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Developing Exe-Learning Media for Explanatory Texts through the 6C Skills Approach in 21st Century Language Learning

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Abstract

This study aims to develop Exe-Learning-based educational media focused on the material of Explanatory Texts, utilizing the 6C competency approach within the context of 21st-century language learning. Given the rapid advancement of technology, there is an urgent need to create educational materials that not only align with contemporary dynamics but also meet learners' expectations. Technology-based learning media is expected to provide a more engaging and interactive learning experience. The development process follows the ADDIE model, encompassing five stages: Analysis, Design, Development, Implementation, and Evaluation. Data were collected through questionnaires and interviews with students and Indonesian language teachers to gain in-depth insights into the use of this media. The findings indicate that E-learning-based educational media can significantly enhance student engagement and understanding of Explanatory Texts. Furthermore, this media supports the development of 21st-century skills, including critical thinking, creativity, collaboration, and communication. These findings underscore the importance of integrating technology into education to create interactive and effective learning experiences, allowing students to be more actively involved in the learning process and significantly improve their learning outcomes. This research also contributes to the development of more innovative and relevant learning strategies that address contemporary needs.

Keywords: *Teaching Materials, Exe-Learning, 6C Skills, 21st Century Learning, Explanatory Texts*

Abstrak

Penelitian ini bertujuan untuk mengembangkan media pembelajaran berbasis Exe-Learning yang berfokus pada materi Teks Eksplanasi, dengan menggunakan pendekatan Kecakapan 6C dalam konteks pembelajaran bahasa di abad ke-21. Mengingat pesatnya perkembangan teknologi, terdapat kebutuhan mendesak untuk menciptakan bahan ajar yang tidak hanya sesuai dengan dinamika zaman, tetapi juga mampu memenuhi harapan peserta didik. Penggunaan media pembelajaran berbasis teknologi diharapkan dapat memberikan pengalaman belajar yang lebih menarik dan interaktif. Proses pengembangan media ini mengikuti model ADDIE, yang mencakup lima tahapan: Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi. Data dikumpulkan melalui kuesioner dan wawancara dengan peserta didik serta guru Bahasa Indonesia untuk mendapatkan perspektif mendalam tentang penggunaan media ini. Hasil penelitian menunjukkan bahwa media pembelajaran berbasis Exe-Learning dapat secara signifikan meningkatkan keterlibatan peserta didik serta pemahaman mereka terhadap materi Teks Eksplanasi. Selain itu, media ini juga mendukung pengembangan keterampilan abad ke-21, termasuk berpikir kritis, kreativitas, kolaborasi, dan komunikasi. Temuan ini menegaskan pentingnya integrasi teknologi dalam pembelajaran untuk menciptakan pengalaman belajar yang interaktif dan efektif, di mana peserta didik dapat lebih aktif terlibat dalam proses belajar dan meningkatkan hasil belajar mereka secara signifikan. Penelitian ini juga memberikan kontribusi pada pengembangan strategi pembelajaran yang lebih inovatif dan relevan dengan kebutuhan zaman.

Kata kunci: Bahan Ajar, Exe-Learning, Kecakapan 6C, Pembelajaran Abad-21, Teks Eksplanasi

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INTRODUCTION

In the ever-advancing wave of globalization, technological development has experienced an extraordinary surge that can no longer be contained. The education sector must respond to this progress by integrating technology into classroom learning processes. Traditional teaching methods, such as lecture-based instruction where students play a passive role as "empty vessels," are no longer relevant. Today, students are expected to be more active and engaged in the learning process (Dipani, 2023). This is especially true for students at the secondary education level, who are almost certainly familiar with and regularly use gadgets in their daily lives. Therefore, students' inclination toward gadget use should be leveraged to support a more interactive and engaging learning process (Hartanto & Khairuddin, 2020; P. A. S. Sari et al., 2024).

