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Optimizing the Potential of Artificial Intelligence (KA) in the Preparation of Teaching Materials in Elementary Education

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ABSTRACT

Teaching materials can be said to be supplements based on specific achievements, goals and flow of learning objectives. Teaching materials have a significant role in their implementation, as they will affect the learning experience that takes place. However, currently teaching materials are still an administrative burden so that they are constrained in the preparation by several educators and teachers. The role of teaching materials is to be a booster of material study content because it has the characteristics of facts, concepts, principles, and procedures. This study aims to explore in depth how opportunities in the era of artificial intelligence (KA) can be a solution for every educator and teacher in compiling teaching materials that are implemented in experience and the achievement of learning goals. This study uses a qualitative research approach with a literature review method. Based on the results of the study, the potential for train optimization is in line with the current needs for the preparation of teaching learning or teaching materials, although its position remains as a tool and supporting media. Because in fact, the role of an educator and teacher cannot be replaced with the birth of the era of artificial intelligence (KA) technology. Artificial intelligence (KA) technology is able to optimize its role in strengthening the potential for strengthening learning through the potential of intelligence in the preparation of teaching materials . This is also very important to answer today's educational challenges. With the right approach, teachers can become learning architects who create dynamic, meaningful, and far-reaching learning environments.

Keywords: *Teaching Materials, KA, Basic Education*

INTRODUCTION

The rapid flow of science and technology has become a necessity with its character that increasingly triggers the birth of various innovations in every human activity. Currently, technological civilization is entering the web technology era 3.0, known as the digital asset era (Gan et al., 2023), strengthened by the birth of intelligence-based technology or known as artificial intelligence (AI) or artificial intelligence (KA). The character of artificial intelligence (KA)-based technology basically refers to the ability of technology to perform tasks that usually require human intelligence. In the field of education, this opens the door to significant innovation in learning that has great potential.

Artificial intelligence (KA) is simply the ability of a computer system to imitate human intelligence (Copeland, 2023). This includes machine learning, pattern recognition, and decision-making. The definition of artificial intelligence (KA) is a field of computer science that focuses on the development of systems and technologies that allow machines to mimic human behavior in problem solving, decision-making, and adaptation to the environment. By using mathematical algorithms and models, artificial intelligence allows computers to learn from data, recognize patterns, and make decisions based on the information provided. The main goal is to create a system that is able to think, learn, and adapt independently.

The basic concept of KA In the academic context, namely the use of intelligence-based technology in various forms, ranging from learning applications, learning planning, curriculum, to automatic evaluation systems (Supriadi et al., 2022). A deep understanding and good implementation of the technology will open eyes to potential achievements and academic goals.

Artificial intelligence (KA)-based technology continues to be developed by experts so that it can develop rapidly, allowing technology and systems to respond to user needs. The following is an example of the use of train technology; Among them are used to help prepare teaching materials, one of which is in the preparation of learning plans or teaching modules used by teachers (Melisa et al., 2025). The presence of the train will help teachers in arranging their workload, so that teachers can optimize their time potential without having to be drained to only complete teaching materials that are very administrative. Humans can experience the various benefits that artificial intelligence also has, because the train is impartial, regardless of the user. According to the language dictionary, intelligence has the meaning: An ability to understand (The Faculty of Understanding). This behavior is characterized by; understanding of experience, solving a contradiction, speed of response to a new situation.

The Utilization of Technology in the Development of Teaching Materials Digital technology opens up great opportunities in creating interactive and adaptive teaching materials. Platforms such as Canva, copilot, and gemini, allow teachers to compile teaching modules, handouts and jobsheets.

Digital technology has offered teachers a way to design and organize teaching materials. From just printed text, now teaching materials can be packaged in the form of interactive multimedia, learning applications, and virtual simulations. The use of technology not only increases the accessibility and flexibility of learning, but also enriches the learning experience of students (Saba, 2024).

The birth of artificial-based technology or artificial intelligence (KA) in the context of learning is considered to be able to stimulate the realization of learning nuances between teachers and students in a creative-innovative way, allowing teachers to compile and enrich content that is more visual, dynamic, and contextual. For example, the use of infographics, animated videos, or digital quizzes in the application of assessments. Technology also supports differentiated learning, where teachers can tailor teaching materials to learning styles and the needs of students.

