Development of Technology-Based Learning Media Books to Support 21St Century Learning in Elementary Schools

Pengembangan Buku Media Pembelajaran Berbasis Teknologi untuk Mendukung Pembelajaran Abad 21 di Sekolah Dasar

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Abstract

Technology is a supporting tool for conveying information that makes learning activities easier. Learning media with technology is designed to improve student learning outcomes and teacher efforts to demonstrate the ability to develop mastery of technology in the 21st century. This research aims to develop a technology-based book to help the Teachers Working Group (KKG) of MI Bantul in the teaching process. The research method used is R&D with development stages. The type of research is descriptive qualitative, with the research object being 45 teachers who are connected to the MI Bantul KKG. This research focuses on increasing the development of teachers' abilities in the productivity of book writing with technology content. The results of this research indicate that the book development process is still in the development stage and has not yet reached the product testing stage. Making the book involves five applications: Canva, Edu Assemblr, Quizzizz, World Brush, and Comic Creator. Technology-based books have four parts: introduction, process, evaluation, and learning reflection. Development is carried out using barcodes, links, AR, and video.

Keywords: *Teachers Working Group (KKG), MI Bantul, Learning Media, Learning Technology.*

Abstrak

Teknologi merupakan alat pendukung penyampaian informasi yang mempermudah kegiatan belajar. Media pembelajaran dengan teknologi dirancang untuk meningkatkan hasil belajar siswa dan upaya guru untuk menunjukkan kemampuan perkembangan penguasaan teknologi di abad ke-21. Penelitian ini bertujuan mengembangkan buku yang berbasis teknologi untuk membantu Kelompok Kerja Guru (KKG) MI Bantul dalam proses pengajaran. Metode penelitian yang digunakan adalah R&D dengan tahapan pengembangan.

Jenis penelitian adalah diskriptif kualitatif dengan objek penelitian 45 guru yang tergambung pada KKG MI Bantul. Penelitian ini berfokus pada peningkatan pengembangan kemampuan guru dalam produktivitas, karya tulis buku dengan muatan teknologi. Hasil penelitian ini menunjukkan bahwa proses pengembangan buku masih sampai pada tahap pengembangan, belum sampai pada tahap uji coba produk. Pembuatan buku melibatkan lima aplikasi, yaitu canva, edu assemblr, Quizizz, world brush, dan comic creator. Buku berbasis teknologi memiliki empat bagian yaitu pendahuluan, proses, evaluasi, dan refleksi pembelajaran. Pengembangan yang dilakukan menggunakan barcode, link, AR, dan video.

Kata Kunci: Kelompok Kerja Guru (KKG), MI Bantul, Media Pembelajaran, Buku berbasis teknologi

A. Introduction

Learning activities are the efforts of educational units to train students through teaching and learning activities that aim to help students actively develop their potential, abilities, and talents. Education is a need for students to develop quality and prepare themselves to face the development of human resources in the future. Developments made in the world of education are one of them with curriculum, learning models, and learning media from education units that can increase teacher productivity and competence.[1] Improving the quality of education in Indonesia can be developed through the implementation of technological reform. In the current era of digital technology development, teachers must master various ways, techniques, methods, and media related to digital learning.[2]

Previous research entitled "Development of interactive storybooks based on AR technology" from Febyan Dimas Pramanta explained that technology-based books can provide additional reality for readers in the form of 3D objects and animations that are interesting and easy for readers to follow the storyline. One proof that technology has an important role in helping the learning process according to the needs of each school encourages researchers to conduct research in the realm of teachers. The real activities that have been planned are about how to continuously improve the potential of teachers. KKG activities that are planned independently or collaboratively are one of the spearheads in coordinating all MI teachers to continue learning.

[1] Ramen A. Purba et al., "Teknologi Pendidikan," 2020.

[2] Baginda Sitompul, "Kompetensi Guru Dalam Pembelajaran Di Era Digital," *Jurnal Pendidikan Tambusai* 6, no. 3 (2022): 13953–13960.