Educators must possess the ability to create media and learning materials that are in synergy with technology, so that the learning experience becomes more engaging and not monotonous. In the context of language learning in the 21st century, students must not only hone the 4C competencies—critical thinking, creativity, collaboration, and communication—but also develop the 6C competencies, which additionally encompass character and citizenship (Paramita, 2023; S. P. Sari et al., 2021; Sarip et al., 2024). Twenty-first-century competencies represent a set of essential skills for building an advanced civilization. As stated by Ki Hajar Dewantara, "Education must be in harmony with the nature of the world and the nature of the times," meaning that education must be adaptive to the progress of the era and actual needs (Niyarci, 2022; Santika & Khoiriyah, 2023; Yulianto, 2024)

Critical thinking is the ability to think rationally and analytically, enabling students not only to receive information passively but also to question and analyze it in order to solve problems they encounter. This ability is essential for fostering logical and methodical thinking in addressing various challenges (Paul & Elder, 2010). Meanwhile, communication skills involve the ability to convey ideas effectively, both orally and in writing, so that the intended message can be received and clearly understood by the audience without misunderstandings. Good communication also entails understanding the context of the situation and the characteristics of the audience.

In the context of the 21st century, collaboration skills have become highly important, as collaboration allows individuals to leverage each other's strengths and address weaknesses, while fostering responsibility, empathy, and respect for differing opinions. Through collaboration, students learn to work effectively in teams, which is a vital skill in today's professional world. Furthermore, creativity is necessary to develop new ideas or improve existing ones. Students should be given the space to explore their imagination with appropriate support from educators so they can generate meaningful innovations.

The newest competencies that must be developed in 21st-century education are citizenship, accompanied by cultural literacy. Citizenship competence encompasses active participation and responsibility within society, as well as the ability to contribute positively to the community. This aligns with UNESCO, (2015) view, which emphasizes that 21st-century education should prepare individuals to become responsible citizens who respect cultural diversity and actively participate in society (UNESCO, 2015). In addition, cultural literacy relates to the understanding and appreciation of existing cultural diversity. A deep understanding of culture can foster tolerance and respect for differences, which is essential in an increasingly globalized environment.

Furthermore, the competence of character, accompanied by compassion, in 21st-century learning—which is part of the 6C—refers to moral qualities such as integrity, responsibility, and perseverance, as well as compassion, which is the ability to show empathy and care for others. Character skills aim to help individuals develop sound moral qualities necessary to face moral and social challenges with integrity and empathy. Research indicates that students with strong character can also enhance their moral and social quality, which is crucial in shaping a generation that is both empathetic and has integrity (Lestari, 2021). Therefore, integrating

citizenship, cultural literacy, and character into the 21st-century education curriculum is essential to developing individuals who are not only academically intelligent but also virtuous and ready to contribute positively to society.

To support the development of the 6C in classroom learning, innovative and up-to-date learning materials are needed. One type of material that can be developed is e-learning–based content. E-learning is the use of information and communication technology to support the teaching–learning process, encompassing various digital forms such as online courses, webinars, and internet-based learning modules. E-learning offers several significant advantages, including wider accessibility, lower costs, flexibility in time and place, and interactive learning materials (Ajiatmojo, 2021; Inawati et al., 2022). The use of e-learning in language learning in Indonesia has been proven to increase students' active participation and facilitate the development of 21st-century skills such as critical thinking and collaboration. Therefore, integrating e-learning into learning materials is crucial to ensuring a teaching–learning process that is relevant to the needs of the times and supports the effective achievement of the 6C competencies.

Exe-Learning is an innovative platform for developing interactive e-learning content, enabling the creation of digital materials rich in media such as text, images, videos, and interactive quizzes without requiring advanced programming skills (Dewi et al., 2022). In the context of teaching explanatory texts, the use of Exe-Learning-based e-learning has been proven to significantly enhance students' engagement and comprehension. Through the presentation of interactive and multimodal materials, such as animated videos and quizzes, this tool not only helps assess students' understanding in real time but also increases their motivation in the learning process. Previous studies have shown that integrating diverse media into learning can facilitate a more comprehensive and effective learning experience (Endawan & Yati, 2021).