Teaching material is a learning material to discuss a subject, it can be in print or non-print (audio and video) (Magdalena et al., 2020). Through the involvement of teaching materials in its development, it is hoped that it can help improve the achievement of comprehensive learning in each topic of discussion or study in a subject. From the Merdeka Teaching Platform page, teaching materials can also be said to be supporting materials for teaching modules based on specific learning outcomes and objectives. Based on the type of teaching materials according to the teacher's information center on the page (RI, 2022), teaching materials can be in the form of; a) reference materials, which are tools designed to help in explaining specific material or topics. b) assessment, which is a tool designed to assist student assessment, both diagnostic, formative, and summative assessments. c) Reflection instruments, in the form of tools for reflection for teachers and students after learning.

According to Miftah, teaching materials based on their development can be distinguished into learning source by design and as learning source by utilization (RI, n.d.). This means that learning resources designed for teaching purposes have been selected and teaching materials around the school are used to make it easier for students in the learning process. According to E Kosasih, based on its utilization, teaching materials are divided into two types, namely teaching materials that are designed and teaching materials that are used (Kosasih, 2021). First, teaching materials are designed, meaning teaching materials that are

specifically developed as components of the instructional system in order to facilitate formal and systematically planned learning actions, such as; textbooks, reference books, storybooks, newspapers, and so on that are specifically created and designed to achieve educational goals. Second, teaching materials that are used or that are specifically designed for instructional purposes, but are available and can be obtained because they already exist around or in the environment and can be used for learning purposes.

Every teacher must be skilled in selecting and determining the right involvement of teaching materials to be able to pump and develop the entire realm of achieving student learning potential optimally, effectively-efficiently and fun. Teaching materials are the content of learning materials in the form of knowledge including, facts, concepts, principles, and procedures.

Teaching materials have a very important role, especially in determining the sustainability of the learning process. Teaching materials can be used for the benefit of the learning process and improve learning success in each educational institution. Teaching materials are something that cannot be left by every teacher because they can help and make it easier for students to understand the material and even the learning process.

Through the development of good teaching materials, the role of teachers is more clearly said to be a learning facilitator. The development of good teaching materials will also focus on the concept of student center, students become active learners (Sadjati, n.d.). The function of teaching materials can be seen from the importance for students and educators. According to E Kosasih in the book center (Kosasih, 2021), first, the function of teaching materials according to the interests of students is as a means of learning, a source of information, and a means of practicing in mastering certain learning programs. Second, the function of teaching materials for educators is that the presence of teaching materials allows teachers to deal more with students individually or with small groups, teachers can focus more of their attention on efforts to arouse students' interest and can even be a solution for students who are in dire need.

Teaching materials can maximize the basic knowledge and skills that have been acquired by each student and discussed from the previous book. Time Efficiency Function The existence of teaching materials for students. A teaching material fulfills its function well if it meets the interests of students and teachers in learning. To obtain optimal learning outcomes, students must always be invited and stimulated to be able to optimize their knowledge or skills not only from sources and occur in the classroom, but must be willing and able to explore the various teaching materials needed.

METHOD

The study uses a qualitative research method called a literature review, which involves observing and assessing various sources of literature relevant to the research subject. In order to conduct the most complete synthetic analysis of Islamic education, the researchers chose this research methodology. The findings of the analysis can be applied to improve educational resources with artificial intelligence.

The literature review stage in this study then determines the sources of literature that are relevant to the research study, then analyzes the literature sources systematically and critically. The literature review method can provide a more comprehensive and in-depth picture of the research topic to be researched. The steps used in literature review research include: (1) Topic Identification; (2) Literature search; (3) Literature Selection; (4) Literature Analysis; (5) Synthesis of Literature; (6) Review Writing, and; (7) Evaluation and Editing.

RESULTS AND DISCUSSION

A. Preparation of Teaching Materials Through Artificial Intelligence-Based Technology

1. The Context and Urgency of the Use of Artificial Intelligence in the Preparation of Teaching Materials

The preparation of teaching materials through the potential of artificial intelligence (KA) is one of the strategic solutions offered not only to fulfill the administrative burden of teachers, but also as a catalyst in improving the quality of learning holistically. In the context of 21st century education, teachers face complex multidimensional challenges: high administrative demands, the need for differentiation of learning, and the expectation to integrate technology in pedagogical processes (Darling-Hammond et al., 2020).

