ABSTRACT
The 21st-century educational landscape necessitates integrating technology into learning. This study highlights a gap in current learning media, overly reliant on traditional textbooks, and failing to fully engage students. To address this, the research proposes the development of webtoon-based e-comic media focused on Indonesian Flora and Fauna, aiming to create a more engaging and effective learning experience. This research utilizes the 4D model by S. Thiagarajan for media development, encompassing four distinct phases: 1) Define, 2) Design, 3) Develop, and 4) Disseminate. The study's participants include students from class XI IPS 1 and a geography teacher at SMAN 1 Gambiran, Banyuwangi. The research employs qualitative descriptive analysis for data evaluation. The findings of the material and media validation process yielded a score of 77.7%, categorizing it as highly appropriate or valid. Furthermore, the implementation of this media in an educational setting was assessed, revealing that teachers found the media 91.3% effective, while student receptivity was even higher at 93.2%. These results underscore the suitability of the webtoon-based e-comic as a learning medium. The positive reception from both students and teachers indicates its potential as an engaging educational tool, enhancing knowledge acquisition in the field of Indonesian Flora and Fauna.

KEYWORDS
E-Comic Based Webtoon; Indonesian Flora and Fauna; Enjoy Learning Approach

INTRODUCTION
The development of learning media is crucial in improving the quality of education in Indonesia. Learning media serves as an intermediary to convey information from structured sources, creating a conducive learning environment where teachers and students can execute learning processes effectively (Komang Prinandari, A. A., Putra, A. K., Sahrina, A., & Purwanto (2024). Development of Webtoon-Based E-Comics as a Learning Media for Indonesian Flora and Fauna with Enjoy Learning Approach. Future Space: Studies in Geo-Education. 1(2), 112-128 © 2024 by the authors of this article. Published under CC-BY.)
et al., 2021). The customization of learning media to meet students' needs and characteristics is essential. Notably, students show a preference for electronic media over conventional or print media (Aeni & Yusupa, 2018). Engaging in learning media significantly alters the effectiveness of students' learning processes through technological integration. For instance, a study demonstrated that interactive e-books and educational software not only enhance students' engagement but also improve their understanding of complex concepts (Rinaldi et al., 2017). Similarly, in another research, the use of virtual reality in geography education was found to significantly increase students' spatial awareness and interest in the subject matter. These examples underscore the transformative impact of electronic media in fostering a more interactive and immersive learning experience (Putra et al., 2022).

The implementation of learning in the 21st century must be related to technology because of the demands of the times in the digital era, such as the use of learning media. 21st-century learning must be in accordance with the challenges and needs of real life, which require the ability to think critically, collaborate, solve problems, master technology, and communicate effectively (Ike Hermawan et al., n.d.). In the learning process, teachers are required to be involved in the role of technology, and students must be able to contribute to community life and be productive, creative and innovative (Hadinugrahaningsih et al., 2017). By using digital learning media, 21st-century learning is an effort that can achieve several things, such as learning how to access, evaluate, use, manage and increase knowledge (Rahayu et al., 2022).

In learning geography, the use of learning media is pivotal in aiding the analysis of information related to learning materials. The approach shifts the learning process from a teacher-centered model to one that blends teaching and learning activities, placing students at the core (Yang & Lin, 2016). This shift emphasizes the need for students to be creative in expanding upon the learning they acquire (Hadi et al., 2020). In this context, the application of webtoon-based e-comic learning media in Indonesian Flora and Fauna geography education has been identified as an effective tool (Indriasih & Santoso, 2020). These webtoon-based e-comics, created and disseminated using internet tools enhance accessibility in several ways (Khotimah et al., 2021). For instance, they eliminate the need for physical distribution and storage, making them readily available to a broader audience regardless of geographical constraints. Additionally, e-comics are generally more cost-effective than their printed counterparts, reducing the financial barrier for users (Faisal, 2022). The digital format also allows for interactive features like zoom and search functions, which further facilitate user engagement and understanding, particularly in the visualization of complex geographical concepts (Wang et al., 2021).

