3D Street Story Map Learning Media for High School Student's Spatial Thinking Ability

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ABSTRAK

Salah satu kecakapan geografi yang dimiliki siswa adalah kemampuan berpikir spasial. Tujuan dari penelitian ini adalah mengembangkan media pembelajaran 3D Street Story Map sebagai upaya akselerasi kecerdasan spasial siswa. Media pembelajaran yang dikembangkan berbasis Google My Map terintegrasi virtual tour sehingga juga dapat digunakan pada pembelajaran geografi. Pengembangan menggunakan model 4D yang disesuaikan kebutuhan pengembangan. Tahap define yakni mengkaji studi kebutuhan pengembangan diantaranya studi literatur dan studi kebutuhan siswa dan guru. Tahap perancangan memuat empat langkah yakni mengkonstruksi kriteria dan referensi, memilih media, memilih format, dan desain awal. Tahap develop yakni melakukan pengembangan dan melakukan uji kepakaran materi dan media pembelajaran dan uji kepraktisan media pembelajaran. Hasil penelitian yakni tercipta media pembelajaran 3D Steet Story Map yang dikembangkan berdasarkan studi kebutuhan, teruji valid berdasarkan penilaian ahli materi dan media, dan memiliki nilai kepraktisan dan keefektifan terhadap pembelajaran geografi siswa. Implikasi praktis pemanfaatan media pembelajaran 3D Street Story Map terdapat pada artikel ini.

ABSTRACT

One of the geography skills is students have spatial thinking ability. The aim of this research is to develop 3D Street Story Map Learning Media to accelerate students' spatial thinking ability. Learning media developed based on Google My Map integrated with virtual tours so that learning media can be used in geography learning courses. The development uses a 4D model that is adjusted to development needs. The define phase examines the study of development needs including a literature study and needs assessment of high school students and teachers. The design stage contains four steps, including constructing criteria and references, selecting media, selecting formats, and initial design. The second stage is to develop and validate learning media from material and media experts and test the practicality of learning media. The research results are the creation of 3D Steet Story Map learning media which was developed based on a needs assessment study, tested validity based on the material and media experts, and has practical and effective value for student geography learning. The practical implications of using 3D Street Story Map learning media are in this article.

1. INTRODUCTION

The development of 21st century competencies aims to welcome Indonesia's golden generation in 2045. The required competencies are compiled in the 2013 curriculum and continue in the independent curriculum (Uddin et al., 2022). The scope of material and the level of competence of students that must be met or achieved in an educational unit at a certain level and type of education is formulated in the Content Standards for each subject. The independent curriculum is a curriculum designed with a student center learning approach according to students' interests and talents. Student centered learning requires constructive learning (Sulistianingsih & Mukminan, 2019; Sari, 2022). This learning requires the development of logic and conceptual learning. In addition, learning independence and the ability to reflect on learning outcomes are also needed (Fitri et al., 2022; Sari, 2022b). Learning geography in the 21st

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century aims to optimize students' ability to think at a higher level (Sari et al., 2021). In addition, Bednarz (2019) describes that learning geography has the main strengths, namely the ability to think spatially, think geographic and think geospatially. This ability is also expected to be developed to encourage students to optimize their thinking skills so that they can have the ability to make decisions based on the facts and data found. The ability to think spatially is a characteristic of geography with other sciences. People who have spatial intelligence have special characteristics. The special features of spatial intelligence are understanding directions, carrying out thought processes, and using three dimensions to design something (Hilman & Mainaki, 2020; Lutfi & Jupri, 2020). While the general characteristics of spatial intelligence are: 1) agile in playing spatial forms; 2) able to read maps very well; 3) prefer pictures compared to writing; 4) responsive regarding color; 5) like things related to photos and videos; 6) from various angles, can describe all objects well; 7) accustomed to imaginative; and 8) very good at drawing (Triutami et al., 2021).

