

Utilization of Digital Technology in Organizing STEAM-Based Inclusive Education for Children with Special Needs at SMP Lazuardi Al-Falah GIS Klaten

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ARTICLE INFO

Article history

Received August 02, 2026

Revised September 21, 2026

Accepted September 24, 2026

Keywords: Inclusive education;
Digital technology; organization;
Children with special needs;
Assistive technology.

ABSTRACT

Inclusive education at the secondary school level needs management that can accommodate the diverse characteristics of students with special needs. The presence of digital technology can serve as a support tool for integrating educational services with a STEAM approach that connects science, then technology, then engineering, arts, and mathematics in a contextual learning experience. This study aims to examine the use of digital technology in organizing STEAM-based inclusive education for students with special needs at SMP Lazuardi Al-Falah GIS Klaten. The study uses a descriptive qualitative approach with a case study design. Research information was obtained from observations, interviews, and document reviews, with informants who have at least three years of work experience. The findings show that digital technology is used to support learning arrangements, coordination among educators, information delivery, and the provision of learning resources. Teachers use digital platforms to manage assignments and monitor students' work, video conferences for communication and joint planning, digital documents to access work guidelines, and Chromebooks along with various learning websites to support STEAM activities. Using these tools helps teachers adjust learning activities to individual abilities, expand access to learning resources, and maintain service coordination. These findings show that integrating digital technology can support the organization of inclusive STEAM-based education that responds to the needs of students with special needs in a more targeted, flexible, collaborative, and context-appropriate way.

I. INTRODUCTION

All children with disabilities have equal opportunities to get an education according to their needs and conditions, because this right is legally supported by Article 9 Paragraph (2) of the Law of the Republic of Indonesia Number 35 of 2014, which regulates the provision of special education for these children with special needs. (Presiden Republik Indonesia, 2014). The reality on the ground shows that fulfilling the right to education for children with special needs still faces a number of obstacles, especially when the learning process uses a general education pattern that hasn't been able to deeply accommodate the needs of each student (Nuzuliana & Santosa, 2024). Making school need to provide easily accessible facilities, appropriate learning support tools, and good working relationships with parents so that children's abilities can develop more optimally (Tahsinia et al., 2024). Technology transformation has brought a big impact on education, especially in the use of digital media as part of learning activities, so skilled educators who can operate various tech devices are needed. (Ambarwati et al., 2022). The use of digital technology in educational activities is still limited by the condition of facilities, the adjustment of teaching materials, and the ability of educators to operate the available devices, so improving teacher skills through proper training is needed so that technology can be applied correctly in teaching and learning activities. (Khasanah, 2024). When various obstacles are successfully overcome, digital technology can support the emergence of creative learning methods, including the application of the STEAM approach in education (Kristien & Yogyakarta, 2016). Ambarwati links the quality of education with mastery of knowledge,

technological development, and the creation of creative works, while the use of technology in learning activities can help teachers present ideas and more innovative ways of teaching. (Ambarwati et al., 2022). The study covers the use of several internet-based learning apps, like Quipper, Ruang Guru, and Zenius, as a form of updating educational activities, because the presence of digital media helps students access learning materials more easily and gives teachers room to apply a variety of teaching methods.

Azizah, through her literature review, explained that digital-based media can be a supportive option for implementing inclusive education, because its use can make students more active in participating in learning activities, open up opportunities to work together with friends, and train their abilities when facing problems that arise during the learning process (Azizah & Hendriyani, 2024). The presence of technology-based media gives educators and students the opportunity to access learning materials from various references, express ideas creatively, collaborate in learning activities, and conduct distance learning without having to meet in person (Hakim & Yulia, 2024). Learning media that is tailored to the conditions and special needs of each student can be provided through the use of digital technology, so that children with special needs get learning tools that are more suitable for their characteristics. Digital media can be a good option to support learning activities for children with special needs, because presenting material in various formats gives them the chance to receive information in a way that feels more comfortable for learning, whether through sound, visual images, or interactive activities that make the learning process easier to follow. (Azizah & Hendriyani, 2024). The use of digital devices gives teachers the freedom to adjust learning activities based on the students' conditions, in line with Ariyanto's (2017) study that outlines the benefits of technology for implementing inclusive education (Ariyanto, 2017). The use of digital technology needs to be seen as a supportive element in running education, especially to help schools provide a more open learning process that can accommodate the diversity of students. The implementation of digital technology in inclusive schools needs to be accompanied by clear governance so that its use fits the needs of students. Schools need to prepare teachers and staff with adequate skills, organize work assignments properly, maintain communication among parties, give authority according to responsibilities, and provide learning facilities that are friendly for children with special needs. All of these elements should then be arranged into an institutional strategy that can guide the use of digital technology as part of inclusive education.