Previous research from Feriska Achlikul Zahwa entitled "Selection of information technology-based learning media development" explained that learning media with this type of technology greatly facilitates teachers in teaching and learning activities, because teachers no longer re-explain the material that has been discussed. The coverage in this technology-based media is very broad so it is very easy for students to reach in learning new things. The research objectives describe how the advantages of technology provide an opportunity for the MI Bantul teachers' working group to be able to learn to improve teachers' professional abilities in the field of technology development. The MI Bantul teachers' working group is a forum for developing teacher professionalism that aims to: (1) facilitate activities carried out at the teacher activity center based on problems and difficulties faced by teachers, (2) provide professional assistance to classroom and subject teachers at school, (3) improve understanding, knowledge, skills and development of professional attitudes based on kinship and sharing, (4) improve the management of active, creative and fun learning processes (PAKEM).[3] The Bantul Teachers Working Group (KKG MI Bantul) is one of the centralized teacher groups in the Bantul area with the vision and mission of fostering professional development and teacher expertise that can be used to communicate, share thoughts and experiences, implement actions and simulations in the world of learning. However, KKG, especially in the Bantul area, is still limited in developing expertise and skills either in career advancement or productive mastery of technology for individuals or schools.

Currently, PGMI UIN Sunan Kalijaga has a target and goal to become an agent of change that instills knowledge and skills in teachers through training and institutional cooperation. The MI Bantul teachers' working group is one of the targets to be cooperated in improving technology for teachers in the field of technology-based learning media development. In the implementation in the field, both pedagogical competence factors and writing skills, teachers have not been able to show independence, especially in improving media making.[4]

Observations at KKG MI Bantul found several findings that are worthy of being raised following the topic of this research. First, teachers' understanding and skills of multimedia are still relatively low, as evidenced by the fact that many teachers still prefer printed materials to multimedia-

[3] Harun Al Rasyid, "Fungsi Kelompok Kerja Guru (KKG) Bagi Pengembangan Keprofesionalan Guru Sekolah Dasar," *Sekolah Dasar: Kajian Teori Dan Praktik Pendidikan* 24, no. 2 (2017): 143–150.

[4] Arsyad Djamaluddin Palettei and Wahyu Bagja Sulfemi, "Pengaruh Kelompok Kerja Guru (KKG) Terhadap Peningkatan Kompetensi Pedagogik Dan Kemampuan Menulis Karya Ilmiah," *JPDI (Jurnal Pendidikan Dasar Indonesia)* 4, no. 2 (2019): 53–58.

based materials. Second, the use of Android-based learning media in the learning process is not optimal, and many teachers only use WhatsApp for online learning and PowerPoint. Third, there are still many teachers who have difficulty making technology-based printed materials, and digital applications, and mastering Android-based learning applications. As a result, teachers have not utilized technology optimally because they have not mastered technology to design learning both in terms of planning, and the development process.

Through this collaboration, teachers will get assistance in making technology-based learning media where media will be stored in print and its use involves technology in the school realm. Information technology as a product has now developed very rapidly. This development affects all human life in various forms of learning with applications.[5] Technology collaboration activities will be interesting for teachers because they will dissect each technology-based learning media, especially on the use of smartphones that teachers use in learning appropriately.[6]

The creation of technology-based learning media will be the first collection of books that provide knowledge and skills for teachers, especially KKG MI Bantul. Teachers will learn technology-based learning media involving smartphones and other technologies. In addition, another hope of making this book is to answer the challenges of learning in era 4.0 which is characterized by rapid changes in the flow of information and technology in the realm of education. According to Haris, the basic concept of learning that emphasizes the relationship between learning materials, pedagogy, and technology is one of the learning models that is ready to embrace modern learning. The interaction between the three components of learning has the power and attraction to demand teachers to always be productive. To foster active learning in schools centered on students with teachers, teachers with the environment, and students with the environment through technological aids.[7]

According to Miarso, learning media is anything that is used to channel messages and stimulate students' thoughts, feelings, attention, and

[5] Yusufhadi Miarso, "C. Perubahan Paradigma Pembelajaran Dengan Kehadiran Teknologi Informasi," *ESENSI PENGEMBANGAN PEMBELAJARAN BERBASIS MULTIMEDIA*, n.d., 26.