The flexibility offered by e-learning, particularly when using Exe-Learning, allows students to learn at their own pace and on their own schedule—an essential feature for those with limited time or access to educational resources. Exe-Learning's capability to enable educators to design dynamic and adaptive materials supports the principles of 21st-century education, which emphasize the importance of personalized, adaptive, and technology-driven learning. Furthermore, research indicates that flexibility in e-learning can improve accessibility and student engagement, providing an effective solution to learning challenges in the digital era (Paramita, 2023; Rumsowek et al., 2024; Sihite et al., 2024). The integration of Exe-Learning into the curriculum has been proven to align with the goals of modern education, which aim to develop 21st-century 6C skills such as critical thinking, creativity, collaboration, communication, character, citizenship, and adaptability to technological capabilities.

METHOD

This study is a development research employing the *Research and Development* (RnD) approach. The focus of this research is on the development of e-learning teaching materials using the **Exe-Learning** platform for teaching *Teks Eksplanasi* in Grade XI Bahasa Indonesia. The development model applied in this study is the **ADDIE** model, developed by Dick and Carey in 1996. The ADDIE model consists of five main stages: *Analysis*, *Design*, *Development*, *Implementation*, and *Evaluation* (Pitriani et al., 2021).

The selection of the ADDIE model in this study is based on the consideration that the product being developed is teaching material rather than software, making this model highly relevant for instructional material development (Kurniasih et al., 2023).. The ADDIE model includes five main stages implemented in this research as follows: (1) **Analysis**: At this stage, the researcher conducted an analysis of the curriculum, learners' needs, and learners' characteristics through observation and interviews. (2) **Design**: In this stage, the researcher began designing the product by gathering the necessary tools or materials, such as the Exe-Learning application, supporting images or animations, audio, and learning materials to be

incorporated into the application. (3) **Development**: At this stage, the design that had been created was presented in tangible form. All the elements or materials collected during the design stage were assembled into an integrated unit within the Exe-Learning application (Putra et al., 2014). (4) **Implementation** and **Evaluation**: Due to time constraints, this study only reached the *Development* or *Production* stage.

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RESULTS AND DISCUSSION

In this study, the ADDIE approach was used as a framework for developing e-learning teaching materials focused on explanatory text learning. Each stage of the ADDIE model was integrated with the 6C competencies, which are the hallmarks of 21st-century learning. In the **Analysis** stage, a comprehensive review was conducted, covering curriculum analysis, analysis of students' needs, teachers' needs, and the relevance of the material to 21st-century learning.

In the curriculum review, the *Kurikulum Merdeka* is seen as a significant breakthrough in Indonesia's education system, as it offers flexible and student-centered learning. This approach not only encourages students to be more active and independent but also equips them with skills relevant to facing the challenges of the 21st century. Students are given the freedom to choose subjects or topics according to their interests and talents, allowing for deeper exploration tekuni (Efendi et al., 2023). The implementation of *Kurikulum Merdeka* adopts Project-Based Learning to connect knowledge with the real world through the integration of various disciplines and practical skills (Wahyuni, 2022). Technology is also widely utilized, including e-learning platforms and gamification elements, to enhance student motivation and engagement. The curriculum emphasizes authentic assessment that covers both the process and product of learning, such as portfolios of student development, and integrates character education that instills values of integrity, responsibility, and empathy empati (Bukoting, 2023; Purnawanto, 2023; Turnip et al., 2023). Moreover, a supportive learning environment—such as flexible classrooms and access to diverse learning resources—plays an important role in producing students who are knowledgeable, have strong character, and are prepared to face future challenges (Dwita & Zulfitria, 2024).

The analysis of students' needs shows that technological advances in the digital era have transformed the learning patterns of today's generation. Students are increasingly accustomed to using devices such as smartphones, tablets, and laptops to access information and learning materials (Afriyadi et al., 2023). This situation has created a demand for digital teaching materials that can be accessed anytime and anywhere, providing students with the flexibility to adjust their study time to their own convenience. Digital-based materials also allow for the integration of interactive formats such as videos, quizzes, and simulations, which have been proven to significantly increase engagement and comprehension of the material (Abdullah et al., 2024). Therefore, the provision of accessible e-learning platforms rich in interactive content is an essential step toward optimizing the learning process in the digital era.