The administrative burden of teachers in Indonesia reaches an average of 30-40% of their total working time, which should be allocated for more meaningful learning activities (Raihani, 2023). This condition shows the urgency to optimize technology in supporting the efficiency of teachers' work. As an optimization of potential, the preparation of train-based teaching materials implemented in learning is considered a necessity and an inevitable change.

Contemporary learning requires adaptive technological carrying capacity, especially in meeting learning needs in the era of digital transformation (Fullan, 2007). The implementation of educational change involves fundamental "changes in practice", not just the adoption of

technology without pedagogical transformation. The preparation of teaching materials through the potential of artificial intelligence (KA)-based technology is an integral part of the solution to meet the needs of contemporary learning that requires an innovative and responsive approach to the development of the times.

2. Working Principles of Artificial Intelligence in the Preparation of Teaching Materials

The preparation of teaching materials through KA-based technology is a utilization based on four pillars of computational thinking: decomposition (breaking down complex problems into simpler parts), pattern recognition (identifying regularity and similarities), abstraction (simplifying and focusing on important information), and algorithmic planning (designing systematic steps to achieve goals) (Wing, 2006; Barr & Stephenson, 2011).

In the context of the preparation of teaching materials, these four principles are translated as follows:

a. Decomposition: KA breaks down the components of the teaching module into specific elements such as learning objectives, indicators, learning activities, and assessments. This process allows teachers to focus on one component at a time, reducing cognitive overload in the drafting process (Sweller et al., 2019).
b. Pattern Recognition: The KA system analyzes patterns in the curriculum, learning outcomes, and student characteristics to generate relevant recommendations. Machine learning in KA can identify patterns of learning success from existing teaching module databases (Holmes et al., 2019).
c. Abstraction: KA helps teachers simplify complex concepts into representations that are easier for learners to understand, by providing a variety of visualization formats such as infographics, diagrams, and animations (Mayer, 2021).
d. Algorithm: KA follows systematic steps in producing teaching materials based on the input provided by the teacher, ensuring consistency and completeness of components (Russell & Norvig, 2021).

3. Artificial Intelligence Platform for Teaching Materials Preparation

One of the most widely accessible train platforms is Canva for Education. Launched in 2013, Canva is an online design and publishing tools platform with a mission to empower everyone around the world to create any design and publish it anywhere. With Canva, educators can easily create

materials in an attractive visual format (images) with templates and other visual materials that are ready to use and can be modified, especially with the classification of their innovation features, which are based on artificial intelligence.

However, the ecosystem of the train platform for education is not limited to Canva. Various other platforms also offer specific capabilities to support the preparation of teaching materials:

a. ChatGPT and GPT-4 (OpenAI): Capable of generating draft teaching modules, student worksheets (LKPD), evaluation questions with various levels of difficulty, and learning narratives tailored to the local context (OpenAI, 2023). This platform excels in natural language processing that allows for dialogue interaction with teachers.
b. Google Gemini: Offers integration with the Google Workspace for Education ecosystem, facilitating real-time collaboration in the preparation of teaching materials and multimodal capabilities (text, images, data) in content analysis and generation (Google, 2024).
c. Microsoft Copilot: Integrated with Microsoft 365 Education, providing assistance in creating PowerPoint presentations, Word documents, and Excel spreadsheets for learning purposes, with high automation capabilities (Microsoft, 2024).
d. Quizlet AI: Specifically for creating assessments and practice questions with an adaptive learning feature that adjusts the level of difficulty based on student performance (Quizlet, 2023).
e. Diffit: An AI-based platform specifically designed to create differentiated learning materials, capable of adapting one content into different levels of difficulty to accommodate the diversity of learners (Diffit, 2024).

With Canva for Education and other platforms, educators can optimize education-specific features such as virtual classrooms to collaborate with students and fellow educators, learning content management systems, and analytics to monitor student engagement with the materials presented.

4. The Crucial Role of "Prompt" in Artificial Intelligence Optimization

The optimization of the potential use of artificial intelligence (AI)-based technology is greatly influenced by the role of 'prompt', as it occupies an integral position as a catalyst in the creative generative process. Prompts, as defined in this context, refer to external stimulants in the form of text, questions, or visual stimuli that trigger cognitive responses that lead to creative production (Liu et al., 2023).

The quality of the output produced by the train system is directly proportional to the quality of the prompt given a principle known as "garbage in, garbage out" in computer science (White et al., 2023). Therefore, the ability of teachers to design effective prompts (prompt engineering) is an essential skill in the KA era.