The success of running an inclusive school is closely related to the ability of school leaders to manage various institutional needs, from determining each member's tasks, the working relationships between teachers and educational staff, delegating authority, to allocating budgets and facilities according to the needs of students with special requirements, which means that everyone in the school needs proper training and a shared understanding of how to carry out inclusive education from the preparation stage to the actual activities. (Pratama et al., 2020; Wibowo & Santosa, 2022). Properly organized school governance can help make the most of digital devices, enabling learning for students with special needs to adapt to their conditions and run optimally. Previous studies have shown that discussions about inclusive education often place digital technology mainly as a tool to deliver materials to students, whereas this study takes a different perspective by linking technology to the management of inclusive schools, especially in terms of task distribution, forming workgroups, granting authority to relevant parties, and allocating staff, facilities, and budgets based on the needs of students with special need

II. METHODS

This study uses qualitative descriptive research with a case study design to explore in more detail the implementation of inclusive education and how schools manage various institutional needs

when facing limited resources. (Muktamar et al., 2023; Rozi, 2025). This study is aimed at understanding the meaning behind social phenomena and human actions by looking at them thoroughly from various perspectives. (Assyakurrohim et al., 2022). The study was conducted at SMP Lazuardi Al-Falah GIS Klaten, with data collected through in-depth interviews, direct observation of school activities, and document review, while informants were chosen purposively with the consideration that they had at least three years of teaching experience or work experience at their school. (Asrulla et al., 2023). The study flow is arranged using an input, process, and output pattern by examining the connections between the expected conditions, the situation found in the field, gaps in previous studies, and the preparation of organizational steps for implementing inclusive education. The selection of sources used purposive sampling based on the consideration that they had worked as teachers at the school for at least three years. Then, five people who met this requirement were chosen as interviewees for this study, and their identities and details are presented in the following section.

Table 1 Interviewee details

No	Role	Educational degree	Years of service	Code	Interview time
1	Principal	S.Pd., T.	13	N1	June 29, 2026
2	Deputy Principal for Curriculum Affairs	S.T., M. I. B., M. Ed.	13	N2	June 29, 2026
3	Shadow teacher	A.Md., Kes.	4	N3	June 30, 2026
4	Teacher	S.Pd.	3	N4	June 30, 2026
5	Therapist	A.Md., OT.	5	N5	July 1, 2026

The interview process was semi-structured, guided by instruments prepared by the researcher, consisting of several main topics and open-ended questions that give the respondents the freedom to share their experiences and opinions. The observation activities took place from June to July 2026, with observation locations including the school area, classrooms during learning activities, and the therapy room, as detailed below.

Table 2 Observation table

No	Tempat	Waktu Obsevasi
1	School environment	Juni 30, 2026
2	Therapy room	July 1, 2026
3	Classroom during a learning activity	July 22, 2026

The supporting data was obtained by reviewing school archives, including SOPs, meeting notes, and official letters related to job assignments. The series of studies started with determining the topic, searching for references, setting the direction of discussion, collecting and summarizing information, organizing data, analyzing results, linking to theory, checking validity through triangulation, drawing conclusions, and finally writing up the research findings (Assyakurrohim et al., 2022).

III. RESULTS AND DISCUSSION

Implementing inclusive education requires organized school workflows so that the needs of students with special needs can be properly addressed from the moment digital tools are used as part of school management activities. Interviews, field observations, and reviews of various records at SMP Lazuardi Al-Falah GIS Klaten show that there is a structured workflow starting from assigning tasks to each party, organizing work groups, giving authority to the right personnel, to determining the use of staff, facilities, and other resources based on the needs of inclusive services

