

## SCIENCE LEARNING ASSISTANCE THROUGH ANIMATED LEARNING VIDEOS FOR SUPPORTING TRANSFORMATION IN SPECIAL SCHOOLS

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**Abstrak:** Pendidikan untuk siswa berkebutuhan khusus perlu terus ditingkatkan agar mereka dapat menjawab kebutuhan dan tantangan global. Sayangnya, konsep sains menjadi topik yang sulit dipahami secara utuh di tengah keterbatasan daya tangkap informasi yang dipengaruhi oleh kondisi khusus siswa berkebutuhan khusus. Pengabdian masyarakat ini bertujuan untuk membantu guru dalam mengoptimalkan pembelajaran sains di era digital melalui pengembangan video pembelajaran animasi. Metode yang digunakan adalah difusi IPTEKS dengan menggunakan media pembelajaran IPA berbasis digital. Kegiatan dibagi menjadi empat tahap, yaitu persiapan, pelaksanaan, evaluasi, dan tindak lanjut. Hasil dari program pengabdian masyarakat ini telah menghasilkan konten pembelajaran IPA berupa video pembelajaran berbasis animasi, serta peningkatan wawasan guru mengenai pentingnya mengintegrasikan teknologi pembelajaran digital yang menarik dan sesuai dengan kebutuhan siswa. Tindak lanjut yang perlu dilakukan adalah melakukan pendampingan dan pelatihan agar inovasi pembelajaran berupa aplikasi pembelajaran terintegrasi yang berisi media pembelajaran IPA berbasis video animasi dapat digunakan oleh guru untuk meningkatkan kualitas layanan pembelajaran.

**Kata kunci:** media pembelajaran digital, pembelajaran sains, siswa berkebutuhan khusus

**Abstract:** Education for special needs students requires continuous improvement to meet global needs and challenges. Unfortunately, science is difficult to understand due to limited information comprehension influenced by the special conditions of students with special needs. This community service aims to assist teachers in optimizing science learning in the digital era by developing animated learning videos. The method used was the diffusion of science and technology using digital-based science learning media. The service program was divided into four stages: preparation, implementation, evaluation, and follow-up. The results of the community service program have produced science learning content in the form of animation-based learning videos, as well as increased teacher insight regarding the importance of integrating digital learning technology that is interesting and appropriate to students' needs. The follow-up that needs to be taken is to carry out mentoring and training so that learning innovations in the form of integrated learning applications that contain animated video-based science learning media can be used by teachers to improve the quality of learning services.

**Keywords:** digital learning media, science learning, students with special needs

### Introduction

Law No. 20/2003 Article 3 on the National Education System states that education aims to develop the whole person. Equal opportunities to obtain education (education for all) are also intended for every citizen, including groups of children who have special needs. The education regulation contained in Law No. 20/2003 Article 32 states that special education is education for students who have difficulty in following the learning process due to physical, emotional, mental, and social abnormalities and or have special intelligence and talent potential.

The quality of education for Children with Special Needs (ABK) needs to be improved, like other students who are more fortunate, so that they can continue to respond to global needs

and current developments. The skills needed in the 4.0 era are technical skills which include technological and digital skills; as well as non-technical skills which include thinking skills (including creativity, innovation, collaboration, etc.), social and personal skills (Geisinger, 2016; Maisiri et al., 2019; Pereira, Steven Wolfe Fishman & Rowe, 2022; Angraini et al., 2023). This is important to do so that children who have mental or physical disabilities are able to develop their knowledge, attitudes, and skills for themselves and society, and so that they are able to continue their education to a higher level and have the skills needed in work.

State Special School in Magelang, namely SLB Negeri Kota Magelang, has 38 teachers with 200 students across SDLB, SMPLB, and SMALB education levels. The results of the situation analysis through interviews, observations, and questionnaires with the principal and teachers show that there are problems faced by the school that need help to solve, namely the difficulty of teachers in teaching science concepts to students with disabilities. Science is one of the subjects that is difficult to understand as a whole for students with special needs with various types of disabilities. This condition is influenced by two factors. Firstly, a number of concepts in science learning are abstract and therefore difficult to understand in the midst of the limited capacity to capture information influenced by the special conditions of students with disabilities. Secondly, adequate learning resources/media support is not yet available to help concretize science concepts.

