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Development of StoryMaps-Based Learning Media on Tourism Resource Materials of Batu City from a Spatial Perspective

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ABSTRACT

The innovation of digital learning media is needed in line with the continuous advancement of technology. The utilization of geospatial technology must be enhanced to promote students' spatial literacy through the habituation of thinking from a spatial perspective. This study aims to develop a feasible StoryMaps-based learning media for the Tourism Resources material analyzed from a spatial perspective. This study is classified as Research and Development (R&D), using the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation. The media was developed by integrating multimedia elements such as maps, photos, videos, animations, graphics, and virtual tours, which were systematically, interactively, and communicatively packaged using the ArcGIS Online StoryMaps platform. The developed learning media were tested through a demonstration in a limited-scale trial. The research instrument used was a questionnaire to measure the feasibility and user satisfaction levels of the learning media. The results of the study showed that the average feasibility score of the StoryMaps-based learning media from two validators, namely one media expert and one subject matter expert, was 88.8% with a classification of highly feasible. The trial results of the StoryMaps-based learning media obtained a score of 95.0% from the teacher and 91.3% from the students, classified as highly satisfactory. Based on these results, the StoryMaps learning media is considered feasible for use in the learning process.

Keywords: learning media, StoryMaps, tourism resources, spatial perspective

INTRODUCTION

The development in the field of Information and Communication Technology (ICT) does not merely create significant opportunities in promoting and improving the quality of education, but also presents a range of new challenges that are complex and multidimensional. Therefore, making technology a partner in education is an appropriate step. The 21st-century learning paradigm emerges as an innovative solution to develop holistic competencies by integrating technology so that learning activities can be carried out effectively [1]. This phenomenon is in line with the conceptual framework of 21st Century Learning, which comprehensively identifies a set of essential competencies, knowledge, and skills that students must master. These competencies include: first, mastery of core skills along with central themes that characterize 21st-century learning; second, the development of independent learning capacity and literacy that adapts to the dynamics of the era; third, mastery of the ability to manage information, media, and technology effectively; and fourth, the development of integrated skills to face everyday life challenges while also preparing students for sustainable and dynamic careers [2].

Digital literacy for teachers and students can help enhance the transformation of processes, teaching practices, and learning [3]. Align with this, Önür [4], in his study, stated that students' technological competence has a significant influence on the mastery of 21st-century skills. As part of 21st-century education, geography learning also faces challenges in integrating technology. In geography learning, the use of technology becomes essential to help students understand complex spatial concepts. Spatial skills are essential geography skills that must be understood and mastered by students. Students' spatial skills can be developed through the advancement of learning models, methods, and media. Spatial ability is an abstract concept [5]; thus, innovation in learning media is required to visualize spatial information more interactively and engagingly. Through the utilization of advanced geospatial technology, students are given the opportunity to significantly sharpen and expand their spatial capabilities in the context of space-oriented data analysis and interpretation [6]. In addition, the implementation of geospatial technology in the learning

process has the potential to generate a more dynamic and interactive learning approach, in which the central role of students as active subjects in acquiring knowledge and skills is further strengthened [7].

StoryMaps can be categorized as one of the geospatial technology-based learning media that has significant potential to be integrated into the geography learning process to enrich students' learning experiences. As part of ArcGIS Online, StoryMaps is capable of integrating cartographic elements, text, video, and other multimedia into a single interactive unit [8]. Compared to traditional maps, StoryMaps offers active interactivity and is effective in integrating various types of media within the same platform, making the conveyed information clearer and more engaging [9]. The implementation of StoryMaps as a learning media enables students to actively explore the content material through interactive and immersive visual representations, thereby substantially deepening and expanding their conceptual understanding of the presented material [10]. In addition, StoryMaps can promote independent learning and can be utilized at all educational levels across various fields of study, by both professionals and laypersons [11]. Several previous studies have shown the effectiveness of StoryMaps in geography learning, namely in enhancing teachers' geographical awareness as well as increasing students' active engagement in the learning process [12]-[13]. In addition, the study by Bukhori [14] found that StoryMaps is more effective in improving students' geography learning outcomes compared to conventional methods.

Findings from the needs analysis and preliminary review indicate the presence of several significant obstacles faced by students in the geography learning process, including the complexity of materials that are difficult to comprehend, the implementation of teaching methods that lack variation and tend to be monotonous, as well as limitations in the use of learning media that are unengaging and fail to optimally stimulate learning interest. The use of digital media and maps at SMA Negeri 01 Batu (State Senior High School 01 Batu) is fairly varied, but the frequency of their use remains low. Geography teachers at SMA Negeri 01 Batu expressed the need for the development of learning media that are contextually appropriate and highly relevant to support the effectiveness of the geography learning process, particularly for students at the institution. Based on the explanation provided by the teachers, among the various topics covered in the Natural Resources material, including Forestry, Marine, Mining, and Tourism Resources, the topic considered the most strategic and promising for development into innovative and adaptive learning media is the topic related to Tourism Resources. This is based on the fact that students live in a tourism sector environment; thus, providing an in-depth understanding of this material is deemed more relevant, contextual, and has higher practical value for the students at SMA Negeri 01 Batu.