From the perspective of teachers' needs, it was found that educators require diversified teaching materials to accommodate students' varied needs and learning styles. Such diversification enables teachers to present learning content that is more relevant, engaging, and adaptive to current developments (Maspupah & Wulan, 2021). Broad access to learning resources, both printed and digital, allows for the design of a curriculum that is flexible and responsive to change (Fitrawan et al., 2024). The variety of teaching materials not only enriches students' learning experiences but also fosters the development of their critical and creative thinking skills. Therefore, support from educational institutions in helping teachers acquire and develop diverse teaching resources is crucial (Agustina et al., 2023);(Dwita & Zulfitria, 2024)..

Furthermore, 21st-century learning, which serves as the foundation for this study, emphasizes the integration of the 6C skills—Character, Citizenship, Critical Thinking, Creativity, Collaboration, and Communication—into explanatory text learning. In terms of *Character*, strengthening integrity, responsibility, and curiosity is achieved by guiding students to present information accurately and honestly. *Citizenship* is instilled through assignments to

write about social, environmental, or public policy issues, enabling students to understand the impact of phenomena on society and the environment. *Critical Thinking* is fostered by encouraging students to conduct in-depth analysis, evaluate sources, and construct logical, evidence-based arguments. *Creativity* is facilitated by encouraging the use of diagrams, illustrations, or interactive media to clarify concepts. *Collaboration* is developed through group work in which students collect data, discuss, and compose explanatory texts collaboratively. Finally, *Communication* is trained through the creation of clear and structured texts, as well as oral or multimedia presentations.

The integration of 6C skills into explanatory text learning ensures that students not only understand the material conceptually but also acquire the competencies needed to adapt to global demands. Thus, the *Analysis* stage in the ADDIE model serves not only as the foundation for planning teaching material development but also as a roadmap for identifying needs and strategies relevant to producing innovative, interactive, and 21st-century-aligned e-learning media.

At this stage, the process of designing interactive e-learning materials based on Exe-Learning was carried out through several interrelated key steps. The first step was the selection of the material, which in this case focused on explanatory texts. This choice had a strong rationale because explanatory texts are an essential part of the curriculum that serves to develop students' reading, writing, and analytical thinking skills (Setiawan et al., 2019). This material supports the mastery of 21st-century skills such as character, citizenship, critical thinking, creativity, collaboration, and communication. Writing explanatory texts requires students to conduct thorough research and present information accurately, thereby fostering integrity and responsibility. Furthermore, the themes in explanatory texts often address social, environmental, and scientific issues relevant to life, helping students to understand their role in society and how they can contribute positively (Setiawan et al., 2019). These characteristics make explanatory texts highly suitable for development in an interactive e-learning format, utilizing multimedia such as videos, animations, graphics, and other interactive elements to facilitate the understanding of complex concepts. The use of multimedia not only makes learning more engaging but also provides flexibility for students to access the material according to their own time and learning pace (Atikah et al., 2021; Haryadi et al., 2023). Thus, the selection of explanatory texts ensures that the learning process remains relevant, engaging, and contributes to the development of students' essential skills.

The next stage was the formulation of learning outcomes aligned with the context of the *Merdeka Curriculum*, as stipulated in the Decree of the Head of the Agency for Standards, Curriculum, and Educational Assessment (BSKAP) Number 032 of 2024 concerning Learning Outcomes for Early Childhood Education, Primary Education, and Secondary Education (Kemendikbudristek, 2024). The *Merdeka Curriculum* provides flexibility for educators and students to determine the direction and methods of learning according to their needs and interests. The learning outcomes were designed to develop critical thinking, creativity, collaboration, communication, and to integrate aspects of character and citizenship. The established graduate competency standards require deep understanding, the ability to apply knowledge in various contexts, and mastery of skills that can be measured objectively. In the context of explanatory text materials, the learning outcomes include the ability to write clear and structured texts with accurate data, to evaluate texts that have been read, and to present explanations orally in an effective manner. This approach ensures that students not only master academic knowledge but also acquire practical skills relevant to real life (Kemendikbudristek, 2024).