Using e-comic learning media in the process of learning geography material about Indonesian flora and fauna, students will find it easier to access and use a fun, enjoyable learning approach. The enjoy learning approach can help students develop the ability to think more critically, build concepts of subject matter, formulate conclusions, and provide a pleasant atmosphere for students (Fauzan Attamimi et al., 2021). The enjoy learning approach is designed so that students can develop a sense of wanting to try and do, ask questions, and be able to express opinions so that students can focus their full attention on learning (Heintzman, 2020). To achieve learning goals, an enjoyable learning approach is needed by teachers and students in learning activities in a fun, effective and efficient manner (Sajjad & Djuhan, 2021).
In the development of e-comic media, particularly webtoons, the application of the enjoyable learning approach plays a vital role. This approach involves incorporating elements such as humor, portrayed through funny stories and characters with relaxed traits, and everyday language that resonates with the students. For example, an e-comic on geographical concepts might include characters humorously navigating through different terrains, making the content more relatable and engaging. Additionally, teacher-guided activities like interactive chants can be integrated into the e-comics, enhancing the learning experience by making it more dynamic and participatory (Wikara et al., 2020). The want learning approach is also crucial in this context. It focuses on creating a learning desire among students. By designing webtoon-based e-comics that are visually appealing, and storylines that are intriguing and relevant to the students' interests, educators can foster a natural curiosity and a proactive attitude towards learning. This approach makes the learning process not just a necessity but a choice driven by the students' intrinsic motivation (Permatasari et al., 2014). Through these methods, webtoon-based e-comics become an effective medium, not only in conveying educational content but also in ensuring the content is enjoyable and eagerly received by the students.

In research conducted by Khotimah (2021), it is known that learning resources, learning activities and media used to support the learning process are not limited to conventional media but have an essential role in supporting optimal learning. The development of digital technology in the 4.0 era has changed and influenced many aspects of human life, such as education, as well as encouraging more innovative and varied learning. Given the obstacles and solutions faced by researchers in previous research, they wanted to develop a product that could be accessed at any time via an Android-based e-comic product (Khotimah et al., 2021). Study (Luh Putu Ari Laksmi & Wayan Suniasih, 2021) also explained that not only can text be used to convey material, but you can also use multimedia elements such as video, animation, images or graphics as well as various creative ways to learn. (Cahyani et al., 2023) explained that good learning outcomes include the use of appropriate learning media and are able to improve the learning process to be more effective.

This research is in line with previous studies, so carrying out the analysis requires several stages to obtain the problems that occur. The researcher interviewed the Geography XI IPS teacher at SMAN 1 Gambiran. It was discovered that he did not use special electronic learning media to deliver the material. The teacher only relied on the 2013 curriculum package book as a learning resource, so the learning process often experienced boredom, and students needed more understanding. Material. Then, the researcher carried out an analysis in class XI IPS 1, which requires learning media such as videos or other visual media; 93.8% of students need an illustration in the learning process which can help students understand geography material, and 100% of students are more enthusiastic if there is the use of technology in the learning media used in Geography. Given these problems, a medium that is able to contain various learning information is needed, so this e-comic medium was chosen to be a solution to the geography learning problems at SMAN 1 Gambiran Banyuwangi.

Based on the description above, there is a clear need for media development focusing on Indonesian flora and fauna material. E-comic learning media, particularly in the form of webtoons, was chosen to address challenges faced by students in learning Geography, specifically Indonesian Flora and Fauna content. The use of webtoon-based e-comic learning media in the educational process...
offers significant advantages. Its internet accessibility means it is more effective and efficient, allowing students to access the material without being constrained by time. This webtoon-based e-comic media can be easily utilized via smartphones or the web through a webtoon application. The anticipated benefits of this development are manifold. It is expected to not only enhance students' engagement and interest in the subject matter but also to improve their understanding and retention of complex geographical concepts. The digital, interactive nature of webtoon-based e-comics provides a more dynamic and visually stimulating learning experience, thereby catering to the diverse learning styles of students and potentially leading to better academic outcomes in the study of Indonesian flora and fauna.