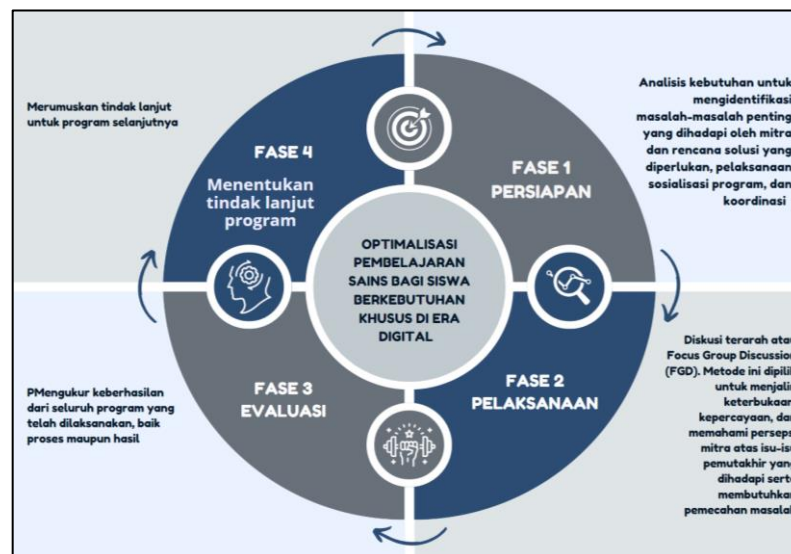
In fact, learning support facilities, either in the form of media or science teaching aids owned by schools are still very limited. The use of media during the learning process is only done on the teacher's initiative by utilizing simple media such as images downloaded from the internet. Likewise, Supiyani & Sukmawati (2023) also reported that reproductive health in young women is greatly influenced by the level of knowledge regarding the reproductive organs and system. The focus of science learning, especially Biology, is not only to achieve learning outcomes but also to provide students with a full understanding of their bodies, so that they can avoid deviations in sexual behavior and targets of sexual violence. Indeed, this is in line with the purpose of science learning, which is to build individual abilities to understand, convey, and use scientific knowledge to solve problems and make appropriate decisions in various aspects of life (Hoolbrook & Rannikmae, 2009; Gormally et al., 2012; Angraini et al., 2023).

Special schools and their students have always encountered a variety of problems and challenges that range from physical, social, and economic to attitudinal. A person with special needs does not even have equal access to the fulfilment of quality learning needs, including the digitalization aspect of learning which is still far behind regular students in general. Through digital learning, students with special needs can also learn anytime, anywhere at their own pace, making the learning process more flexible (Keegan, 2013). For this reason, this service aims to provide assistance to teachers in optimizing science learning through the use of animated learning media for learning transformation in the digital world. Assistance for the use of digital media in science learning has not been done much so far. Similar service activities have been carried out previously by Ramadani et al. (2021) to support the learning process during the pandemic, while Isnainiyah et al. (2022) also reported on activities to empower special school teachers in utilizing Google Assistant-based media. Meanwhile, mobile application-based

training for early childhood teachers is reported to be able to create innovative learning media as a means of supporting their teaching (Noviar et al., 2023). Thus, efforts to improve the ability of SLB teachers to integrate digital learning media to support the learning process are very important as an effort to create an interesting and innovative learning environment in accordance with the developmental stage and conditions of students.

## Method

The method of implementing this Community Service (PKM) is the diffusion of science and technology (IPTEK) through the development and application of digital-based science learning media. The activity is divided into 4 stages which refer to the opinion of Knowles et al. (2005) regarding education for adults which includes preparation, implementation, evaluation, and follow-up stages (Figure 1). The targeted participants in this community service activity are principals and teachers, especially those who teach at the SMPLB and SMALB levels. The activity was carried out during June - August 2023 at SLB Negeri Kota Magelang.



**Figure 1.** Program implementation phases

Referring to the problem-solving framework in Figure 1, the activities carried out are as follows:

1. Carry out a needs analysis to identify problems and solutions needed, conduct socialization to partners and prepare technical matters, as well as coordination through communication with school principals and teachers.
2. Develop animated video-based science learning media by the results of the needs analysis and the implementation of workshops in the form of focused group discussions (FGD) with related parties including principals and teachers regarding the results of the development of animation-based science learning media to partners for evaluation and input.
3. Evaluate the impact by distributing questionnaires to participants. The data obtained from distributing questionnaires were then analyzed quantitatively by calculating the percentage of participants' responses to the implementation of service activities.
4. Determining the follow-up of the program.