People who have a high level of spatial thinking skills have various benefits in their lives. The person can take advantage of spatial information (Purwanto et al., 2021). Spatial information is related to location and everything related to spatial concept (Majeed & ALRikabi, 2022; Putra et al., 2020). Spatial thinking provides an advantage for someone to be able to utilize spatial information. Having spatial intelligence is beneficial in various fields (Putra et al., 2020). Spatial thinking can be useful in various fields of work, so it is important for students to have it as readiness in the world of work. The ability to think when looking at an image, as well as the ability to absorb, transform, re-create various aspects of the visual-spatial world are needed to increase students' knowledge in studying various tours that exist in each area is a spatial intelligence (Triutami et al., 2021). This intelligence is needed so that people understand the geographical wealth possessed by the Indonesian people (Salam et al., 2019; Aliman et al., 2019; Duarte et al., 2022).

However, the facts in the field related to the ability to think spatially are still very low. Many think that the ability to think spatially is only limited to memorizing the names of places and the direction of the wind. The results of observations made on high school students, many do not know the position point and do not know how to read GPS to be able to determine points on the map. Therefore, learning innovations are needed that can accommodate the acceleration of spatial thinking skills.

Learning media is needed to support the learning objectives of the 21st century. Through learning media it is hoped that students can increase learning motivation and have an impact on increasing students' understanding of learning material (Malik & Nugraheni, 2020; Putra et al., 2020; Sari, 2022b; Sari et al., 2020; Sejati et al., 2019). Especially in learning 21st century geography, learning media aims to be able to improve spatial intelligence (Haz et al., 2019; Šafhalter et al., 2022). Spatial intelligence is the ability to perceive ideas visually and be able to orient positions appropriately and be sensitive to shape, space, color, and the relationship between locations (Aliman et al., 2019; Duarte et al., 2022; Hilman & Mainaki, 2020). Therefore, technology-based learning media is needed that can optimize spatial intelligence.

Technology-based learning media that can be used to help implement this learning is by utilizing virtual tour technology. The virtual tour is used in the form of a website to make it easier for users to access the application (Kim, 2021). The area will look more real if it is accessed through this virtual tour because it will appear real in a panoramic photo with a viewing angle of 360° x 180°. To represent the location plan, the virtual tour also includes a 3D Maps feature that is integrated with the website. Through virtual tour applications it makes it easier for students to see the virtual world as if it were the real world (Argyriou et al., 2020). In addition, there are many advantages of integrated 3D maps and virtual tours, including easy access, attractive appearance, and representative designs in real environments (Iglesias et al., 2021; Kim, 2021).

The 3D Street Story Map was created with a stationary still camera and is made up of a number of photos taken from a pivot point. An environment can be seen without having to physically travel to that location making it easier for users to see various locations (Bandarsyah & Sulaeman, 2021). The use of a 3d street story map requires the presence of a smartphone and access to the internet. The attractiveness of the development of learning media has attracted previous researchers to develop street map media. However, no one has yet integrated 3d street sory map media for spatial acceleration.

A storytelling strategy in the form of a map, which combines story maps in the form of text and images, is also known as story mapping. To make it easier for children to understand the contents of a material. Story mapping strategies are also useful for the ability to read and understand children's narrative texts (Cullen & Metatla, 2019). The reason for selecting the story mapping strategy is because it has several advantages in helping students as a strategy in understanding texts, including: (1) students can use story mapping as an initial reading strategy. Teachers can introduce books through a complete story mapping. By removing some events students can make predictions about what they think will

happen; (2) students can use their story mapping as notes for reading report books; (3) students when using story mapping in preparing media presentations; (4) students can use story mapping as a tool before writing in developing their own stories; and (5) teachers can use story mapping as a way to help revise/review written stories (Dickinson & Telford, 2020).

Several previous studies have described learning components to improve spatial abilities. Research discusses the effect of Google Earth Assisted Remote Sensing Learning on spatial thinking skills and the ability to solve disaster recovery problems (Wibowo et al, 2021). Other research tested the effect of the problem-based hybrid learning model on geography learning outcomes and spatial thinking abilities (Amin et al, 2020). The impact of Blended Project-Based Learning with the Batang Approach on spatial thinking skills and geography skills (Putra et al.,2021). However, there is few research that develops interactive media based on virtual tour 360 and integrates it into information on learning media for spatial thinking skills.