METHOD

This research adopts the 4D development procedure formulated by S. Thiagarajan as its foundational design framework. The 4D model is an extensively recognized instructional design methodology, comprising four distinct phases: Define, Design, Develop, and Disseminate. Each phase plays a critical role in the overall research process.

![4D Model Development Steps](source: Kristanti & Julia, 2017)
In the Define stage, the research begins with a thorough objective analysis aimed at determining and defining the learning requirements. This involves a careful consideration of material limitations and gathering an in-depth knowledge of the product or learning media to be developed (Rafida et al., n.d.). This stage encompasses several key activities including an initial final analysis, student analysis, concept analysis, task analysis, and the establishment of learning objectives (Harjanto et al., 2022). These activities collectively lay the groundwork for the study, ensuring a clear understanding of the end goals, target audience, and the conceptual framework that will guide the research.

Following this is the Design stage, where the focus shifts to identifying suitable products for further development. This stage involves the selection of media and format, and the initial design of the learning media. The selection process is informed by the insights gained from the Define stage, ensuring that the chosen media and format are best suited to meet the established objectives and cater to the needs of the target audience.

The third develop stage, revolves around the creation and refinement of the product or learning media. Here, a second draft or an improved version of the learning media is developed, based on validation data and input from supervisors. This stage is crucial for enhancing the quality and effectiveness of the learning media, incorporating feedback and making necessary adjustments to align with the research objectives.

Finally, the Disseminate stage involves the practical application and testing of the developed learning media. The feasibility of the media is tested in an actual learning environment, specifically in a classroom setting with a selected group of students, in this case, 34 students from class XI IPS 1 at SMAN 1 Gambiran Banyuwangi. This stage is critical for evaluating the practicality and impact of the learning media, ensuring that it effectively meets the educational needs of the students.

The data collection methodologies employed in this study encompass a multifaceted approach, integrating questionnaires, interviews, and observations. This triangulation of methods ensures a comprehensive understanding of the existing educational dynamics at SMAN 1 Gambiran and the efficacy of the e-comic learning media in addressing students’ needs. The interviews and questionnaires are meticulously crafted to elicit insights into the challenges and requirements pertinent to the students and the prevailing media utilized in educational processes. These tools are instrumental in identifying areas for enhancement in both the content and delivery of educational material.

The research instrument, primarily the questionnaire, is meticulously designed to garner extensive feedback from a diverse array of stakeholders, including media and material experts, educators, and students. For media experts, the questionnaire is structured to critically evaluate the e-comic learning media across three pivotal dimensions: Display Aspects, Material Aspects, and Usage Aspects. These dimensions are essential for assessing the aesthetic appeal, content relevance, and practical utility of the media. In the realm of material experts, the focus shifts to the intrinsic qualities of the educational content, scrutinizing the Basic Aspects of Material and Material Content Aspects. This scrutiny is vital to ensure the content's accuracy, structural coherence, and adherence to educational standards.

For educators and students, the questionnaire pivots to appraise the same dimensions as those considered by media experts - Display Aspects, Material...
Aspects, and Usage Aspects. This alignment is crucial for evaluating the media’s effectiveness in real-world educational settings. The comprehensive nature of this product assessment questionnaire, as validated by Berkaitan et al., (2017), enables a holistic evaluation of the e-comic learning media. It encompasses both the educational effectiveness and the degree of user engagement. The questionnaires, refined through validation instruments, are a blend of open-ended and closed questions. This design is strategic to elicit nuanced responses from students about their experiences and perceptions of the newly developed learning media. Such responses are invaluable for refining the media and enhancing its pedagogical impact.