## Result and Discussion

### Preparation stage

The first stage carried out in this community service activity is to conduct a needs analysis to identify important problems faced by partners and the necessary solution plans. At this stage, the service team conducted a needs analysis through interviews, observations, and questionnaires to school principals and teaching teachers (Figure 2). The results of the needs analysis show that there are 2 important problems faced by partners, namely: (1) the difficulty of teachers in concretizing several abstract science concepts to students with disabilities who have limitations in capturing learning information and (2) the limited ability to develop/utilize digital learning media that is designed deliberately to meet the learning needs of students with disabilities. Based on the results of the situation analysis, one of the stages of problem-solving is the development of learning innovations in the form of animation-based learning videos and the implementation of Focus Group Discussions (FGDs).

### Implementation stage

In the implementation stage, the community service team together with partners developed animation-based science learning media, starting with developing teaching modules, learning video scripts, and developing animated learning videos with translations of the sign language. Furthermore, FGD activities were held on July 21, 2023, involving school principals and teachers who assisted the learning process of students at the SMPLB and SMALB levels (Figure 3).

The community service team began the presentation by presenting a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis of learning digitization to motivate teachers to teach in the digital era (Table 1). Based on the results of the SWOT analysis, it is necessary to develop science learning media to help teachers facilitate an interesting and integrated science learning process for children with special needs.



**Figure 2.** Discussion of the Community Service Team with Principal and Teachers of SLB Negeri Kota Magelang



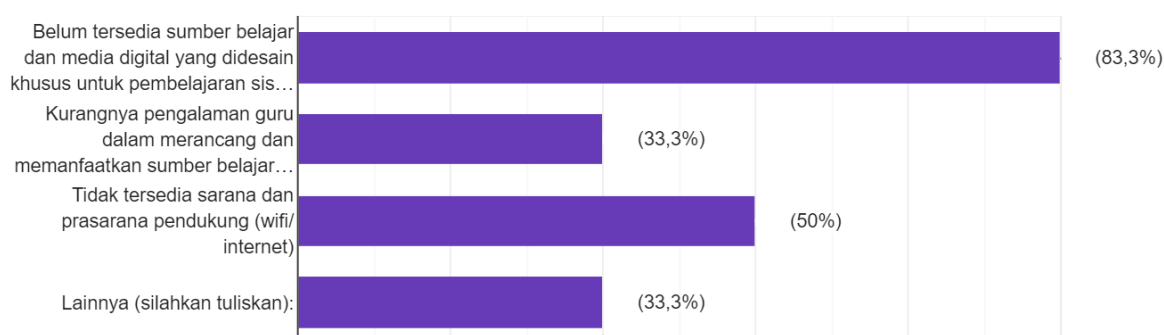
**Figure 3.** Implementation of Focus Group Discussion (FGD) Activities

**Table 1.** SWOT Analysis Matrix (Source: Primary Data, 2023)

<div>Eksternal</div> <div>Internal</div>	<b>Opportunity</b> <ol style="list-style-type: none"> <li>1) SLB teachers as partners have the competence and commitment to improve the quality of learning through the integration of digital technology in learning</li> <li>2) Students have gadgets to use during the learning process</li> <li>3) There is no integrated digital learning technology available to improve the quality of learning services provided by teachers</li> </ol>	<b>Threat</b> <ol style="list-style-type: none"> <li>1) Requires an adequate budget to support the success of the program</li> <li>2) Program implementation cannot be done in a short time, it takes at least 4 months.</li> </ol>
<b>Strength</b> <ol style="list-style-type: none"> <li>1) The community service team consists of a team who have disciplines and fields of expertise that are affected by the problems encountered.</li> <li>2) SLB teachers as partners have good technology adaptation skills</li> <li>3) Science learning materials become more interesting and easy to understand</li> <li>4) Availability of Program Funding</li> </ol>	<b>Strategic Planning (SO)</b> Developing science learning media to support science learning for children with special needs	<b>Strategic Planning (ST)</b> Utilizing the potential to face the development of information technology information
<b>Weakness</b> <ol style="list-style-type: none"> <li>1) Inadequate learning resources/media support to help concretize a number of abstract science concepts so that they are more easily understood by students with special needs.</li> <li>2) Lack of teacher knowledge and skills in integrating digital learning technology during the learning process, so that the development of students' life skills, especially digital literacy, has not been empowered.</li> </ol>	<b>Strategic Planning (WO)</b> Develop a complete and integrated digital learning platform for children with special needs	<b>Strategic Planning (WT)</b> <ol style="list-style-type: none"> <li>1) Design a specific budget for program implementation supported by a clear timeline of activities.</li> <li>2) Minimize factors that become weaknesses in order to improve quality and quantity program</li> </ol>

The presentation of material during the FGD was delivered interactively through learning case studies during the Covid-19 pandemic which had an impact on the learning loss of students at all levels and educational institutions in the world, especially Indonesia. In the national case, participants were also invited to compare the learning loss received by regular students who are still facilitated by digital learning, either through National TV broadcasts, content provided by the government on the learning house platform, or various e-learning platforms developed to facilitate online learning; while students with special needs have not been affected by the digitization of learning. This is in line with what was stated by Olanrewaju et al. (2014) that people with special needs do not even have equal access to basic needs fulfillment, including quality education. The conditions during learning from home that have not been supported by digital learning technology ultimately add to the difficulties that must be felt by students with special needs.