An effective prompt has several characteristics:

a. Specific and Clear: Avoid ambiguity by providing adequate context
b. Structured: Following a specific framework that guides trains in producing outputs
c. Contextual: Consider learner characteristics, subjects, and learning objectives
d. Iterative: Can be improved and refined based on the output produced (Zhou et al., 2023).

5. Systematic Steps for the Preparation of Artificial Intelligence-Based Teaching Materials

The use of artificial intelligence-based technology involvement stimulates potential in a transformative way. The following are systematic steps that need to be considered in compiling teaching materials, especially when compiling teaching modules or lesson plans to provide a more effective and personalized learning experience:

a. Determine Learning Objectives with SMART Principles

The first step is to set clear and measurable learning goals by adopting the principles of SMART (Specific, Measurable, Achievable, Relevant, Time-bound) (Doran, 1981). Specific learning objectives can be in the form of: improving conceptual understanding of a particular subject, developing procedural skills, strengthening character or attitude, or achieving certain competencies according to learning outcomes in the curriculum (Anderson & Krathwohl, 2001). Setting specific, measurable goals will help in crafting an effective learning plan and facilitate the evaluation of learning achievement.

b. Identify Needs and Challenges with a Data-Driven Approach

Once the goals are set, identify the needs and challenges faced by students in achieving those learning objectives through a data-driven approach. A comprehensive understanding of these needs and challenges will help in tailoring the learning plan more on target (Tomlinson, 2017).

c. Choose Relevant and Trusted Content and Resources

Once you understand your learning goals and needs, choose content and resources that are appropriate, relevant, and trustworthy. This can include

textbooks (both print and digital), online materials from trusted repositories, learning videos from educational platforms, virtual simulations and digital labs, learning software (learning management systems), and contextual learning resources from the surrounding environment (Beetham & Sharpe, 2019).

Ensure that the content and resources chosen: Relevant to the learning objectives, In accordance with the level of cognitive development of the learners, Supports various learning styles (visual, auditory, kinesthetic), Contains accurate and up-to-date information, Accessible to all learners, including those with special needs (UNESCO, 2017)

d. Use Train for Adaptive Learning

One of the main advantages of KA is its ability to personalize learning for each student—an approach that is difficult to do manually by teachers dealing with 20-40 students in a single class (Pane et al., 2017). Use machine learning algorithms to analyze data about students' progress and learning preferences, and adjust the learning plan individually based on the results of that analysis.

e. Integration of Train Technology in the Learning Ecosystem

Choose the train technology that suits the learning goals and needs, taking into account the pedagogical aspect over technology (TPACK - Technological Pedagogical Content Knowledge) (Mishra & Koehler, 2006). Technology integration must be meaningful and support the achievement of learning goals, not just the use of technology for the sake of technology itself.

f. Monitor and Evaluate Progress with Learning Analytics

Continue to monitor student progress during the learning process through learning analytics. Use the data collected by the KA system to identify areas where students need additional help or are already well versed and ready for further challenges (Siemens & Long, 2011). With careful and data-driven monitoring, teachers can adjust learning plans in real-time to maximize outcomes an approach known as formative assessment or assessment for learning (Wiliam, 2011).

g. Continuous Evaluation and Adjustment

After a certain period of learning, comprehensively evaluate the effectiveness of the learning plan. Use quantitative (assessment scores, analytics) and qualitative (student feedback, teacher reflection) data to evaluate the success of the lesson plan (Kirkpatrick & Kirkpatrick, 2006).

Identify areas where improvements can be made, then make necessary adjustments to improve future learning plans. The PDCA (Plan-Do-Check-Act) cyclical approach can be applied to continuous improvement (Deming, 1986).

6. Structural Components of Teaching Materials in the Independent Curriculum

The preparation of teaching materials carried out by educators and lecturers still maintains the completeness component in accordance with the framework of the Independent Curriculum, even though the technical preparation uses artificial intelligence (KA)-based technology tools and media. The standardization of this component ensures the consistency of the quality and completeness of teaching materials throughout Indonesia (Ministry of Education and Culture, 2022).

The following are the components that can be considered in the preparation of teaching tools or teaching materials.