In the current study, the methodology employed for data analysis encompasses qualitative descriptive techniques. The research, inherently developmental in nature, gathers its qualitative data from a series of validations carried out by media specialists, subject matter experts, educators, and learners. Prior to engaging in the data interpretation process, the raw data undergoes a transformation into percentages. This conversion is essential for a comprehensive analysis and is accomplished using the following formula:

\[ P = \frac{\sum x}{\sum x_i} \times 100\% \]

Information:
- \( P \) = Larger percentage
- \( \sum x \) = Total number of scores obtained form validators
- \( \sum x_i \) = The maximum expected score
- 100 = Constant number

Subsequent to data compilation and its representation via the aforementioned formula, an ensuing value is deduced. This value is indicative of the e-comic learning media’s suitability level. The categorization of the learning media’s appropriateness, grounded in the percentage table obtained, is delineated as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Percentage</th>
<th>Qualification</th>
<th>Eligibility Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>76% - 100%</td>
<td>Very good</td>
<td>Very valid, not revised</td>
</tr>
<tr>
<td>2</td>
<td>56% - 75%</td>
<td>Good</td>
<td>Fairly valid, not revised</td>
</tr>
<tr>
<td>3</td>
<td>40% - 55%</td>
<td>Not good</td>
<td>Invalid, partial revision</td>
</tr>
<tr>
<td>4</td>
<td>0% - 39%</td>
<td>Very Not Good</td>
<td>Invalid, revised</td>
</tr>
</tbody>
</table>

**RESULT AND DISCUSSION**

**Media Development Result**

1. Define

The define stage is the initial stage in carrying out the research and development process for webtoon-based e-comic learning media. In this case, there are several analyses, including initial and final analysis, student analysis, concept analysis, task analysis and learning objectives. The first stage of this preliminary and final analysis was to identify the geography teachers of class schools who can help with learning.

In the second stage of student analysis, which is crucial for selecting appropriate learning media, the process of developing webtoon-based e-comic products becomes more focused. This stage of analysis reveals that
Prinandari, dkk

a significant portion of XI IPS 1 students, 68.8%, express a need for learning media involving videos or other visual elements, while a remarkable 93.8% of them find that illustrations aid in comprehending geographical material. Additionally, it is noteworthy that 90.6% of students show greater interest in activities that involve their active participation, and notably, 100% of students display increased enthusiasm when technology is integrated into their learning resources. Given these insights, webtoon-based e-comic products are chosen as the preferred learning medium because they effectively address these specific needs.

Webtoons, with their combination of visual appeal, interactive illustrations, and technological integration, cater to the students' preference for visually engaging and interactive content. The format of webtoons, which often includes storytelling elements and interactive features, aligns well with the students' desire for more engaging and participatory learning experiences. Thus, by leveraging the unique attributes of webtoons, the learning process becomes not only more appealing to students but also more conducive to their understanding and retention of geographical material.

The third stage of concept analysis involves preparing learning objectives that are adapted to the subject matter being taught and can be arranged systematically. This concept analysis includes Core Competencies (KI) and Basic Competencies (KD), which are discussed in the 2013 curriculum regarding Indonesian Flora Fauna material. In KD 3.2, we analyze the distribution of Indonesian Flora and Fauna based on ecosystem characteristics. The learning media provided by the teacher is only through textbooks and explanations from the teacher, so there is a need for relevant learning media to help students understand the material.

In the fourth stage, task analysis is used to determine the task, this is related to planning, sequence of actions, and what is used to complete the task based on specific techniques. At this stage, you can also find out the skills needed by students in the learning process; this is in the form of an analysis of Core Competencies (KI) and Basic Competencies (KD) regarding Indonesian Flora and Fauna, which will be developed through this learning media. KD 3.2 is used as a reference in training students' understanding of the learning media that will be created and helps students in solving problems in the Indonesian Flora Fauna material. This learning aims to change the learning objectives from task and concept analysis to focused learning. This means that researchers can easily find out how much students have achieved in the learning process so that they know the design of e-comic product.