The next stage was the creation of an interactive e-learning instructional material design based on Exe-Learning with an ecological theme. The selection of relevant topics such as the impact of deforestation or plastic waste management was carried out to foster environmental awareness while enhancing scientific understanding. The learning design was developed with clear objectives, covering the causes and impacts of ecological problems as well as possible

mitigation measures. Interactive content such as quizzes, simulations, and animations were included—for instance, a simulation of plastic recycling—to support students' comprehension. The activity plan also involved discussions and research projects, while integrating 21st-century skills (6C) to sharpen critical thinking, creativity, collaboration, and communication abilities (Balti et al., 2023; S. P. Sari et al., 2021; Sarip et al., 2024). This design considered engaging visual aspects, easy navigation, and relevant assessments. Feedback from the use of the teaching materials would be utilized for revisions, ensuring the content remained effective and contextual.

In the development process, various supporting applications were used to create interactive and professional materials. Canva was utilized to design presentation slides and teaching materials by leveraging the *Belajar.id* account, which allows access to premium features. This application offers various customizable educational templates, making it easier to create consistent and engaging learning media. The design process was carried out by adjusting slide content, font type and size, as well as adding visual elements that supported material comprehension. Canva served as an efficient solution to produce presentations ready to be integrated with other learning media, including audio-visual and interactive elements.

Figure 1. Process of Creating Learning Materials with Canva

After selecting an appropriate template, the process of creating the learning media continued with the systematic arrangement of the content. This stage involved adjusting each slide or page, organizing the type and size of text fonts, as well as adding supporting visual elements such as icons, illustrations, or graphics to ensure the overall appearance remained consistent and visually appealing. These adjustments were intended to ensure that the learning media was not only informative but also possessed visual aesthetics that supported learners' focus and comprehension. Once the editing process was completed, the finalized learning media design was saved in PPTX format to facilitate ease of use and allow integration with other applications in the subsequent development stages.

Figure 2. Process of Creating Learning Media with Canva

The next stage involves utilizing the Zoom application, a video conferencing platform that serves functions beyond being merely an online meeting medium, namely as a tool for recording instructional videos. One of Zoom's key features employed in this process is the *greenscreen* facility, which allows users to remove the original video background and replace it with images or settings relevant to the learning material. Recording is carried out automatically through Zoom by using this feature without requiring complex additional equipment. This approach is highly beneficial in producing instructional videos that are more focused, professional, and visually engaging. For instance, in a lesson on climate change, the background can be replaced with visualizations of appropriate ecosystems, making the learning message more contextual and easier for students to understand.

Figure 3. Process of Recording Video Content with Green Screen on Zoom Application

The next stage in the development process of instructional media is video editing using the CapCut application. This application is popular due to its ease of use, comprehensive features, and free accessibility, making it highly suitable for creating digital learning media. In this context, CapCut is utilized to combine presentation slides previously designed in Canva with video content recorded using Zoom. This merging process enables a harmonious integration of visual and audio elements, resulting in a more cohesive learning product. In addition, CapCut is also used to add text, visual effects, and transitions that are carefully designed to make the video more informative, engaging, and professional. The final product of this process is an audio-visual-based learning medium that can optimally support students' auditory and visual learning styles.

Figure 4. Process of Merging Learning Content Videos with CapCut

The final stage is the implementation of gamification-based learning evaluation, an approach that incorporates game elements to both assess and enhance students' understanding of the material studied. This approach has proven effective in making the evaluation process more engaging, challenging, and motivating for students to actively participate. In this learning media, gamification is realized through word puzzle and frog leap games, both designed in alignment with the explanatory text material. The games are created using the Educaplay platform (https://www.educaplay.com/), which offers a variety of interactive game types.

The design process begins by selecting the type of game that aligns with the evaluation objectives, followed by filling the game content with relevant material. The next step involves customizing the game's theme and visual design, including setting difficulty levels and adding time limits to increase the challenge for students. Once the games are completed, they are published and shared with students via a link or QR code for direct access. Students can immediately play the games, and at the end of the session, they will see the scores they achieved as an indicator of their level of understanding of the material. These scores can then be used by teachers as a reference for evaluating students' learning achievement. In this way, Educaplay functions not only as an evaluation tool but also as an enjoyable, motivating, and effective medium for reinforcing students' understanding of explanatory text material.