The main differentiation between this study and previous research lies in the approach to content delivery, which is more varied, interactive, and communicative. This strategy is intended to more optimally meet students' learning needs while also preventing the learning process from appearing monotonous and tedious. Interactive learning media have the capacity to significantly enhance learning motivation through mechanisms that require students to directly and actively engage with the presented content [15]. This study offers novelty by adopting a spatial perspective as the conceptual framework and methodological approach in the development and presentation of learning materials. It also presents novelty in the selection of specific subject matter and case study location, as well as in the development of media content that is entirely based on actual field data. In addition, the media is designed by integrating various interactive elements such as digital maps, animations, videos, and virtual tours, allowing students to gain contextual spatial learning experiences. This strategy is rarely found in previous geography learning media, thereby providing added value to the contribution of this study in digital learning innovation. The final product of this study is a digital learning media in the form of a website, systematically designed for the Tourism Resources material in Batu City. Based on the background described above, this study aims to produce a StoryMaps-based learning media that is feasible for use in geography learning, with an emphasis on interactivity, communicative quality, and contextual relevance following students' needs.

RESEARCH METHOD

This study is categorized as a type of Research and Development (R&D), which is a methodology specifically designed to create, develop, and validate products or innovations applied within the context of education and learning processes systematically and continuously [16]. The development research model used in this study adopted the ADDIE framework (Analyze, Design, Development, Implementation, Evaluation), a systematic approach that is widely recognized and applied in efforts to comprehensively achieve and optimize educational objectives [17]. The ADDIE model, as a research framework, has a systematic process that guides the development of learning media following learning needs and objectives [18]-[19]. The research method used in this study was the mixed method [20], which is a research approach that integrates quantitative and qualitative methods synergistically into a unified framework, with the aim of complementing and strengthening each other to generate more comprehensive, valid, reliable, and objective data simultaneously. The ADDIE learning media development model, adopted from Robert Marie Branch [17], used the Input, Process, and Output (IPO) approach to describe the steps in each phase. The research procedures are described in detail in Table 1.

Table 1. ADDIE Research Procedure: IPO (Input, Process, Output)

ADDIE	Input	Process	Output
Analyze	a. Curriculum analysis. b. Analysis of students' needs. c. Material analysis.	a. Prepared questionnaire and interview instruments. b. Conducted school observation (field study). c. Collected data on school, students, and teachers (needs assessment). d. Evaluated progress.	a. Observation results. b. Results of curriculum, needs, material, and media analysis.
Design	a. Formulated and planned the concept of learning media (tools, materials, content). b. Prepared validation instruments for media and content experts.	a. Designed the storyboard for learning media: design, layout, content, and materials. b. Evaluated progress.	a. Learning media storyboard.
Development	a. Learning media storyboard. b. Materials and content for the learning media.	a. Developed the learning media based on the storyboard. b. Conducted validation with media and content experts. c. Revised the media when necessary. d. Evaluated progress.	a. Validated learning media product. b. Validation result data.
Implementation	a. Validated learning media product.	a. Prepared questionnaires for teacher and student responses. b. Designed the limited field trial scenario. c. Conducted a limited field trial on research subjects. d. Evaluated progress.	a. Response to questionnaires. b. Field trial scenario. c. Photo and video documentation.
Evaluation	a. Response to questionnaires from teachers and students.	a. Collected teacher and student response data through questionnaires. b. Evaluated progress at each stage.	a. Teacher and student's response data.

Source: (Researcher, 2025)

The research subjects consisted of one Geography teacher and 64 eleventh-grade students from classes XI 4 and XI 5 at SMA Negeri 01 Batu. The research sample was determined using the simple random sampling technique [20], which is a sampling method that does not consider strata or specific criteria within the population. Since the population size was not too large (finite population), the sample size was calculated using the Slovin formula with a margin of error of 10%.

$n = \frac{N}{1+N\text{e}^2}$ [21]

where n is the sample size, N is the population size, and e is the margin of error.

The data collection process in this study used questionnaires and interviews as the primary instruments. The questionnaire instrument was structured in the form of semi-closed questions using a Likert scale ranging from 1 to 4, as presented in Table 2. Meanwhile, the interview instrument consisted of open-ended questions to obtain in-depth information. The learning media product was validated by two validators, namely one media expert and one subject matter expert, to determine the feasibility level of the media. The

validation data were analyzed quantitatively using descriptive percentage analysis with the following formula:

$$\textbf{Average Score} = \frac{total\ score\ obtained}{maximum\ possible\ score}\ x\ 100\% \quad [22]$$

The learning media were tested on the teacher and students through a limited-scale trial. The response data from the teacher and students were analyzed using the same technique to determine the level of satisfaction with the developed learning media. The criteria for the feasibility and satisfaction results of the learning media were determined as presented in Table 3.