2. Design

The second stage, namely the design stage, includes media selection, format selection, and initial design of learning media. This media selection process is to determine the appropriate learning media for presenting learning resources according to material analysis by students and task analysis. The development of this webtoon-based e-comic was adapted to the results of material analysis, which showed that 71.9% of participants found it challenging to understand the Indonesian Flora and Fauna material effectively, so the choice of media was closely related to an efficient learning process. The webtoon-based e-comic press was chosen to suit students' needs and is closely associated with an efficient method. It is made so that
students can be confident and active in the learning process so that it becomes more interesting. At this design stage, the researcher creates a storyboard or initial design regarding the learning product that will be developed.

<table>
<thead>
<tr>
<th>1. Tampilan Awal</th>
<th>2. Penokohan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petualangan Jum &amp; Adi di Taman Nasional Baluran</td>
<td>Karakter tokoh</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Figure 2. Story Board**

The second stage, selecting the format for this webtoon-based e-comic media, includes the writing font, background, layout, and several panels in each chapter, choosing the background, the layout in the learning area media, and selecting the characters used in the e-comic learning media. And designing materials that are adapted to the 2013 curriculum, where the format includes concepts that are aligned with the learning objectives. The following are original photos and illustrations in the Baluran forest as well as the characters in the learning media created:

<table>
<thead>
<tr>
<th>Original Image</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Original Image" /></td>
<td><img src="image2.jpg" alt="Illustration" /></td>
</tr>
<tr>
<td><img src="image3.jpg" alt="Original Image" /></td>
<td><img src="image4.jpg" alt="Illustration" /></td>
</tr>
</tbody>
</table>
In the initial design stage of this learning media (draft I) or prototype is created before testing is carried out. This stage is a collection of analysis results that have been carried out previously, such as beginning-to-end analysis, student analysis, concept analysis, task analysis, learning objectives, and media and format selection. Then, the product that has been produced will be validated first until it obtains valid criteria and will be tested on students.

3. Development

In the third stage, it is carried out after going through analysis and design. This stage aims to produce products or learning media that have been revised or drafted (II). At this stage of development, e-comic press began to be developed. Several things must be done in creating this e-comic media, starting from choosing the characters and the location to the themes used. Then, after that, Indonesian flora and fauna material began to be included in the e-comic, and the place used as the main object was the Baluran Forest Area in Situbondo, East Java.
the material validator on duty is a lecturer from the Geography Department of FIS UM.

Table 2. Media validation test results

<table>
<thead>
<tr>
<th>Assessment Indicators</th>
<th>Score (%)</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display aspects</td>
<td>95%</td>
<td>Very good</td>
</tr>
<tr>
<td>Material aspects</td>
<td>100%</td>
<td>Very good</td>
</tr>
<tr>
<td>Usage aspects</td>
<td>95.8%</td>
<td>Very good</td>
</tr>
<tr>
<td><strong>Total overall score (%)</strong></td>
<td><strong>96.9%</strong></td>
<td><strong>Very good</strong></td>
</tr>
</tbody>
</table>

According to the results of media and material validation that has been carried out, webtoon-based e-comic media received a very feasible classification so that trials could be carried out at the school that was the subject of the research, namely SMAN 1 Gambiran Banyuwangi. Through the written responses, the media expert validator revealed that the media developed was good, the illustrations displayed were simple and in accordance with the material, but the presentation of the content was excellent, coherent and careful. Illustrations are also adapted to the characteristics of students. Meanwhile, the material expert validator has provided several inputs such as that overall; the material is in accordance with the learning objectives; however, in e-comic media products related to the material presented relating to the distribution of flora and fauna, it is not enough just tigers and bulls to provide other illustrations in the story.