3.1 Assigning tasks using digital technology

The results of conversations with the principal and teachers, reinforced by document reviews, show that job organization starts by identifying the job needs and responsibilities required to support inclusive school activities. Then, the principal assigns personnel to each task based on the suitability of their educational background, abilities, and skills each teacher has. Information regarding the assignment of responsibilities and placement of each party was obtained from interviews with the Special Supervising Teacher (Shadow teacher), who explained that the organization of work at the school had utilized digital media in the form of shared documents as a place to compile and align the details of tasks for subject teachers, Shadow teacher, and other educational staff, as conveyed by the informant as follows: “Yes, everything is in the shared draft. We have a draft that includes tasks for subject teachers, special supervising teachers, and so on. This allows us to synchronize everything.” (N3 Shadow teacher). The basis for placing teaching staff is known from interviews with the school principal, who explained that the decision is adjusted according to each worker's education and experience, “We pay attention to educational background and work experience; for example, we have someone with a speech therapy background who previously worked at a clinic.” (N1 School Principal). The assignment of responsibilities at school is supported by official documents like the principal's decree and the Standard Operating Procedures (SOP), so every task has a clear basis for implementation. As the vice principal for curriculum explained, “Usually, there's an official decree from the principal. Regarding directions, we get them from two sources: the principal and the head of the foundation.” (N2 Vice Principal). The explanation was also supported by the results of an interview with the principal, who explained that there are work guidelines for each unit, “We do have SOPs. We have a unit called NTC—*noto nalar* [reasoning development]. This unit has its own coordinator who oversees the mentoring teachers.” (N1 Principal)

3.2 Grouping tasks using digital technology

Interviews with school leaders and teachers, supported by document analysis, showed that work is organized into several smaller work groups, and then each group carries out communication and coordination of activities internally and with other groups as needed for the job. The division of labor into smaller groups can be seen from the statement of the interviewed Shadow teacher, “Yes, we are divided into groups. There is a coordinator here, Mrs. Finda, and we are the members. What I mean by 'groups' is the division based on levels: kindergarten, elementary, middle school, and also the therapist team.” (N3 Shadow teacher). The working relationship between groups can be understood from interviews and examination of school documents, with the principal describing that each team is connected when planning needs and programs, “As soon as we sit together to identify the needs, we make the process more efficient. That's the general approach. We work as a single unit; all subject teachers form one team, which also includes special education teachers. They also help in developing these programs.” (N1 Principal). Coordination between parties at school is also supported by the use of digital media, like Google Meet and Zoom for holding online meetings, while observations show that Google Workspace is used as a place to store meeting notes, so documents can be managed in one storage space, accessed by those who need them, and updated directly when there's still information that teachers need to fill in.

3.3 Delegating tasks using digital technology

Assigning responsibilities for running inclusive education in schools is done based on each staff member's abilities and job field, with support from digital tools that help organize task assignments more systematically. Each individual gets the authority that matches their responsibilities, and the implementation is monitored regularly so that the activities stay focused on inclusive service goals, paying attention to job clarity, task assignment procedures, and regular

supervision. The division of responsibilities for teaching staff already has written guidelines outlined in the Standard Operating Procedure (SOP), and this document is available in digital form so teachers can use it when they need a reference for the tasks they need to carry out. This information comes from the Special Assistant Teacher (Shadow teacher) as follows: “Yes, there’s an SOP. The assistant teacher has several tasks. The first is preparing the Individual Learning Program (PPI). The second is helping classroom teachers handle students with special needs in the class. Then, they help those students complete assignments given by subject teachers or tasks listed in their PPI.” (N3 Shadow teacher).

The division of teachers' duties at school is discussed during meetings and then reinforced with official documents as the basis for assigning responsibilities, as explained by the subject teachers: 'Regarding clarity, various matters are explained in meetings like this and then communicated again later. As for official assignments, they are determined through formal appointment decrees (SK) that have been mentioned before.' (N4 Teacher). Supervision of the work assigned to each educator is carried out regularly, using the students' progress as one of the evaluation points. These activities occur at several intervals, from weekly meetings to monthly, semester, and annual evaluations. The vice principal said, “Weekly meetings focus on each student's progress and development. We discuss whether adjustments are needed, such as adding or reducing support, and the decisions are usually made during the weekly meetings. Basically, these meetings serve as monitoring and evaluation sessions.” (N2 Vice Principal)