Table 2. Likert Scale

Scale	Description
1	Strongly Disagree
2	Disagree
3	Agree
4	Strongly Agree

Source: Sugiyono [20]

Table 3. Criteria for Feasibility and Satisfaction of Learning Media

Percentage (%)	Criteria	Description
0–20	Very Unfeasible / Very Dissatisfied	Cannot be used, complete revision needed
21–40	Unfeasible / Dissatisfied	Can be used, revision required
41–60	Fairly Feasible / Fairly Satisfied	Can be used, revision required
61–80	Feasible / Satisfied	Can be used, minor revision needed
81–100	Very Feasible / Very Satisfied	Can be used, no revision needed

Source: Sugiyono [20]

RESULTS AND DISCUSSION

Media functions as a tool in the learning process that facilitates dynamic interaction and communication between teachers and students, thereby enabling the achievement of learning objectives that have been systematically and deliberately formulated [23]. Studying geography from a spatial perspective can be carried out by utilizing geographical tools and techniques through Geographic Information Systems (GIS) [24]. StoryMaps is one of the web-based geospatial technology innovations developed by ESRI (Environmental Systems Research Institute) [25]. StoryMaps enables the integration of interactive maps, videos, photos, audio, and various other forms of multimedia into a digital narrative or presentation, which is structured simply and flexibly, thereby enriching the user experience in conveying spatial information [26]. This development research produced an innovative product in the form of StoryMaps-based learning media that focuses on the Tourism Resources material in Batu City from a spatial perspective. The learning media product was constructed through a series of structured stages, in accordance with the ADDIE model research procedure, with the details of each stage comprehensively identified in Table 1.

1. Analyze Stage

The first stage, analyze, is the needs analysis conducted to identify and define problems in the learning process [17]. The purpose of the needs analysis is to determine the objectives and direction of the research. The analysis carried out in this study included three main components, namely curriculum analysis, student needs analysis, and learning material analysis. The findings from this analysis served as a critical foundation in determining relevant material choices, organizing essential content, and designing optimal media packaging strategies. The implementation of this stage played a vital role in ensuring that the research had a clear foundation of urgency and that the developed learning media could effectively meet students' needs while also serving as a strategic solution to the problems identified in the field.

The use of the curriculum as a reference was carried out by adopting the *Merdeka* Curriculum implemented at SMA Negeri 01 Batu; thus, the entire analysis process was adjusted to support pedagogical continuity and relevance within the context of that curriculum. The needs analysis of the students produced the following information. Students' learning preferences varied, with a dominant preference for visual learning styles (86.7%). The main difficulties experienced by students in geography learning were materials that were difficult to understand (54.1%), monotonous teaching methods (21.6%), and unengaging and unappealing learning media (16.5%). The use of digital learning media was fairly diverse; however, website-based media were still rarely used (2.7%). Similarly, the use of digital maps in learning was also varied but infrequent (12.8%). Only a small proportion of students were familiar with StoryMaps (34.8%). On the other hand, students' ability to read and understand maps was still relatively low (35.8%). The material identified as most in need of support from learning media was Tourism Resources (29.4%). The specifications of learning media identified as essential needs by students included the use of animations and illustrations with high visual appeal (86.2%), the presence of relevant and contextual videos and images (80.7%), the presentation of narratives that are concise, dense,

and clear (61.5%), and the involvement of interactive media (42.2%).

The interview with the Geography teacher produced the following information. The digital media frequently used in learning included YouTube and E-Books. In addition, the geospatial technologies commonly utilized were Google Earth, Windy, and SAS Planet. According to the Geography teacher, the specifications for the required digital learning media include accessibility via smartphones, ease of operation, and the ability to enhance students' learning motivation. Furthermore, due to limitations in conducting learning activities outside of school, even though the school is located in a city with significant tourism potential, students' understanding of the Tourism Resources material needs to be deepened. The content needed in the Tourism Resources material includes explanations regarding the suitability of the location with the physical conditions of Batu City, the attractions of Batu City, the impacts of tourism activities, and a map showing the distribution of tourism locations in Batu City.

Within the framework of the *Merdeka* Curriculum, the material on Tourism Resources is placed in Phase F, in which the expected Learning Outcomes (Indonesian: *Capaian Pembelajaran*; CP) at the end of the phase include students' ability to comprehensively identify, understand, process, analyze, and evaluate phenomena spatially related to the advantages of Indonesia's strategic geographic position and the potential of its natural resources; understand patterns of biodiversity at both national and global levels; explore issues related to population, environmental conditions, disaster dynamics, and climate change. In addition, students are also required to have a deep understanding of the concepts of regionality, regional development, and mechanisms of interregional cooperation. Based on the Learning Objectives Pathway (Indonesian: *Alur Tujuan Pembelajaran*; ATP) used by the Geography teacher at SMA Negeri 01 Batu, the Tourism Resources material aligns with ATP 11.9, which is to develop the potential of Indonesia's natural resources in a sustainable and environmentally conscious manner.

Based on the results of the needs analysis, it can be concluded that there is a need for innovative digital learning media that are engaging and relevant. This finding is in line with what was stated by Ahyan [27] in his study, where engaging and memorable learning media can motivate students to stay focused on achieving learning objectives. With the advantages and ease of use it offers, StoryMaps is considered appropriate to be developed as an innovative learning media that has the potential to train students' spatial thinking skills in geography learning. This has been demonstrated by studies conducted by Nisnala and Sari [28][29], in which the use of StoryMaps as learning media positively influenced the improvement of students' spatial thinking skills.