Table 3. Material validation test

<table>
<thead>
<tr>
<th>Assessment Indicators</th>
<th>Score (%)</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic aspects of material</td>
<td>63.8%</td>
<td>Pretty good</td>
</tr>
<tr>
<td>Aspects of material content</td>
<td>91.6%</td>
<td>Very good</td>
</tr>
<tr>
<td><strong>Total Overall Score (%)</strong></td>
<td><strong>77.7%</strong></td>
<td><strong>Very good</strong></td>
</tr>
</tbody>
</table>

Based on the results of the webtoon-based e-comic media trial on geography teachers at SMAN 1 Gambiran Banyuwangi, it is known that they received an outstanding category overall. According to Mrs Natya Apriliana, a geography teacher at SMAN 1 Gambiran Banyuwangi, the webtoon-based e-comic learning media created is good, the storyline is coherent, and the information contained in this e-comic can be captured and is easy for students to understand. The e-comic press is suitable for students who have difficulty understanding books, so according to Mrs Natya, e-comic media is ideal for students in class XI IPS so they can explore the material further and more widely.

Table 4. Media trial results E-Comic against teachers

<table>
<thead>
<tr>
<th>Assessment Indicators</th>
<th>Score (%)</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display aspects</td>
<td>83%</td>
<td>Very good</td>
</tr>
<tr>
<td>Material aspects</td>
<td>95%</td>
<td>Very good</td>
</tr>
<tr>
<td>Usage aspects</td>
<td>96%</td>
<td>Very good</td>
</tr>
<tr>
<td><strong>Total overall score (%)</strong></td>
<td><strong>91.3%</strong></td>
<td><strong>Very good</strong></td>
</tr>
</tbody>
</table>

Table 5. Media trial results E-Comic for students

<table>
<thead>
<tr>
<th>Assessment Indicators</th>
<th>Score (%)</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display aspects</td>
<td>93.6%</td>
<td>Very good</td>
</tr>
<tr>
<td>Material aspects</td>
<td>91.7%</td>
<td>Very good</td>
</tr>
<tr>
<td>Usage aspects</td>
<td>94.4%</td>
<td>Very good</td>
</tr>
<tr>
<td><strong>Total overall score (%)</strong></td>
<td><strong>93.2%</strong></td>
<td><strong>Very good</strong></td>
</tr>
</tbody>
</table>
Based on the result of trials of webtoon-based e-comic media on students at SMAN 1 Gambiran Banyuwamgi, it is known that they received an outstanding category overall. According to Alwaqi Putri Febriani, who is one of the students in class, this e-comic is very useful for students' learning process because it is exciting. Meanwhile, according to Lintang Nur Yunia, e-comic learning media is amusing and makes it easier to learn. Still, there is a suggestion in the e-comic press, namely that the writing in comics is too tiny and not precise, so in the future, it should be improved again, and the writing should not be too small.

4. Disseminate

After the development stage is carried out, the results obtained will then be evaluated, and the dissemination stage will be carried out. In this distribution stage, the product produced is in the form of webtoon-based e-comic media. In the process of distributing this e-comic, each user must download the Webtoon application via the app store/Google Play store. After downloading the webtoon application and logging into the webtoon account, students can access e-comic media by searching the application with the keyword distribution of Indonesian flora and fauna or can also search with the title "Jum and Adi’s Adventures in Baluran National Park". All XI IPS 1 students become objects in product distribution and can be used by the public or students as a whole. All users can access webtoon-based e-comic media flexibly anytime and anywhere.

The final e-comic product has received various inputs, suggestions and responses from Media Experts, Material Experts, Geography Teachers at SMAN 1 Gambiran and class XI IPS 1 student as target media users. This e-comic is a learning medium that can be accessed digitally using a smartphone, PC or laptop using a webtoon application. This webtoon-based e-comic is divided into 28 pages, including the cover, characterization, material content and reference pages, all of which are displayed in colour. The following is a link to webtoon-based e-comic learning media: https://www.webtoons.com/id/challenge/petualangan-jum-dan-adi-di-taman-nasional-baluran-/list?title_no=872399.

Discussion of Media Development

In producing media products, researchers used the 4D model developed by S. Thiagarajan to create a webtoon-based e-comic with the subject of Indonesian Flora Fauna in class XI IPS 1 at SMAN 1 Gambiran Banyuwangi. E-commerce is a type of digital learning media that is used as a tool or material to convey information. Comics are also helpful, such as adding stimulus to students because comics themselves are divided into pictures and writing with a systematic storyline, and can help students master the material quickly (Kurniaman et al., n.d.). This is adapted to research by Saputra and Pasha (2021), which explains that when presenting learning comics, you must consider the characteristics of students so that they can have a positive impact on students (Saputra & Pasha, 2021).