3.4 Allocating resources by utilizing digital technology

Research findings show that the provision of various inclusive education needs is carried out in a planned manner according to the conditions of students with special needs. This fulfillment includes support staff, digital-based tools, as well as facilities and infrastructure that support learning activities. Human resource allocation is tailored to student needs, a process that begins at the recruitment stage. Selected personnel must possess specific backgrounds and, ideally, specialized skills or experience. This finding is supported by the following statement from the school principal: "Beyond educational background and work experience—for instance, we have staff with speech therapy backgrounds who previously worked in clinics—we look at the types of patients they treated. If they handled patients with conditions similar to those of our students, that experience becomes a key priority for us." (N1 Principal). The allocation of digital technology is vital to this school and serves as a primary strategy for supporting inclusive learning. Regarding digital technology utilization, the school provides a Chromebook for every student. To facilitate this, the school employs platforms such as Google Classroom, the belajar.id site, the lazuardi.id site, and Canva. The principal explained this during the interview as follows: "For the junior high level, we facilitate the use of Chromebooks for every student. We convert all textbooks into e-books for these devices—though we do maintain a small physical library as well. This allows students to access materials from anywhere. We chose Chromebooks partly to avoid the need for mobile phones. We have configured the system to use Google Classroom and various Google features; for example, we use Google Sites to compile student portfolios and assignments." (N1 Principal). This is further supported by the principal's statement regarding the use of digital technology as assistive technology for students with special needs. “...For instance, students with low vision can use their Chromebooks to enlarge text, as well as to find more engaging or simplified teaching materials, such as videos.” (N1 Principal).

In addition to digital technology, the school allocates various facilities and infrastructure to support inclusive education services. The principal utilizes Interactive Flat Panels (IFPs) as interactive learning tools that help teachers deliver material in a more engaging way. This finding is reflected in the following interview excerpt: The IFP is also very helpful. We use it for the children—and especially for the special education teachers—for activities involving gross motor skills, such as

exercise routines. (N1 Principal). Facilities and infrastructure are deployed to help realize STEAM-based inclusive education for students with special needs. The principal designs science lessons around gardening and introduces students to gardening engineering techniques. Mathematics is introduced through projects measuring plant growth in the garden. Furthermore, technology and art are introduced by having students use Canva to create marketing designs for their garden produce. This finding is reflected in the following interview excerpt: So, children with special needs, as well as those performing below average, can use this lab for learning. For example, when planting—if they don't yet know how to measure, they use a ruler to take measurements; that's where the lab comes in. It involves collaboration with the science curriculum. (N1 Principal). The presentation of the research results discussed above is visualized in the concept map below. The mind map illustrates four aspects of digital-based organization.

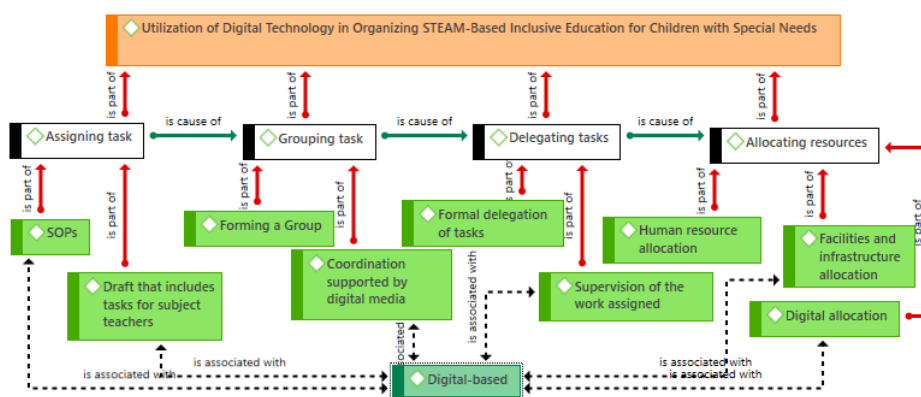


Figure 1. Mind map four aspects of digital-based organization

IV. CONCLUSION

Research results show that using digital devices helps support the management of inclusive education for Children with Special Needs (ABK). This management is seen in four activities: assigning tasks, arranging task distribution, delegating responsibilities, and organizing resource needs. Task assignments are adjusted based on the educator's educational background, skills, and experience, and are then documented in official decisions and SOPs. Task distribution involves forming work groups and appointing leaders connected through digital communication tools. Assigned responsibilities come with clear authority limits, both verbally and in writing, and are monitored and evaluated regularly. In terms of resource fulfillment, the school adjusts the available staff based on the conditions and needs of each student with special needs. Learning needs are also supported by providing appropriate technological tools and facilities. Various devices and platforms, such as Chromebooks, Google Classroom, Google Workspace, Canva, and Interactive Flat Panels, have been used in educational activities. The presence of this technology expands the digital function in the school environment because its use is tied to managing learning activities and inclusive education services. For certain students, technology can also be used as a supportive tool tailored to the learning obstacles they face. For example, the zoom feature can be used to help students with low vision to more easily read the material. This situation shows that systematic school management, along with technology support, can create learning that better suits the needs of students with disabilities.

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