovative and inclusive approaches in primary education to ensure that all students, especially those with special needs, receive a quality education tailored to their unique requirements.

ACKNOWLEDGMENT

This research received support from the Department of Primary School Teacher Education, Faculty of Education and Teacher Training, Ahmad Dahlan Institute Probolinggo.

Author contributions

Yulina Fadilah, research design, data collection, and article writing; Pratiwi Dwi Warih Sitaresmi, research and survey coordination.

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