In choosing the media product for educational purposes, researchers need to consider several critical factors. First, it is vital to ensure that the objectives align with the learning indicators. Second, there is a need for a thorough understanding of the features of the media being considered. Third, comparing the chosen media with other available options is essential to ascertain its suitability for the learning objectives (Ami, 2021). When delving into the features
of the media, researchers must focus on aspects such as interactivity, user-friendliness, content relevance, and the media's ability to engage and motivate students.

For instance, if webtoon-based e-comics are selected as the medium, it is crucial to assess how their interactive panels, narrative style, and visual elements like color and design can enhance the learning experience. Additionally, features like the compatibility of these e-comics with various devices and their ease of navigation are significant contributors to their effectiveness in an educational setting. To gain a deeper understanding of learning difficulties and obstacles, this research involves conducting interviews with XI IPS geography teachers and analyzing student needs through questionnaires distributed in class XI IPS 1. Moreover, the preparation of methods or strategies to ensure that teachers and students can provide accurate information regarding the barriers and challenges in the learning process is an important aspect of this research.

From the results of distributing forms to students in class, after identifying the problem, the researcher discovered difficulties or challenges faced by students during learning. Therefore, the researcher began to collect some data and continued by making designs and designing products resulting from the analysis of students' needs. From the results of interviews with geography teachers at SMAN 1, it was explained that students often feel unfocused and need more enthusiasm in the learning process. In contrast, according to research by Afrinana (2022), it is known that the use of comic media can increase learning efficiency and reduce boredom in learning (Afrinana et al., 2022).

Webtoon-based e-comic learning media is made using the Corel Draw application and several supporting applications such as Canva. Before making the e-comic, the researcher first prepares a storyline to find out the storyline that will be included in the e-comic. Then, after preparing the storyline, a storyboard is made; this aims to ensure that the e-comic creation process can be structured and provide an overview of the media. The e-comic product that has been completed is compiled and revised; then, the researcher publishes it in the webtoon application. Webtoon itself is a digital comic application created based on the vertical scrolling technique.

The learning media that has been prepared is then validated by media experts and material experts, and the results can be determined whether they are suitable or still require revision for testing on teachers and students. From the results of trials carried out at SMAN 1 Gambiran, the percentage results were obtained by 91.3%, and the percentage of student trials was 93.2% in the "Very Eligible or Very Valid" category. This is confirmed by research conducted by Ilmi Syahrina (2023), which revealed that e-comic products are suitable for use as learning media and have very good quality, with a percentage of 85.96% in the validation results and 91.34% in the results of student trials that have been carried out (Ilmi et al., n.d.).

In research conducted by Nurul Khotimah (2021) with the title "Development of Android-based E-Comic as a Learning Media for Class and media validation results were 84.21% (Khotimah et al., 2021). In this research, it is explained that the e-comic products used by teachers as learning tools can be operated anytime and anywhere. In the design process, they are made as attractive and practical as possible. The researcher also explained that the e-comic media developed by the researcher is more effective in the learning process than using the lecture method, can improve students' critical thinking and mastery of subjects, and is able to solve
problems in learning. The advantages of previous research make it easier for teachers to convey the material, easy to master the material and can be accessed in a flexible time; however, there are also several weaknesses in previous research, such as the e-comic being developed requires sufficient storage capacity, must require an internet connection and limited material.