2. Design Stage

Next, the design stage is the process of systematically planning strategies, objectives, materials, and the design of learning media by considering the results from the previous analysis stage [17]. The design of learning media is necessary to ensure that every element of content and visuals works harmoniously in delivering the intended information [30]. In this study, the design of the learning media was presented in the form of a storyboard. The results from the analysis stage were used as a reference in designing the storyboard, which served as the main guideline in developing the learning media. Imbar [31], in his study, explained that a storyboard is a visualization of the idea of the product to be developed, and thus provides an overview of the product that will be produced. The storyboard illustrates the content, the layout of the content, the sequence of the content, the format of the content, as well as the features and elements that will be used. The storyboard was created using the Canva application to make the process easier and to visualize the media design more clearly and in greater detail. A literature review study by Citradevi [32] stated that Canva has advantages in practicality and ease of use as a platform for channeling creativity in presenting abstract information more clearly and engagingly. An example of the storyboard result for the StoryMaps-based learning media is presented in Figure 1.

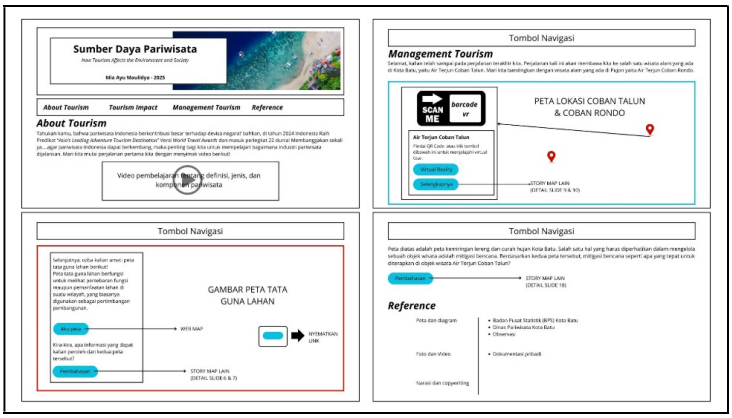


Figure 1. Storyboard of StoryMaps Learning Media

Three main components must be considered in developing the storyboard for the learning media. First, the material component is limited to the topic of Tourism Resources, which is part of Chapter 1: Indonesia's Strategic Position and Natural Resource Potential in Phase F of Grade XI Senior High School. The material presented consists of: a) About Tourism, which provides basic knowledge about tourism, such as definitions, types, and components of tourism in the form of a motion graphic video, and presents a map of the distribution of tourism objects in Batu City. In this section, students can identify distribution patterns and analyze the causes behind the emergence of such patterns. b) Impact Tourism, presents information on the number of visitors and accommodations displayed in the form of interactive charts, a visualization of land use changes over the past ten years using a GIF video extracted from Google Earth Engine, as well as a map of accommodation distribution. In this section, students are required to identify and analyze the relationship between tourism activities and their impact on the environment. c) Management Tourism, presents information on two natural tourism objects, namely Coban Talun Waterfall and Coban Rondo Waterfall, which includes profile videos, virtual tours, visitor number diagrams, and field documentation. In addition, slope maps and rainfall maps are also provided for each location. In this section, students will compare the conditions of the two natural tourism objects and identify differences, problems, and the solutions needed.

Second, the material component required to support the content includes photos, videos, data on the distribution of tourist attractions, number of visitors, and a list of accommodations obtained from the Tourism Office and the BPS-Statistics of Batu City, as well as map materials obtained from the Geospatial Information Agency (Indonesian: *Badan Informasi Geospasial*; BIG) and satellite imagery. The materials used prioritize field-based sources to enhance the originality and contextual relevance of the learning media. A study by Handani [33] stated that learning through a contextual approach can help students connect new knowledge with their existing experiences, thereby making the learning process more meaningful. This is also in line with what was stated by Fawaas [34], namely that contextual learning can encourage students to apply the knowledge they acquire to real-life situations. This is certainly very beneficial and relevant for students who live side by side with tourism activities.

Third, the tool component used to capture and process materials includes the Insta360° X3 camera and the 3DVista application to create virtual tour media, the iPhone 13 camera and Adobe Premiere Pro application to create video media, the Canva and Adobe Podcast applications to create motion graphic video media, the ArcGIS Pro, StoryMaps Pro, and Excel applications to create map media, the Looker Studio Overview website to create interactive chart media, and the StoryMaps Pro website to integrate all media into a unified presentation. At this stage, the materials developed must be designed with a well-structured storyline and effective visualization, as a well-considered approach in media design can enhance teaching effectiveness, improve students' comprehension, and provide meaningful learning experiences [10].