[6] S. Hadisaputra, M. S. Ihsan, and A. Ramdani, "The Development of Chemistry Learning Devices Based Blended Learning Model to Promote Students' Critical Thinking Skills," in *Journal of Physics: Conference Series*, vol. 1521 (IOP Publishing, 2020), 042083.

[7] Judith Harris, Punya Mishra, and Matthew Koehler, "Teachers' Technological Pedagogical Content Knowledge and Learning Activity Types: Curriculum-Based Technology Integration Reframed," *Journal of Research on Technology in Education* 41, no. 4 (June 2009): 393–416, doi:10.1080/15391523.2009.10782536.

dispositions for a directed and controlled learning process.[8] Learning media such as technology is very important because teachers can deliver material to students in a more meaningful, fun, and creative way. Teachers do not only provide material in the form of words in lectures but can create challenging material to be delivered and understood by students in real terms.[9] The material designed and collected in the form of a book will later contain learning materials, instructions, evaluations, hands-on learning practices, benefits, and goals that are applied via smartphones. For this reason, it is very important in addition to being experienced in mastering technology-based learning, teachers can still be invited to be productive. With multimedia learning, the expected sustainable result is that teachers increase their mastery of technology and provide creative results in educational innovation, especially in providing modern learning media.[10] The making of this technology-based book will become more interesting when we realize that the use of multimedia technology can provide changes to the conventional teaching patterns of teachers.

Technology will facilitate the teaching and learning activities of teachers, and become a different learning motivation in front of students.[11] The results obtained in this training encourage the truth of the opinion of experts who state that learning media can be used as a pattern of choice, meaning that teachers can choose learning media that are appropriate to the material and efficient to achieve educational goals.[12]

Based on the research objectives above, there is a need for research for teachers in improving skills and understanding, technology productivity, especially the development of learning media in the classroom, and the positive use of technology. The book development program assisted by PGMI UIN Sunan Kalijaga lecturers with KKG MI Bantul will provide updates that can later be implemented in MI / SD schools.

In this case, the researcher has made a development plan that is followed by teachers about developing technology-based learning media books and documenting teacher work in the form of books that can later be printed. This book will initiate and provide evidence of productivity in the era of Development 4.0 to teachers involved in creating technology-based

[8] Yusufhadi Miarso, *Menyemai Benih Teknologi Pendidikan* (Kencana, 2004).

[9] Wina Sanjaya, "Penelitian Pendidikan: Jenis, Metode Dan Prosedur," 2014.

[10] Miarso, "C. Perubahan Paradigma Pembelajaran Dengan Kehadiran Teknologi Informasi."

[11] B. Lukács, "Movement-Based Music in the Classroom: Investigating the Effects of Music Programs Incorporating Body Movement in Primary School Children," *Psychology of Aesthetics, Creativity, and the Arts*, no. Query date: 2024-03-24 05:19:12 (2022), doi:10.1037/aca0000496.

[12] Sittati Musalamah, M. Agphin Ramadhan, and Arief Saefudin, "Pelatihan Optimalisasi Microsoft Office Untuk Mendukung Kinerja Tenaga Pendidik Di Sekolah," *Panrita Abdi-Jurnal Pengabdian Pada Masyarakat* 5, no. 4 (2021): 528–535.

learning ideas, starting from the design, practice process, evaluation, and reflection of the book.