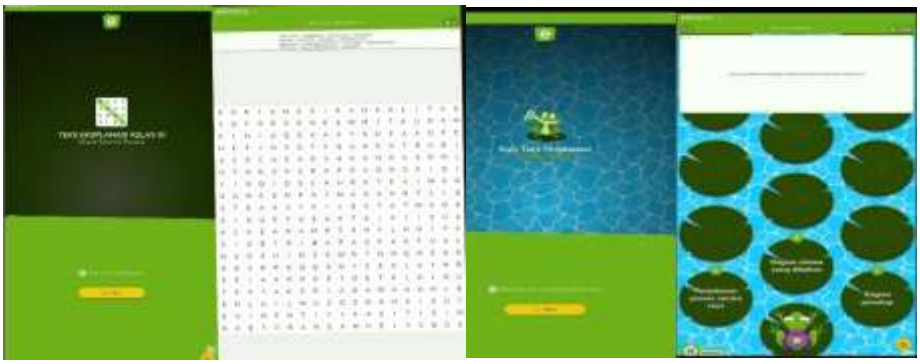

Figure 5. Display of Puzzle and Jumping Frog Games

By utilizing Educaplay, educators can create a learning experience that is both enjoyable and capable of motivating students to actively participate in the learning process. This approach makes the evaluation process more engaging and effective, allowing students to perceive tasks not merely as obligations but as exciting challenges. Overall, the integration of Canva, CapCut, Educaplay, and Zoom in the design process of e-learning materials has proven to produce interactive, effective, and professional learning media. This combination supports the achievement of learning objectives in a creative, adaptive manner that aligns with the demands of 21st-century education.

Figure 6. Initial Display of Exe-Learning

Entering the development or production stage, the process focuses on determining the e-learning design, which serves as the foundation for the entire digital learning product. This stage begins with the selection and evaluation of the Exe-Learning application, which functions as a platform for creating interactive learning materials that can be accessed online by students. The process starts with downloading and installing Exe-Learning on the device to be used, followed by creating an account through login using an email address. Once the authentication process is successfully completed, the user proceeds to compile a list of content that will serve as the main structure of the learning material.

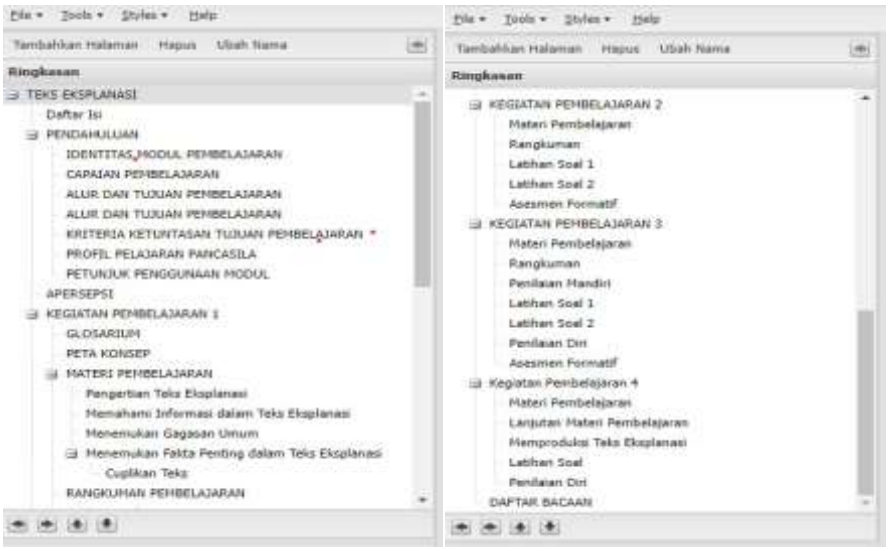

Figure 7. Display of Creating a Content List on Exe-Learning

In the next stage, the user begins arranging the structure of the material to be taught in Exe-Learning (Figure 1.8). The explanatory text material is organized into several core sections: introduction, learning activities, learning materials, and evaluation. In addition to these main components, supporting elements such as a glossary and a concept map are also added to help clarify students' understanding. Once the content structure is established, the process continues with incorporating various types of learning materials, including text, images, videos, and animations. Each piece of content is designed to be visually appealing, informative, and easy to understand. In the final stage, the user configures the user interface settings so that the learning materials become more interactive, easily accessible, and comfortable for students to use.