3. Development Stage

The development stage refers to the process of producing and testing the product based on the previously designed plan, as well as revising it according to initial feedback [17]. The development of the learning media was carried out in accordance with the previously designed storyboard. Referring to the textbook *"Transformasi Bahan Ajar Geografi dengan Teknologi Geospasial StoryMaps (English: Transformation of Geography Teaching Materials with Geospatial StoryMaps Technology)"* by Purwanto [35], there are several stages in developing StoryMaps, namely: a) Developing a storyboard, b) Collecting data, c) Creating a web map, d) Sharing the web map, and e) Publishing the StoryMaps. The development process lasted approximately two and a half months, from February to mid-April.

Based on the storyboard that had been designed, the media development stage began with the process of data collection and acquisition. Primary data collection was carried out through direct observation and in-depth interviews to obtain materials in the form of 360° photographs taken using the Insta360° X3 camera, as well as photos and videos recorded using an iPhone 13 device. In addition, a literature review was also conducted to gather relevant secondary data obtained from official online sources such as the BPS-Statistics Indonesia and the Geospatial Information Agency (BIG), as well as directly from related institutions, namely the Tourism Office of Batu City. This ensured the completeness and accuracy of the information that would serve as the basis for the development of the learning media.

The 360° photo data was used as materials for the development of virtual tour media using the 3DVista application. The secondary data was used to create a map media using the ArcGIS Pro application and interactive charts using the Looker Studio Overview website. In addition, several other types of media were developed as content components of the learning media, namely motion graphic videos, tourism object profile videos, and header videos captured using a DJI drone camera. All of the developed media will be integrated into a web-based platform, namely StoryMaps, as the main learning media being developed. The StoryMaps used is the licensed version of StoryMaps Pro; thus, all provided features can be fully utilized.

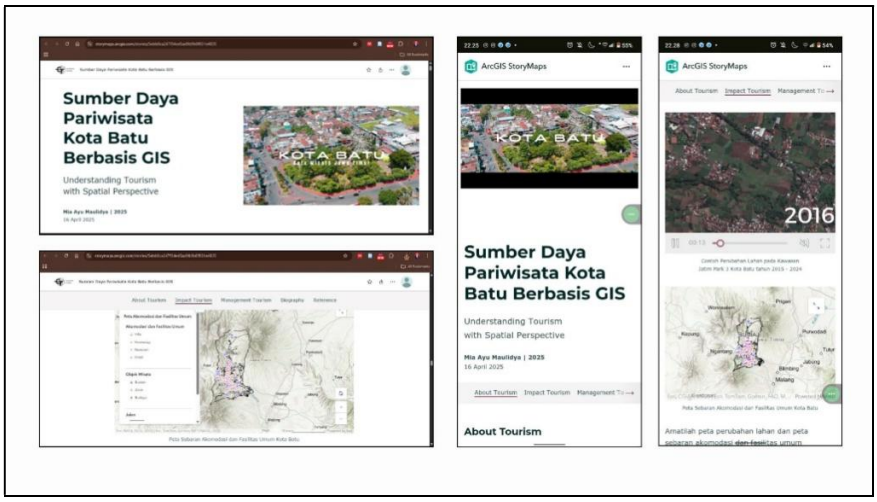


Figure 2. Display of StoryMaps Learning Media on Computer and Smartphone Devices

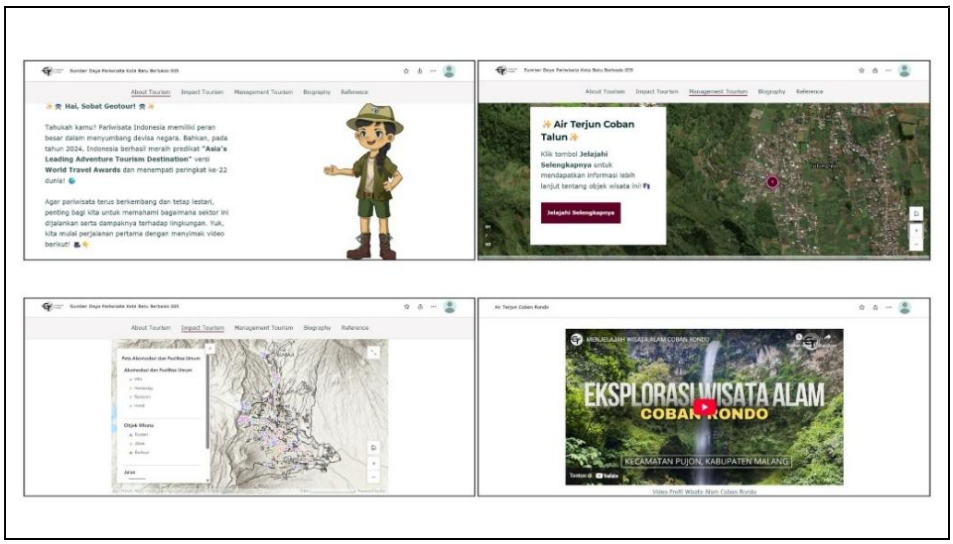


Figure 3. Partial Display of StoryMaps Learning Media Content

The obstacle encountered during the development process was the modification of the storyboard design due to adjustments to conditions based on certain considerations. One of these was that, initially, the video media was planned to be uploaded directly into StoryMaps. However, this affected the accessibility of StoryMaps, causing the website to become slow and sometimes requiring users to reload the page. To facilitate easier access to StoryMaps, the video media was first uploaded to the YouTube platform and then embedded into StoryMaps. However, this modification did not affect the quality of the learning media, as the video media could still be played directly within StoryMaps more smoothly. In addition, the use of YouTube also had a positive impact on the media, as the video descriptions uploaded to YouTube included a link to the StoryMaps learning media website. This allowed the learning media to be discovered and accessed by a wider audience, including both students and non-students who have an interest in the presented topics and content. This aligns with the advantages of the YouTube platform as stated by Reynata [36] in his study, which describes YouTube as a social media platform with the largest number of users and popularity as an information delivery tool due to its ease of access anytime and anywhere. Therefore, YouTube media can provide positive benefits if used wisely.