B. Method

This research is based on RnD (Research and Development), where researchers will collaborate with teachers from several schools in the Bantul area. The type of research is descriptive qualitative, trying to describe the results of the development of technology-based teacher books in KKG MI Bantul. The implementation of RnD-based research combined with CBR Research (Community-based Participatory Research) involved 45 teachers from the combined MI Bantul teachers' working group. This research was conducted for 4 face-to-face meetings and contributed to increasing the productivity of the KKG MI Bantul community in creating a technology-based learning media work. The object of the research includes the working group of MI Bantul with the application of the training and development process on learning media. RnD research is a research method used to produce certain products and test the effectiveness of these products.[13] The development in this study only reached the planning stage and continued with product development without conducting trials. The research design and approach used a qualitative research method that involved a comprehensive review of current scientific research results to identify and categorise character education values in the study of Introduction to Islamic Studies. The collected research data were selected based on their level of relevance to the research problem (research question with the help of an extraction formula). The selected data were then analyzed and synthesized to identify the character values.

C. Results and discussion

The Process of Technology-Based Book Development in KKG MI Bantul

The research was conducted at the Hajj Building of the Ministry of Religious Affairs in Bantul. It was carried out in stages with 4 face-to-face sessions and was attended by several teachers representing their respective schools from the Bantul MI teachers' working group. Participants from the Bantul MI teachers' working group totaled 45 people from various private and public schools. In the early stages of planning, researchers determined the object that would become a collaborator. The chosen collaborator has several specifications, including a community of teachers from a collection of

[13] Dr Sugiyono, "Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif Dan R&D," 2013, https://digilib.unigres.ac.id/index.php?p=show_detail&id=43.

elementary school teachers or madrasah ibtidaiyah. The observation results showed that KKG MI Bantul was suitable to be the object of research. The initial research stage was planning and then followed by technology-based media development. Researchers carry out development by directing teachers to make technology-based media books that are easily accessible to students and can even be printed.

The results of interviews with the head of the KKG MI Bantul, Mr. Mulat, S.Pd.I said that the teachers' working group has not been able to develop technology-based learning media independently, this is evidenced by the lack of published work to be used as a reference for learning in schools. In the planning stage, teachers are briefed on how to form technology-based media books and the manufacturing process using learning media applications. First teachers are introduced in the theoretical form of applications that support teacher productivity.

At the initial observation stage, some teachers had difficulty developing technology-based books because they were limited to operating applications on laptops. However, the first stage of this research was proven by the presence of 45 teachers from KKG MI Bantul who were very critical of the initial exposure to learning media applications. The introduction to teachers begins by showing a presentation of examples of using technology-based learning media including digital book media, learning applications on smartphones, electronic LKPD, and other digital learning support media.

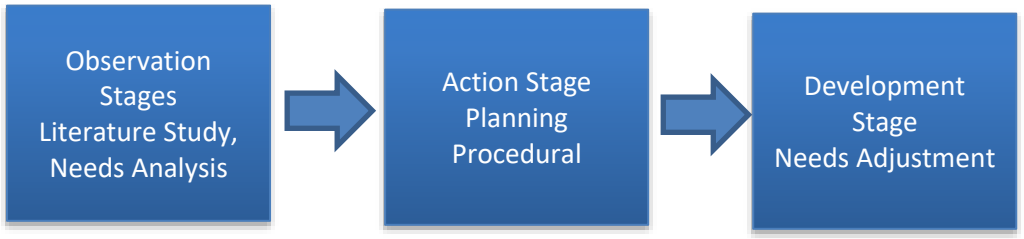

Figure 1. The flow of development of a technology-based book media

Researchers set 4 times the process of face-to-face assistance to teachers in developing technology-based books. In each digital book, the teacher can create media according to the subject taught. This will support teacher learning to be more interesting by using technology-based learning media according to student needs and maintaining teacher skills in the field of operating technology according to subjects.