In connection with previous research, the use of webtoon-based e-comics has advantages compared to other e-comic media because by using the webtoon application, teachers and students can access this e-comic media for life, or there is no minimum usage limit. By implementing this webtoon-based e-comic, students can more easily understand the Indonesian Flora Fauna material for Class XI IPS because there are conversations accompanied by visual images that are tied to real life. This makes learning more fun, and students can understand each piece of material. The use of webtoon-based e-comics can help students re-learn because the webtoon system can be saved or downloaded, and students will not have difficulty finding the theme they are studying. The weaknesses in this webtoon-based e-comic media are limitations in conveying material or information comprehensively, the limitations of the comic format in terms of the number of pages and panels can also hinder the ability of this media to present information in detail, as well as being dependent on technology, meaning that even if it is accessed without using the application but must be connected to the internet.

The research and development of this project has produced the final product, namely webtoon-based e-comic media. The final e-comic product created can help students learn because this medium is very effective, efficient, and practical. In its application this e-comic media uses a webtoon application, where teachers and students must have a webtoon application first before learning to use this e-comic media. However, there is also another, more accessible option, namely utilising the webtoon link that has been uploaded so that students who do not have the webtoon application can directly enter the webtoon via the link shared by the teacher.

E-comic media is designed to focus on specific topics, allowing students to use these comics as a resource to deepen their knowledge in particular areas. This media format is particularly effective in simplifying complex concepts by offering straightforward and memorable explanations. Supporting this approach, a study by Puspitasari et al., (2021), found that e-comics can significantly increase student motivation. These comics provide varied and concrete material, making it easier for students to understand and retain the information presented. Additionally, research by Mahuze (2017) highlights the value of illustrations in e-comics. These visual aids are instrumental in providing clear and concrete descriptions, thereby enhancing the clarity of material or written content.

This webtoon-based e-comic product that has been developed can be used by teachers to complete the learning process and be used as a learning resource for participants to understand geography material with the sub-material Distribution of Indonesian Flora and Fauna, which can be used flexibly. This webtoon-based e-comic media that has been developed can help students learn and encourage students to think more concretely with visual displays in images that are made exciting and practical. This research is in line with (Apriani et al., n.d.) which explains that media development can help students increase their vocabulary and generate broader ideas in learning. This media will create enthusiasm for students to carry out a fun learning process with an enjoyable learning approach. The enjoy learning approach can help students and arouse
interest, which creates feelings of happiness, activity and creativity so that the learning process does not cause boredom and learning tension.

**CONCLUSION**

Based on the results of the discussion described above, this research aims to use webtoon-based e-comic media about Indonesian Flora Fauna with a learning approach. It is enjoyable to find out whether the validation results are suitable for webtoon-based e-comic media; validation is carried out with material and media experts, and trials are carried out on teachers and students. A webtoon-based e-comic product that meets the requirements as a valid learning media or is suitable for development in accordance with the 2013 curriculum at SMAN 1 Gambiran Banyuwangi. The results of developing this learning media can have a positive impact by helping students in the learning process because this product is very effective, efficient and practical in its use and is presented interestingly and entertainingly so that students do not feel bored during the learning process and can help learn Flora Fauna material. Indonesia. However, in its implementation, there are still weaknesses, namely that it requires an internet network to access it, there are limitations in conveying material, limitations in the comic format in terms of the number of pages and panels can also hinder the ability of this media to present information in detail. The results of developing this learning media can have a positive impact by helping students in the learning process because this product is very effective, efficient and practical in its use and is presented interestingly and entertainingly so that students do not feel bored during the learning process and can help learn Flora Fauna material. Indonesia. However, in its implementation, there are still weaknesses, namely that it requires an internet network to access it, there are limitations in conveying material, limitations in the comic format in terms of the number of pages and panels can also hinder the ability of this media to present information in detail.

For researchers who will develop similar research, there are several suggestions regarding further development of learning media products as follows: 1) It is hoped that e-comic media can provide benefits for students in understanding more straightforward material, 2) It is hoped that teachers or instructors can apply webtoon-based e-comics as a learning media in the classroom, 3) E-comic media webtoon-based comics can be developed continuously for different materials, 4) webtoon-based e-comics cannot be used offline because they require an internet connection, so for further development they can be developed with several options so that they can be used when not connected to the internet.

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