After the development process of the learning media was completed, the next stage involved media validation by experts in the fields of educational media and content, with the evaluation results presented in detail in Table 4. The media and content validators consisted of lecturers from the Geography Education Study Program, Faculty of Social Sciences, Universitas Negeri Malang, who hold academic qualifications at the doctoral level (Ph.D.). The media expert validator specializes in the field of Innovative Geography Education; meanwhile, the content expert validator possesses expertise in the fields of Social Geography Education and Tourism Geography. In the validation process, in addition to evaluating the quality and feasibility of the media, the validators also provided input in the form of constructive criticism and suggestions for improvement. The feedback and suggestions from the expert validators served as guidelines for product revision to enhance the quality of the developed media [37].

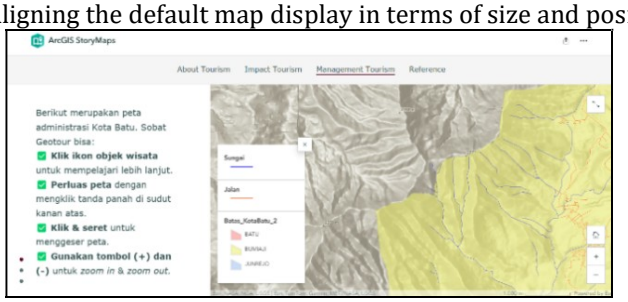
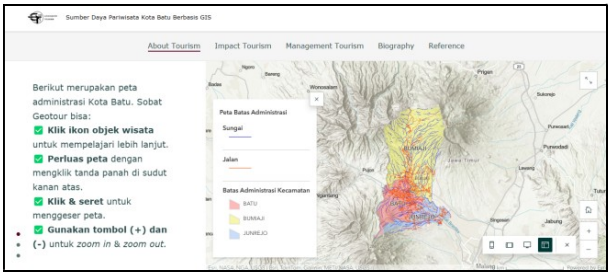
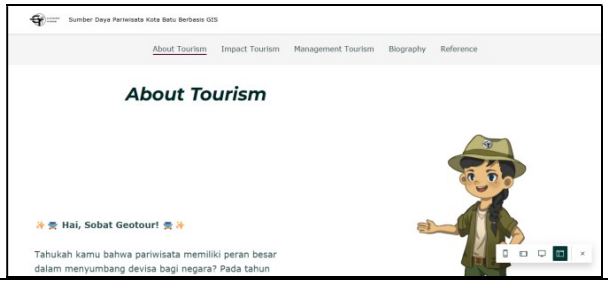
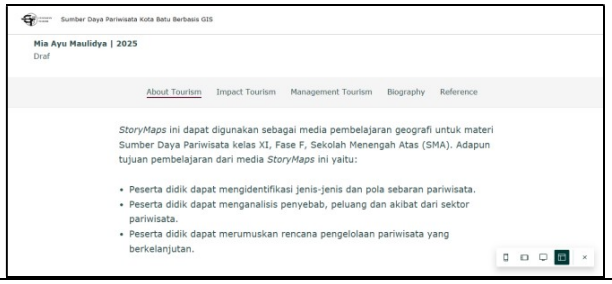
Table 4. Validation Results of Learning Media by Media Expert and Content Expert

Media			Content		
Aspect	**Indicator**	**Percentage (%)**	**Aspect**	**Indicator**	**Percentage (%)**
Visual	Attractive design and layout	83.3	**Language**	Appropriateness of language (clear, communicative, easy to understand)	100
	Accuracy of background and font selection		Content Relevance	Alignment of content with learning objectives	87.5
	Accuracy of layout (systematic and clear)			Alignment of content with the *Merdeka* Curriculum	
Operational	Responsiveness across various devices	91.7	Content Presentation	Content is presented concisely and clearly	81.3
	Navigation buttons and features function properly			Content is presented sequentially and systematically	
	Ease of operation			Content is presented contextually	
Media Quality and Relevance	Relevance and clarity of the media in relation to the material and spatial concepts.	87.5		Spatial concepts are presented with relevant examples	
	Accuracy of intonation and voice-over alignment with illustrations in the video		Content Accuracy	Accuracy of content and concepts	100
Usefulness	Effectiveness of media for both group and individual learning	100	Usefulness	Helps improve students' spatial understanding	87.5
	The efficiency of the media as a tool to deliver learning content.			Accommodates students' competencies and learning needs	
Total Percentage		90.0	Total Percentage		87.5
Highly Feasible Criteria			**Highly Feasible Criteria**		