The first meeting of the presentation of the research achievements and objectives was delivered at the first face-to-face meeting to all teachers who are members of the KKG MI Bantul. According to Nurfadillah, interest in

learning must always be built in the era of educational development that uses digitalization as a student learning zone.[14]

All teachers in the first stage followed the technology-based book planning with directions to operate applications that support the creation of lesson media. Some teachers who are members of KKG MI Bantul stated that in the learning process, teachers are still comfortable using conventional media supported by PowerPoint. PowerPoint media has several features that allow teachers to easily add audio, video, images, and interesting presentations. This is a finding from the first research stage that the distribution of mastery of technology with other supporting components is still uneven. PowerPoint is considered to be an easy learning application program for students and makes it easier for teachers to teach without having to waste time in front of a laptop. An interview with Mr. Andi Raharjo, S.Pd, a member of the KKG MI Bantul explained that the PowerPoint application is easy to use for teaching presentations and practice questions for students because it is considered simple in its utilization.

The second meeting of the technology-based book development process carried out with KKG MI Bantul was to download several applications supporting the development of learning media. Researchers provide technology-based book designs that are ready to be edited by each teacher with the guidance of supporting application tutorials. Furthermore, teachers can edit the design into subject books according to their respective fields with applications that have been prepared by researchers.

Figure 2. The second meeting of downloading applications of learning media

[14] Septy Nurfadhillah et al., "Pengembangan Media Pembelajaran Berbasis Teknologi Untuk Meningkatkan Hasil Belajar Siswa Sd Negeri Pinang 1," *BINTANG* 3, no. 1 (2021): 153–163.

This stage was carried out by researchers to measure and determine the cooperative interaction between teachers in the use of technology for teaching. So that training activities will be more effective and efficient by the ability of teachers in KKG MI Bantul to recognize technology-based applications. Researchers specifically explained again some of the benefits that will be obtained from this training. Among them, teachers are encouraged to recognize some of the benefits of media in learning by downloading applications and listening to how they work. The material at the second meeting includes:

1) The delivery of uniform teaching materials according to the needs of each school, meaning that teachers are given an understanding of how to use digital book-based teaching materials with several parts such as introduction, core learning, and learning assessment. Teachers get material on how to edit designs that have been provided by researchers according to the learning needs of interest in their respective schools.

2) The delivery of a clearer and more interesting digital learning model, the aim is to provide direction to foster teacher identity in teaching. The material provided directs to learning models that use creative technology. Learning is attempted to be carried out indoors or outdoors with direct practice using technology-based books and attractive models. The book as a media model designed can be used anywhere, both inside and outside the classroom.

3) Building more interactive and creative learning according to the subject to be taught with the application. Teachers are invited to make quizzes, according to the teacher's idea, and pay attention to the subject interactively optimized in the use of digital learning media applications.

4) Time and energy efficiency in the long run, including how teachers can create technology-based media books and collect them together. This will support the productivity of the MI Bantul teachers' working group to maintain the work and collaboration in the field of teaching. Digital books will be easy to store and access. Researchers hope that one school can produce one book and collect it to become an archive of the MI Bantul teachers' working group.

5) Teachers can make technology-based print and digital book publications. In addition to getting assistance in developing learning media, teachers are directed to be able to publish their respective book works.

Under the second stage of research planning, teachers are directed to recognize the application and, after that map the subjects that want to be developed in the form of technology-based books. Next is assistance with researchers to start writing learning media technology-based books. This

research activity is not only to lead to the achievement of the product but the provision of knowledge that is directed at the development of teacher media in KKG MI Bantul. The initial process of research is to focus on understanding the benefits of teachers developing media, forms of media, and development results.

The third stage at the technology-based book development meeting is to introduce and operate the application that has been downloaded to find out how to apply it in technology-based learning media books. The applications taught at the third meeting are:

 Application of Quizizz	The introduction of the Quizizz application to teachers of KKG MI Bantul is not only to support the development of interactive technology-based books but also to interact with creative assessment models. Teachers can digitally zoom in and out of the exam display with quizzes or games.
 Application of World Brush	World Brush is an application that helps teachers invite children to play outdoors and create hands-on learning media. This application can add characters, text effects, animation, images, and colors by looking at objects directly. This interactive multimedia learning application allows KKG MI Bantul teachers to move children out of the classroom.
 Application of Canva	Canva is an application introduced to teachers of the KKG MI Bantul. Teachers will choose a suitable template according to the subject to create teaching media that they want to create based on the material and characteristics of the students. This technology-based media application is very easy to access using a cellphone or computer.