The next material presented during the FGD was about the development of digital technology-based learning media. This material needs to be introduced and delivered to teachers so that teachers can direct the teaching and learning process to be more effective and efficient, and flexible because it is not limited by time and space. Education must be able to build and improve the digital literacy of its students in facing the current era (Heryani et al., 2022). So far, the media used by teachers is limited to card media, images, and learning videos accessed from the YouTube page which have many limitations, namely not supported by complementary information that can be listened to by students, as well as a mismatch in the depth of material content and delivery methods that should be adjusted to the level of student needs and characteristics. The factors that contribute to the limited adaptation of learning technology in schools were also identified through the questionnaire results filled out by the teaching teachers and school principals (Figure 4).



**Figure 4.** Factors that hinder the integration of technology during the learning process

Based on Figure 4, the factor that most inhibits the integration of digital technology to improve the quality of learning for students with disabilities is the unavailability of learning resources and digital media specifically designed for learning for students with disabilities (83.3%). Teachers explained that their knowledge and ability to develop learning media to support learning is very limited, especially for digital learning media.

At the end of the material delivery session, the service team then presented the results



of the product design to partners for evaluation and input. Figure 5 shows some of the animation-based science learning videos that have been developed by the service team with partners.

Learning media is one of the components that contribute importantly to the learning process, especially for delivering learning materials to students as recipients of learning messages. Learning media that is used appropriately during the learning process will make learning more effective, can clarify learning material, and increase student learning motivation (Heryani et al., 2022). The results of research conducted by Maulana et al. (2015), for example, show that teachers get a positive impact in using Android as a learning media for students with special needs, such as happy students, attracting their attention. Thus, the role of academics is needed to provide transfer of knowledge and digital-based learning technology to teachers.



**Figure 5.** Sample display of animation-based science learning videos available in the video menu

### Evaluation Stage

This service activity provides benefits in providing insight/knowledge about the importance of integrating digital learning technology to improve the quality of learning services for ABK students (Table 2). Based on the results of the FGD conducted with the partner, the needs to develop an Edufabel application were generated. These needs include system interface

needs, system interaction design, and content needs that will be included in the Edufabel Application. The target group realized that science learning needs to be supported by digital learning media that can concretize abstract concepts in ways that are fun and in accordance with student needs so that it has an impact on improving the quality of learning services for students with disabilities.

### Program Follow-up Stage

Based on the results of the program evaluation, the follow-up will be carried out with partners to continue the development of learning media to produce an integrated digital learning platform in the form of the Teman Belajar Edufabel application to facilitate students' learning experience.

**Table 2.** Participants' Responses to the Implementation of Service Activities

Pernyataan	SA	A	D	SD
This service activity provides benefits in providing insight/knowledge about the importance of integrating digital learning technology to improve the quality of learning services for ABK students	100%			
This community service activity requires ongoing follow-up and assistance	90,90%	9,09%		
Through the FGDs carried out, we were able to provide new information related to technological literacy	90,90%	9,09%		
Through the activities carried out during this FGD, I will apply appropriate digital technology to meet the needs and develop soft skills of my students	72,72%	18,18%	9,09%	

SA: Strongly Agree; A: Agree; D: Disagree; SD: Strongly Disagree

### Conclusion

The mentoring activities for teachers in optimizing science learning for learning transformation in the digital world have produced animation-based science learning video content. Based on the participants' responses at the end of the activity, teachers are also increasingly open to the importance of integrating digital learning technology to improve the quality of learning services for students with disabilities. The use of learning media, which was previously limited to conventional media and videos from YouTube, which have weaknesses in terms of material coverage and suitability of delivery, can now be improved through the use of animation-based science learning videos developed together with the service team. To optimize the learning innovations developed, the follow-up is to package the learning media in the form of a learning application called Teman Belajar Edufabel.

### Acknowledgement

Gratitude is expressed to Kementerian Pendidikan dan Kebudayaan, Riset dan Teknologi (Kemendikbudristek) Republik Indonesia, who have funded this community service program. Thanks also go to the Rector and LPPM of Universitas Tidar for the support provided and to the team and partners for the collaboration to succeed the service program.



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