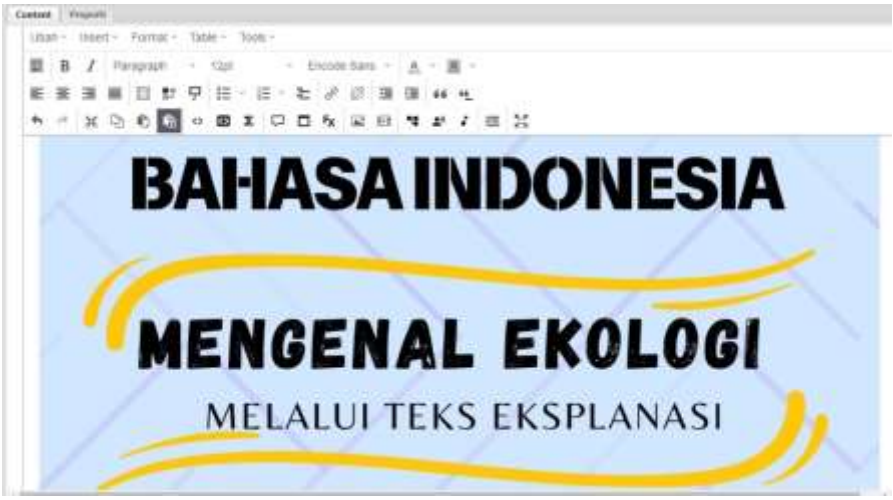

Figure 8. Display of the Material Import Process on Exe-Learning

The next step is the process of importing learning materials into the Exe-Learning application (Figure 1.9). Once the detailed list of materials has been arranged, the educator begins entering the prepared content in a format compatible with Exe-Learning. The materials include explanatory text, images, graphics, and videos that serve to support conceptual understanding both visually and contextually. In addition, various exercises and interactive questions are also developed to assess students' comprehension, such as multiple-choice questions, short-answer items, and other interactive formats designed to enhance active engagement in learning.

The following stage involves revising and refining the materials based on feedback from experts. In this context, fellow teachers with expertise in education and technology act as

evaluators to ensure the quality of the learning resources. The evaluation process is carried out by reviewing all components, ranging from the content, supporting media, to the level of interactivity offered. The evaluation results are then presented in the form of a data table assessing the Exe-Learning instructional media, which is further analyzed and used as a reference for improvement.