Table 1.
Components of Teaching Tools and Materials in the Independent

Components of the Teaching Module	Components of Teaching Materials	Project Module Components
1. Informasi umum 2. Fase Pembelajaran 3. Capaian dan Tujuan Pembelajaran 4. Detail Rancangan Penggunaan 5. Detail Pertemuan • Alokasi Jam Pembelajaran (JP) per pertemuan • Rincian Kegiatan Pembelajaran, yang disarankan te rdiri dari: o Tujuan Pembelajaran pada pertemuan secara spesifik o Pertanyaan Pemantik & Pemahaman Bermakna o Indikator Keberhasilan	1. Informasi umum 2. Isi bahan ajar, yang dapat terdiri dari: • Referensi materi • Asesmen/latihan • Dokumen kelengkapan instrumen refleksi 3. Dokumen kelengkapan yang terdiri dari: • Dokumen Keterkaitan dengan Kurikulum Merdeka • Dokumen Kelengkapan per Kategori Bahan Ajar	1. Informasi umum 2. Isi modul projek, yang dapat terdiri dari: • Total Alokasi Jam Pelajaran • Elemen Profil Pelajar Pancasila • Tujuan Pembelajaran • Rancangan Utuh Modul Projek

- Daftar Perlengkapan Ajar
- Daftar Lampiran Bahan Ajar
- Rencana Langkah / Kegiatan Pembelajaran
- Rencana Asesmen
- Diferensiasi

- Lampiran atau Materi Pendukung, dapat berupa:
  - Bahan Ajar / Referensi Materi
  - Lembar Kerja Murid / Asesmen
  - Instrumen Refleksi

The above component is one of the structural frameworks that are always considered in the technical steps of preparing teaching materials or teaching tools (teaching materials). The components in each of the above categories can also be used as a reference in determining the preparation of prompts in the use of artificial intelligence (KA)-based programs.

B. Recognizing the Purpose and Framework of Prompt Engineering

1. Concept and Definition of Prompt in the Context of Artificial Intelligence

Prompt is an initial instruction or stimulus that aims to trigger the generative process of an artificial intelligence system. In the realm of education and learning material development activities, prompts can be interpreted as a keyword, phrase, question, or descriptive representation presented with the aim of inspiring and directing the train system in producing the desired output (Reynolds & McDonell, 2021).

Therefore, prompts serve as a tool to activate the generative abilities of the train system and facilitate the initiation of a productive process, allowing the creation of unique and contextual learning materials based on the system's interpretation of the instructions given (Zamfirescu-Pereira et al., 2023).

2. Basic Principles in Creating Effective Prompts

In the exploration of the use of artificial intelligence for education, the question of how we interact with AI is becoming increasingly important. One of the key elements in communicating with an AI system is a prompt, which is a command or question that we give to ask for a response from the system. Here are the fundamental principles for creating an effective AI prompt and getting the desired results.

a. Recognizing Clear and Specific Goals

The first step in creating a good AI prompt is to recognize the goal you want to achieve in a very specific way. Are we looking for specific information, asking for solutions to specific learning problems, generating teaching material content, or designing assessments? (White et al., 2023). Clarifying the purpose will guide us in choosing the right words and the structure of the prompt.

b. Clear, Specific, and Descriptive Wording Selection

The words used in the prompt should be clear, specific, and rich in contextual descriptions. AI requires the right prompts to provide relevant responses. Avoid ambiguity and use words that narrow the focus of the command so that AI can provide answers that are appropriate to pedagogical needs (Kojima et al., 2022).

CLEAR principles in word selection:

1) Concrete: Use concrete terms, not abstract
2) Level-appropriate: Adapt language complexity to the level of learners
3) Explicit: State expectations clearly
4) Actionable: Use clear verbs (create, explain, analyze)
5) Relevant: Relevant to the learning context

c. Logical and Systematic Sentence Structure

The sentence structure of the prompt plays an important role in producing quality output. Well-structured sentences help the AI understand our intent more accurately. Avoid convoluted sentences and make sure the desired information is clearly stated in a logical order (Liu et al., 2023).

Recommended structure:

1) Context (who, where, for what)
2) Tasks (what to do)
3) Format (desired output form)
4) Constraints
5) Examples (if necessary, provide references)

d. Avoiding Bias in Prompts

It is important to avoid using words or phrases that could introduce bias in our prompts. AI has a tendency to respond according to the inputs provided, and avoiding bias helps ensure that the outcomes provided remain objective, inclusive, and in accordance with fair education principles (Bender et al., 2021).