Based on the urgency of this problem, a digital technology-based learning innovation is needed. The purpose of this research is to develop learning innovations in the form of learning media to accelerate spatial thinking skills in the form of 3D street story maps. To develop learning media, we also conduct a need assessment for development needs and adjust learning media with indicators of spatial thinking skills. We also tested the quality with media and concept experts as well as tested the practicality and effectiveness of instructional media to determine the effect of instructional media on increasing the spatial thinking skills of high school students.

2. METHOD

The design of the research conducted is research and development. The method used in this research is 4D model (Define, Design, Develop, and Desiminate stages). We made modifications to the method up to the development stage. This is because the 3D street story map learning media needs to be tested on the effectiveness of spatial thinking skills which will be carried out in further research before being disseminated to all high schools. The details of the stages of development carried out are. First, Define Stage. The define stage is the first stage in the 4D model whose definition is related to development requirements. This stage is the needs analysis stage. Product development refers to the development requirements, analyzes and collects information to what extent the development needs to be done so that in this research the initial stage used is defined, at this stage, the author collects all information from various media about the Langsa city protected forest park. In addition, at the definition stage, it also conducts literature studies that support media development. Researchers also conducted a needs assessment of students regarding needs related to learning media, especially in geography learning. Students and teachers who participated in the need assessment were 20 students and 2 teachers of high schools in Langsa City. We collect need assessment results using Google Forms.

Second, Design Stage. The Design stage itself is the second step in the 4D model at this stage is the design. 4 steps must be passed at this stage, namely constructing criterion-referencedmtest. At this stage, we design criteria according to the purpose of making a 3d street story map, namely the need for media that can answer the optimization of students' spatial intelligence. The results of previous studies became the basis for media development. The second step is media selection, we select the media to display the 3d street story map. The third stage of format selection is choosing a format and compiling a storyboard or initial design/frame of reference for the display to be developed. And the final stage is the initial design, namely the researcher carries out the initial design in making a website-based virtual map.

Third, Development Stage. The development stage is the third step in developing 4D model learning tools, namely the development stage of making the application. This stage itself consists of two steps, namely expert appraisal accompanied by revisions and developmental testing. At the expert appraisal stage, we asked for 2 experts, i.e. learning media experts and subject matter geography experts. We provide assessment instruments filled out by media and material experts. The assessment instrument consists of an assessment using a Likert scale (1 (strongly disagree) to 4 (strongly agree)) according to the components being assessed. The results of the assessment are carried out until they meet the criteria. Data analysis uses descriptive percentages. To determine the conclusion, then apply the following criteria showed in Table 1.

Table 1 shows the percentage of expert validation assessment criteria. 0-60% percentage requires revision. The practicality test was carried out at SMA Negeri 5 Kota Langsa involving 20 students majoring in social studies in the second year (XI IPS class). To assess practicality, researchers provide media practicality assessment instruments developed by researchers. Students who were selected as research subjects were asked to assess the practicality of the media to be used as learning media. the

assessment carried out includes the components of ease of understanding, display, operation, and student understanding.

The results of the practicality test were then tested for effectiveness in terms of improving spatial thinking skills. The indicators were compiled from a number of essay questions which were tested on 40 students which were divided into 20 students who were taught using the 3D Street Story Map media and 20 other students who were taught using textbooks. The number of essay questions is 10 questions. Before being implemented in the control and experimental classes, the instrument was tested on 10 XII IPS students. The indicators, distribution of question, and validity result of spatial intelligence test showed in Table 2.