Application of Comic Strip Creator

The Comic Strip Maker app is one of the simplest comic editor apps that can be used for free on smartphones or tablets. Teachers can use this as an introduction to the material and insert some applications that can be accessed with the internet.

Aplication of Assemblr Edu

Assemblr Edu application is used in learning by paying attention to several things, including that it must be connected to the internet. Smartphones must be used to access the results of Assemblr Edu. This research introduces KKG MI Bantul teachers to understand immersive education in helping teachers learn 3D/AR visuals.

The fourth meeting stage is to assist the teacher in entering the selected ideas and materials with the format that has been prepared by the researcher with the Canva application as a basis. Teachers will carry out the editing process in making technology-based books. Accompanied by a team of researchers who also measure how the teacher's interaction and knowledge in developing books. The application that has been learned at the first stage meeting is applied to the book that has been adjusted to the template. Teachers only need to provide school identity, map name, learning objectives and achievements, teaching module files, subject matter, assessment, and end-of-learning documentation to be included in the book. Although this book takes a long time to make, teachers can duplicate pages according to the material and content they want in the book.

Results of the Development of Technology-Based Learning Media Book

The stage of development is adjusted to the obstacles in mastering technology in teachers. Teachers will be directed to focus on the media development process according to existing facilities and infrastructure. One of them is that teachers will analyze several factors including psychological,

activities at school, health problems, and family environment.[15] The reasons why children are slow learners are unclear teacher guidance, lack of creative teachers, violence in schools, lack of resources and facilities for children to learn, and interaction problems with peers when learning together. Tech-savvy teachers are likely to reduce learning delays and students' academic decline caused by all environmental influences by continuously learning to improve knowledge.[16]

The results of the development of technology-based book media in KKG MI Bantul found several findings. The form of learning media developed by teachers of KKG MI Bantul varies according to the conditions of school students. The form of technology-based books is adjusted to include subject planning of learning outcomes and learning objectives. For book design, teachers have been provided with a template to edit independently. All of these applications are facilitated by researchers with registered premium accounts. Technology-based book development includes four stages, including:

Preliminary stage, this stage is the stage of learning the importance of technology in learning. At this stage, it is usually not yet made and applied. This domain is for explanation and understanding of the importance of learning technology that continues to develop in the school environment. With the utilization of existing technology in schools at the initial stage, children will be stimulated by teachers with basic knowledge such as books. At this stage, the teacher provides an understanding of the technology and applications that support student learning. Teachers at this stage have planned and edited book content by providing an introduction at the beginning of use. Teachers will also introduce the internet to emphasize the use of tools and applications. In the introduction stage, media making is still centered on teacher instruction. The subject matter can be grouped by class including grade 1, 2, 3, and semester material. For each material is adjusted to the method, infrastructure, and level of student ability. Learning materials are adjusted to instructions and procedures for use, methods, and approaches by watching videos. The use of technology as a way to foster interaction with students can be accessed with a barcode. The procedure is not made complicated and descriptive but procedural. The initial stage is introduced with a barcode and a link containing a video on how to use it.

[15] Å. Hedemark, "Constructing the Literate Child: An Analysis of Swedish Literature Policy," *Library and Information History* 36, no. 2 (2020): 73–88, doi:10.3366/lih.2020.0018.

[16] M. Mödinger, "Digital Literacy of Pre-Service Physical Education Teachers: A Subject-Specific Questionnaire Study among Student Teachers Based on the TPACK Model," *German Journal of Exercise and Sport Research* 53, no. 4 (2023): 420–31, doi:10.1007/s12662-023-00896-5.