Types of bias to avoid:

1) Gender bias: Avoid gender stereotypes in examples or scenarios
2) Cultural bias: Consider the cultural diversity of students
3) Ability bias: Don't assume all students have the same abilities
4) Socioeconomic bias: Avoid assumptions about access to resources

e. Literacy and Continuous Evaluation

After creating the prompt, conduct an experiment by testing the AI's response to possible prompt variations. Evaluation of the responses given will help improve and refine the prompt to get optimal results (Zhou et al., 2023).

Prompt iteration cycle:

1) Create an initial prompt
2) Evaluation of outputs: is it up to expectations?
3) Identify gaps or shortcomings
4) Revision prompts with addition of details or changes to structure
5) Test back
6) Document the best version for reuse

C. The Future of Artificial Intelligence in Education between Opportunities and Challenges

1. Emerging Trends

a. Adaptive Learning Systems: Sistem yang semakin canggih dalam menyesuaikan konten dengan kebutuhan individual siswa secara real-time (VanLehn, 2011).
b. Multimodal AI: KA yang dapat bekerja dengan berbagai jenis input dan output (teks, gambar, audio, video) secara terintegrasi (Radford et al., 2021).
c. Collaborative AI: AI yang dapat berkolaborasi dengan guru dan siswa dalam proses pembelajaran, bukan hanya sebagai tools pasif (Dillenbourg & Jermann, 2010).
d. Emotional AI: Sistem yang dapat mengenali dan merespons emosi peserta didik untuk memberikan dukungan yang lebih personal (D'mello & Graesser, 2012).

2. Implications for Teacher Professional Development

Future teachers need to develop KA literacy that includes (Ng et al., 2021):

a. Technical Literacy: Understand how the basic train works and how to operate the tools
b. Critical Literacy: The ability to critically evaluate train output
c. Ethical Literacy: Understanding the ethical implications of using KA
d. Pedagogical Literacy: The ability to meaningfully integrate KA in pedagogical practice

Teacher training programs need to accommodate the development of these competencies in a systematic and sustainable manner (Celik et al., 2022).

3. Critical Reflection Maintaining the Pedagogical Essence in the Train Era

In the midst of enthusiasm for the potential of KA, it is important not to lose focus on the essence of education: forming a whole human being, thinking critically, having character, and contributing positively to society (Freire, 2000).

a. KA as a Tool, Not a Purpose: KA is a powerful tool, but education should not be defined by technology. Pedagogy should lead technology, not the other way around (Mishra & Koehler, 2006).
b. Preserving Human Connection: Authentic teacher-student relationships, empathy, and social interaction remain at the heart of quality education. Trains cannot replace this humanitarian dimension (Noddings, 2005).
c. Critical Thinking about Technology: Students need to be taught not only how to use KA, but also how to think critically about it—understanding its strengths, limitations, and social implications (Selwyn, 2022).
d. Focus on Learning Objectives: Any decision to use KA should start with the question: "Is this helping students achieve meaningful learning objectives?" rather than "How can I use this latest technology?" (Koehler & Mishra, 2009).

With a thoughtful, reflective, and student-centered approach, KA can be a valuable partner in realizing a more quality, inclusive, and liberating education.

CONCLUSION

Optimizing the potential of artificial intelligence-based technology (KA) in the preparation of teaching materials is based on the principles and characteristics of learning, namely based on the utilization of the teaching materials designed and the teaching materials used. Teaching materials based on

their development can be differentiated into learning source by design and as learning source by utilization. This means that learning resources designed for teaching purposes have been selected and teaching materials around the school are used to make it easier for students in the learning process

Optimizing the involvement of artificial intelligence (KA)-based technology in the preparation of teaching materials is categorized as being able to meet the criteria practically. Furthermore, theoretically, it is stated that train technology can be applied in increasing productivity and learning achievement. Meanwhile, empirically it shows that the train meets the practical criteria reviewed from the indicators of implementation and the ability of teachers to manage based on the characteristics of the train, which is based on; Determination of learning objectives, identification of needs and challenges, selection of content and resources, use AI for personalization of learning, integration of AI technology, monitoring and evaluation of progress, evaluation and adjustment. The development of this teaching material has relevance to strengthening learning experiences and learning variations through the optimization of internet-based information technology networks.

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