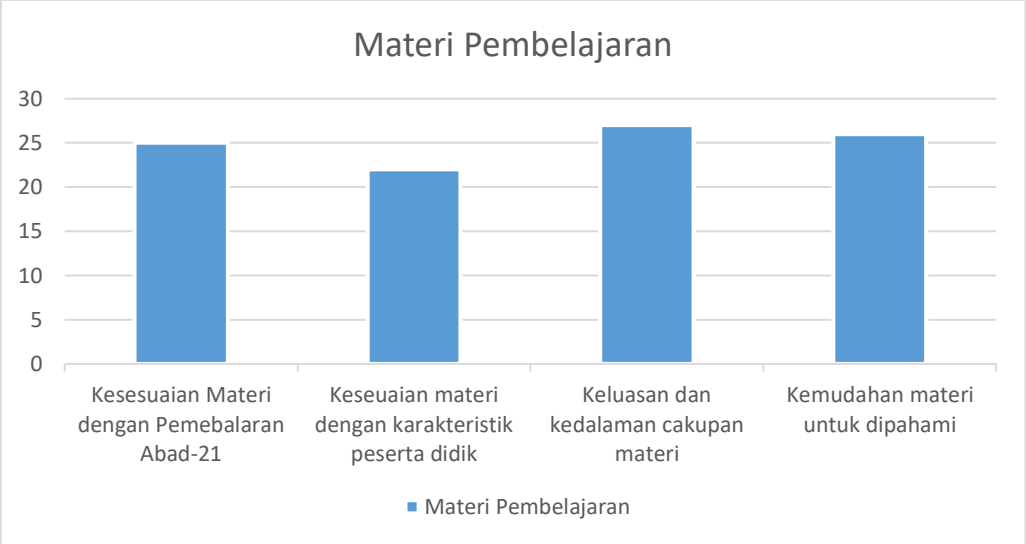

Figure 9. Learning Materials Chart

Overall, the evaluation results presented in the previous table indicate that the Exe-Learning-based learning materials were rated good across all measured aspects. The categories of breadth and depth of material coverage, as well as alignment with 21st-century learning, received the highest scores, indicating that the materials are not only relevant and comprehensive but also adapted to learners' needs and easy to understand. These findings strengthen the evidence that the material development process adhered to modern learning principles oriented toward mastering 21st-century skills.

Meanwhile, the results shown in the second graph illustrate the evaluation of the appearance of the teaching materials developed using Exe-Learning. From these results, user feasibility achieved the highest score, approximately 28 points, indicating that the materials are considered highly feasible and aligned with user needs. The aspects of interactive media usage and the appropriateness of images and illustrations also received high scores, each around 25 points. This confirms that the teaching materials can capture students' attention and increase their learning interest through the effective and interactive use of visual media.

However, the category of students' active engagement obtained a score of around 22 points, which, although quite good, still leaves room for development to further optimize interaction and participation in learning. In addition, the suitability of animation effects with the learning content scored around 21 points, indicating that while animations have supported content presentation, there is potential for improvement to better align them with the learning material. Overall, these results show that the appearance of Exe-Learning-based teaching materials meets most of the essential criteria for creating effective learning media, but still requires enhancements in certain aspects to achieve optimal quality.

CONCLUSION AND RECOMMENDATIONS

This study emphasizes the importance of integrating technology into learning in the era of globalization to create a more interactive and relevant learning experience for students. Traditional, passive learning methods are no longer effective in addressing the challenges of the 21st century. Therefore, innovation in technology-based media and learning materials, such as e-learning, is essential to develop the 6C competencies, which include critical thinking, creativity, collaboration, communication, character, and citizenship. The implementation of e-

learning not only increases students' engagement and active participation but also supports the development of essential skills for life and future careers. Thus, education that adapts to technological advancements and contemporary needs will be able to produce a competent, well-rounded generation ready to contribute positively to society.

Using the ADDIE development model, this research aims to create effective Exe-Learning-based e-learning materials for teaching explanatory texts in Bahasa Indonesia for grade XI students. Each stage of the ADDIE model—from analysis and design to development—is integrated with the 6C competencies to ensure the relevance and effectiveness of the learning materials. The results of this development show that the e-learning materials produced are not only aligned with the curriculum but also support the holistic development of 21st-century skills. The design and development processes, which involve various modern tools and applications, ensure that the learning materials are engaging, interactive, and effective in supporting innovative and adaptive learning in the digital era.

However, this study has not yet reached the Implementation and Evaluation stages. The actual implementation of the materials in a real learning environment and the evaluation of their effectiveness and efficiency have not been conducted. Therefore, future research is expected to proceed to the Implementation and Evaluation stages to test and assess the developed materials. These stages are crucial to ensuring that learning objectives are achieved and to identifying areas that require improvement. By continuing the research into the Implementation and Evaluation stages, it is expected to provide a more comprehensive picture of the effectiveness of the developed e-learning materials, as well as recommendations for improving the quality of future learning.

This research can serve as a reference for educators and other educational institutions in developing technology-based learning materials. By utilizing tools such as Exe-Learning, the learning process is expected to become more interactive, flexible, and tailored to students' needs. In addition, this study is expected to encourage more innovation in the development of creative and adaptive learning materials.

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