Source: (Researcher's Data Processing, 2025)

As presented in Table 4, the evaluation results obtained from the validation process conducted by media experts yielded a feasibility score of 90.0%, which is classified under the "highly feasible" criteria and can be directly implemented without requiring revision. Similarly, the content validation received a feasibility score of 87.5% with the same classification, namely highly feasible and ready to be used without significant revision. Nevertheless, constructive feedback and criticism from the validators were still used as references for refining the learning media, which are fully documented in Table 5. Based on the comprehensive validation results and the series of revisions undertaken, the StoryMaps-based learning media is declared to meet the feasibility criteria and is ready for testing in the next stage. The final version of the StoryMaps learning media can be accessed online through the following link: https://arcg.is/1iX9bC2.

Table 5. Example of Comparison Between Learning Media Before and After Revision

Before Revision	After Revision
Media Validation	
Aligning the default map display in terms of size and position.	
	
Content Validation	
Providing learning objectives at the beginning of the media	
	

Source: (Researcher's Data Processing, 2025)

4. Implementation Stage

After the learning media were comprehensively validated, the next stage was implementation, in which the fully developed product was applied directly to students in accordance with the protocols and instructions that had been systematically designed during the previous planning stage [17]. The implementation stage is the process of conducting a limited field trial of the learning media, aimed at evaluating the level of satisfaction through responses from teachers and students toward the developed learning media. The trial was conducted at SMA Negeri 01 Batu during the first week of May 2025, involving a total of 64 students from classes XI 4 and XI 5 as research respondents. The results of the questionnaire responses from the teacher and students during the trial process can be seen in detail in Table 6, particularly in the section discussing the evaluation stage of the ADDIE model.

The trial was conducted over 2 instructional hours (2 × 45 minutes) with the following stages: a) Introducing oneself, explaining the objectives and activities to be carried out to the students, b) Demonstrating the learning media using a projector, c) Allowing students time to independently explore the learning media in more depth using their own smartphones, d) Distributing assessment sheets in the form of questionnaires for students to complete, e) Inviting several students to provide direct feedback on the learning media, f) Concluding the learning session. During the trial process, observations indicated that the students were enthusiastic in viewing and engaging with the learning media, suggesting that the media was able to attract their attention and help them stay focused on the classroom learning process.

Figure 4. Implementation of Limited Field Trial

5. Evaluation Stage

The evaluation stage occurs throughout the ADDIE process, encompassing both formative evaluation (at each stage) and summative evaluation (to measure instructional success) [17]. There are three levels of summative evaluation in the ADDIE model: Level 1 Perception, Level 2 Learning, and Level 3 Performance [17]. The evaluation used in this study was limited to Level 1, aiming to identify responses and measure the satisfaction of students and the teacher toward the learning media product. The evaluation process was conducted after the implementation stage trial, using a questionnaire instrument, with the measurement results presented in Table 6.

Table 6. Teacher and Student Response Results

Students			Teacher		
Aspect	**Indicator**	**Percentage (%)**	**Aspect**	**Indicator**	**Percentage (%)**
Visual	Attractive and interactive display	94.1	Visual	Attractive and interactive display	100
	Good and clear media quality			Good and clear media quality	
Language	Clear and easy-to-understand language	91.0	Kesesuaian Materi	Alignment of content with learning objectives	100
Usefulness	Supports understanding of the material	91.4		Accommodates students' competencies and learning needs	
	Provides new information and insights		Content Presentation	The material is presented systematically.	87.5
	Increases motivation and enthusiasm for learning			Spatial concepts are presented with relevant media	
Accessibility	Operable on various types of devices	90.0	Usefulness	Helps students understand the material	91.7
	Content flow is systematic and easy to follow			Effective for both individual and group learning	
Learning Experience	Helps better understand the material	90.0		Provides a new learning experience and increases learning motivation	
	Provides a new learning experience		Accessibility	Easy to access and operate	100
Total Percentage		91.3	Total Percentage		95.0
Highly Satisfied Criteria			**Highly Satisfied Criteria**		

Source: (Researcher's Data Processing, 2025)

The evaluation results from students obtained an average score of 91.3%, and from the teacher, 95.0%, both falling under the "highly satisfied" criteria. The findings across various aspects, including visual quality, content relevance and presentation, language, accessibility, usefulness, and learning experience, all received high scores of ≥90%. These results indicate that, as a supplementary learning medium, the StoryMaps-based learning media received positive responses from both students and the teacher, with a high level of satisfaction. The StoryMaps-based learning media provided students with a new learning experience by presenting the material through engaging visualizations. Moreover, with its attractive visuals and interactive content presentation using a spatial perspective, the StoryMaps learning media was considered effective in enhancing students' motivation to learn geography, facilitating material comprehension, and supporting the development of spatial thinking. This is in line with the findings of a literature review study by Tusam [7], which identified 290 research studies indicating that the use of ArcGIS StoryMaps in learning can enhance student engagement in the learning process and provide a more engaging learning experience, as well as improve students' knowledge, creativity, and spatial thinking skills. With its accessibility, StoryMaps-based learning media can be utilized as a tool for independent learning, allowing students to be more actively involved in acquiring and processing information. This is consistent with what was stated by Susantyo [38], namely that independent learning activities can encourage students to be more active in exploring and controlling their learning processes.