Figure 3. Introduction of technology book with video barcode

The book development process stage. At this stage, learn about the application of technology in books that will be used as easy subject media for students. Teachers learn about the contents of the book and students are expected to get an overview of the practice of reality lessons. In the book, the teacher has included some material with applications according to the needs at school. (Applying learning is a stage in the learning process where the knowledge and skills that have been learned are applied in real or contextual situations in the book. In learning books, this stage is very important because it allows learners to connect theory with practice using applications, deepen understanding, and develop problem-solving, projects, skills, interdisciplinary, PBL collaboration, communication, and creativity. Learning technology is applied in schools to facilitate students in learning and perform actions that are collaborative with students. Teachers can distinguish the content of technology and efficient materials by fulfilling learning requirements. Efficient learning with materials collaborated with technology will be easy and interesting for students. Teachers at this stage go through a long process of learning to adjust the content and application of technology for students. In the development of the book's core material, comic applications, AR applications, and educational applications are included in the book. Each has its specifications for use. But there will still be instructions under the media in its use.

Figure 4. The content of the technology-based book learning process

Learning evaluation stage. At this stage, the teacher has carried out the practice to try out the book or integrate the technology according to the material in the book. At this stage, schools usually have facilities such as computer rooms and the Internet. The "evaluation" stage (integrating with technology) in learning is the phase where students begin to combine knowledge and skills from different disciplines or learning experiences to form a more holistic and in-depth understanding. This core part of the book involves an important step in the learning process that allows students to see connections between concepts, apply knowledge in various contexts, problem-solving, projects, practice questions and develop critical thinking and analysis skills.

Technology-based book development for learning is then used to record the learning process and evaluate the success of teaching and learning activities. This stage can answer questions such as how long the learning process will take when it will start, and what form it will take, how the results of using technology, the work process (question and answer) and provide alerts to students to be able to give appreciation/assessment. The evaluation model developed is by using applications such as Quizziz and Esamblr Edu. The assessment can be seen directly by students by using cell phones as a tool for learning. Teachers will provide an evaluation model according to the level of the children and their ease of learning with the application. The book contains several barcodes that are connected to game applications and games that can be accessed if the internet in the school is adequate.

Figure 5: Scoring with games

Learning reflection stage. In this last stage, it is the most ideal stage where teachers invite students to reflect together in learning to be used as a means of change in education. The use of technology in learning in addition to improving skills, teachers invite student teachers to be able to make learning changes by integrating technology-based books to students. This stage focuses on the application of learning to produce a value interaction of innovation, creativity, and real impact on the application of technology. This is the culmination of the book development process, where knowledge can be valued as a carrier of positive change.

The final stage of the book is created to evaluate the teaching and learning process in terms of student progress and retention. Reflections are provided in the book to measure students' progress using technology before and after learning assess how well students understand the material, and provide repeated suggestions to students. Some books contain reflection materials with technology-based audio and video explanations of the lessons. The books were created to debunk the media's lack of interest in the core process aspects of learning. The evaluation aspect is provided in the book by reflecting on learners' satisfaction or perceptions of the learning material by using interactive applications and providing documentation as an attraction of making technology-based books by the KKG MI Bantul.

Figure 6: Learning reflection

Figure 7: Cover of Technology-Based Book Collection of KKG MI Bantul

The overall impact of the results of this book development is that the design of technology-based book media can be seen as a whole and provide benefits for teachers in the MI Bantul teachers' working group. The division of material and content in the book has been agreed upon by the MI Bantul teachers' working group according to the wishes of the teachers. The performance of the results of technology-based book development is divided based on mastery of technology, creativity, application, and learning models and forms. This involves teachers who are weak in technology to contribute as a group. Book products will be collected in the form of files or prints, where each group of teachers must be able to make books as examples to other teachers. The draft that has been prepared by the researcher can be edited at any time according to the teacher's needs. Furthermore, the book will be assembled and synchronized with the application used in teaching. Teachers will be evaluated and made into groups for the obligation to learn and know at least three new applications to be operated in school learning

activities as a support for technology-based books. The description of use and alignment to the subject becomes the main reference in the characteristics of each teacher in teaching and making books. The final stage of the book is not tested on students due to limitations for timely completion of the book. In the era of globalization and information technology, the development of learning technology continues to progress. The utilization of technology-based books as learning media has become a mandatory thing to learn. Designing technology-based book media requires special skills, but that does not mean we should avoid or abandon technology-based media.