This study successfully provided a solution to the problems identified in the field by producing a StoryMaps-based learning media that accommodates students' learning needs in geography education. Overall, the research findings indicate that this StoryMaps-based learning media is feasible for use as a contextual and interactive learning tool in 21st-century education. This aligns with the function of StoryMaps, which is not limited to being a potential classroom learning tool but also serves to connect students with the world outside the classroom [10]. With its ease of use, StoryMaps can serve as an effective learning tool to support the enhancement of students' technological literacy and spatial literacy through project-based learning. This is in line with the findings presented by Nisnala [28], who stated that StoryMaps is effective in improving students' creativity and spatial thinking skills. Based on students' responses to the media as shown in Table 6, the StoryMaps-based learning media provides benefits by facilitating students' understanding of the material and offering a more engaging learning experience. This is consistent with the findings of Melati [39] in her study on the use of technology in education, which found that interactive learning media can enrich students' learning experiences more effectively and flexibly.

The StoryMaps-based learning media that was developed supports innovation in locally contextualized media, which aligns with the National Curriculum, namely the *Merdeka Curriculum*. In addition to serving as an innovative learning medium for delivering the Tourism Resources material, this media is also beneficial as a means of introducing the tourism of Batu City to the younger generation. When compared to other StoryMaps-based learning media, this learning media possesses several advantages. The developed StoryMaps-based learning media uses language that tends to be semi-formal and interactive, in order to create a sense of comfort for the reader, thus making it easier for the reader to understand the information being conveyed. Furthermore, the StoryMaps-based learning media was developed by adopting "Geotour" as the guiding concept for media flow design. Map information is presented using visually appealing symbols, includes a virtual tour to provide an enjoyable learning experience, and is complemented by explanatory videos in the form of motion graphics to provide affirmation for students' thinking outcomes. In addition, the learning media uses Batu City, which is well known as a tourist city, as a case study for the Tourism Resources material, making the contextual relevance of this media superior compared to other learning media. In general, with the completeness of the multimedia presented, this media can accommodate students' diverse learning styles, particularly visual and auditory. The limitation of this StoryMaps media lies in its accessibility range, as it can only be accessed online and requires a stable internet connection.

The role and position of the learning media developed in this study function as a supplementary medium that complements the existing primary learning media. This learning media was specifically designed to have relevance and applicability suitable for teachers and eleventh-grade senior high school students in the Batu City area. The strength of the media's relevance and contextualization lies in the application of a case study that specifically emphasizes the local context, namely tourism resources in Batu City, thereby making the media more meaningful and contextual in the learning process. This is in line with the research conducted by Maharani [30], which showed that learning media that considers local context is more effective in connecting content with students' real-life experiences. Nevertheless, this learning media has the potential to be replicated in other regions with similar geographical characteristics or used as a comparative learning tool in teaching Natural Resources content. In addition, the results of this study open opportunities for the development of other technology-based learning media and enrich the references available for the development of StoryMaps-based media in the field of geography. This study also contributes to the advancement of innovation in digital learning media for 21st-century education.

This study has limitations in the scope of problem analysis, which was only conducted at SMA Negeri 01 Batu; therefore, the results of this study have not yet represented the needs of other schools in Batu City in general. In addition, the StoryMaps-based learning media developed was only tested through a limited Level 1 trial, aimed at measuring the level of satisfaction among teachers and students regarding the developed media. Therefore, it is recommended that this research be continued and further developed to reach Level 3 evaluation to assess the effectiveness, practicality, and relevance of the learning media more comprehensively by expanding the scope to include other schools, both within and outside Batu City. Furthermore, the learning media developed in this study are limited to the topic of Tourism Resources using a case study in Batu City. Future researchers have a significant opportunity to develop StoryMaps-based learning media on different topics, or the same topic with a different case study location.

CONCLUSION

This research and development was conducted in accordance with a structured methodological procedure based on the five stages of the ADDIE model. The resulting product, a StoryMaps-based learning media, was declared to meet the feasibility criteria for use in the context of geography education. The feasibility evaluation of the media was carried out by two validators, namely a media expert and a content expert, who comprehensively assessed both the media and content aspects. The validation results showed that the

learning media obtained high scores, namely 90.0% from the media expert and 87.5% from the content expert, with the classification of highly feasible. Moreover, the feasibility of the StoryMaps-based learning media is also supported by the results of a limited field trial, which demonstrates a positive level of acceptance, with a score of 95.0% from teachers and 91.3% from students, classified as very satisfactory. Overall, this study has successfully achieved its objective, namely to produce a validated StoryMaps-based learning media focusing on the topic of Tourism Resources in Batu City from a spatial perspective. However, this study is limited to media feasibility testing and has not yet included classroom implementation to evaluate the effectiveness of the learning media. Therefore, future research is expected to measure the effectiveness of this StoryMaps media through experimental research activities.

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