To increase the effectiveness and efficiency of learning, it is necessary to develop various creative learning media, including educational media and techniques.[17] This book was developed as one of the learning solutions that is not monotonous and boring but emphasizes more intensive, interactive, and interesting to improve the ability to transfer knowledge. Therefore, the role of technology-based teacher books that have been made in the learning process is important in bringing us back to the spirit of work, as the first source of learning. The level of retention of student understanding is influenced by the model of learning activities applied by teachers in mastering technology.[18] The utilization of books coupled with technology provides a flow of understanding and performance that helps with a percentage of 50% of the learning process. The results of book development that researchers expect are:

1. Teachers can make abstract concepts more concrete and reduce verbalism. For example, using photos, diagrams, graphs, videos, games, etc.
2. Teachers can create motivation so that learning does not become boring and monotonous and can increase students' attention with video technology-based books that can be accessed at any time.
3. Teachers can activate all of the students' senses and compensate for weaknesses in one sense (e.g. eyes or ears) with strengths in the senses in collaboration utilizing technology-based books.
4. Teachers can not only learn theories/concepts that are difficult to obtain but can also have fun with students using technology-based books.
5. Teachers can ensure consistent observations because the reflection ability of each student varies depending on the experience and intelligence of each student to capture new things.

[17] Z. Nuryana, "Literation Movement for Leading Schools: Best Practice and Leadership Power," *International Journal of Evaluation and Research in Education* 9, no. 1 (2020): 227–33, doi:10.11591/ijere.v9i1.20279.

[18] Aulia Riska Nugraheny, "Peran Teknologi, Guru Dan Orang Tua Dalam Pembelajaran Daring Di Masa Pandemi," 2020.

6. Teachers can present learning information consistently and document it in the form of recordings, films, slides, photos, videos, quizzes, and books, as a form of teacher productivity for students.

The results of making technology-based books cannot be perfect and following expectations, especially in the world of education, a real process or form is sometimes not supported by facilities and data in the field. The development of technology-based books that have been implemented will provide a view and make it easier for teachers to continue to be productive. Introducing technology as the key to the development of education has not been well optimized. Several factors must be considered well in the active involvement of a teacher's ability. Among them are the factors of verbal learning knowledge, visual, involved in making, and work experience. At this stage of technology-based book development, it is strongly influenced by these four aspects. Teachers are human beings who continue to learn and need time to develop themselves, both for themselves and for students.[19]

This research is very useful for teachers to not only have the opportunity to achieve potential but also have the opportunity to learn and get assistance in applying technology according to the field and learning desires which will be applied in technology-based books. The results of the development of this technology-based book will become an archive or handbook for teachers' experience in interacting with learning using technology.

D. Conclusion

The implementation of technology-based book development to determine the understanding and mastery of technology at the MI Bantul Teachers Working Group level not only focuses on sophisticated tools for their application but also on human resources that must be guided to be able to always develop. Technology that is mastered is not only hardware and software such as computers but also learning applications such as Canva, Assemblr EDU, Quizizz, World Brush, and Comic Creator, which a teacher must master. In choosing technology, teachers must be able to insert materials that add creativity in the stages of introduction, process, assessment, and reflection. Elementary school students need interesting learning materials to increase their willingness to learn new things.

The results of the development of this technology-based book will become an archive or handbook for teachers' experience in interacting with learning using technology. In the development process under planning,

[19] Rina Febriana, *Kompetensi Guru* (Bumi aksara, 2021).

researchers have provided assistance and understanding of the achievements of technology-based book development.

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