Table 1. Criteria for the Percentage of Suitability of Learning Media 3D Street Story Map

Achievement Level	Qualification	Description
81%-100%	Excellent	No need revision
61%-80%	Good	No need revision
41%-60%	Fair	Need revision
21%-40%	Weak	Need revision
0%-20%	Poor	Need revision

Table 2. Indicators, Distribution of Questions, and Validity Result on Spatial Intelligence Test

Indicator	Question	Validity
Forensic Skills	How does the urban forest park affect the surrounding environment? (7)	0.094
Describing the position, direction, and distance	Explain where is the position of Langsa City forest park? (1)	0.703
Changing the Shape of an object	2	0.167
Determining the Line of Transportation	Explain the fastest route to arrive at the location of the Acehnese traditional house. (3)	0.764
Choosing best place	Based on your analysis, which place is suitable for a family picnic? Explain. (4)	0.366
Observing people, place, and things	Explain why the Rainbow Bridge area is a favorite spot for visitors? (5), Why is the blue lake place suitable to visit when it is green? (6)	0.469; 0.736
Predicting development of a region	What are the predictions for the forest park in Langsa City for the next 5 years? (8)	0.701
Insights on environmental adaptation	After analyzing, what are your predictions for the settlements around the urban forest park? (9), Explain how to access all sites in the Langsa urban forest? Make a sequence and why. (10)	0.577; 0.442

Table 2 shows that the spatial thinking ability test instrument whose indicators are adapted from Mulyadi et al (2018). After conducting validity and practicality tests, valid instruments were produced with values ranging from 0.094 to 0.764 with a significance value of 0.05. Furthermore, the reliability value of the instrument was found that the Cronbach alpha value was 0.512 > 0.05, which means the instrument was reliable.

In the effectiveness test stage we involved 2 classes namely 1 experimental class and a control class with different treatments. Before carrying out the treatment, we distributed spatial thinking ability test instruments to students in the experimental and control classes. Then learning uses the material "sustainable tourism development" with different treatment. Implementation before carrying out the effectiveness test, students were asked to study the material with 3D street story map media for the experimental group and study textbooks for the control group. The next question is done in 45 minutes. After studying, students again do a posttest to assess the effectiveness of the 3D street story map learning media. Questions are collected and analyzed to get results. The questions were tested using the one way ANOVA test using SPSS 23 for windows.

3. RESULT AND DISCUSSION

Result

The aim of the research is to develop a 3D street story map learning media to accelerate the spatial thinking skills of high school students. The development method uses 4D which is detailed into a define stage, namely conducting a literature study and of the needs assessment of students and teachers regarding media development. Then at the design stage, the composition of the storyboard and product description of the results of the study of the need. Furthermore, at the development stage, an analysis was carried out from the results of the validity test of media experts and learning material experts as well as the results of the practicality test analysis taken from the student practicality test data. At the development stage also conducts an effectiveness test to determine the effectiveness of the media on the ability to think spatially. Details of the results of the study are first, Define Stage. The instrument used is the need assessment questionnaire. This questionnaire was distributed to students and teachers in high schools in Langsa City, Aceh. The questionnaire consists of 20 items consisting of 4 indicators, namely the need for material to support understanding of spatial concepts in the geography approach, the need for digital learning media, the need for interactive learning media, and the need for appropriate design and color. Questionnaire results were analyzed through percentages. need assessment results can be seen in Table 3.

Table 3. Results of the Student and Teacher Needs Assessment at 3D Street Story Map Learning Media

Indicator	Students	Teachers
Need for material to support understanding of spatial concepts in the geography approach	85%	90%
Need for digital learning media	92%	80%
Need for interactive learning media	88%	80%
Need for appropriate design and color	92%	90%

Based on the result on need assessment (Table 3), it was found that students and teachers needed learning media to be used to provide an understanding of spatial concepts. Based on the result of the teacher needs questionnaire study, through the 3D Street Story map learning media, students will know the concept of compass points, location, interrelationships between tourist attraction sites. Furthermore, in the section on the need for learning media in digital form, students feel a greater need than teachers (92% <80%). Students want learning media to be easy to carry and not take up space, therefore students need learning media in digital and interactive form. The results then become the basis for consideration in preparing the initial design of 3D street story map learning media.

Second, Design Stage. Pada tahap design stage, dilakukan tahap mendesain media pembelajaran agar mudah dipahami oleh siswa. Tahapan ini mencoba mengembangkan kerangka dari map yang datanya diinput melalui story map. The display of my map can be seen in Figure 1.
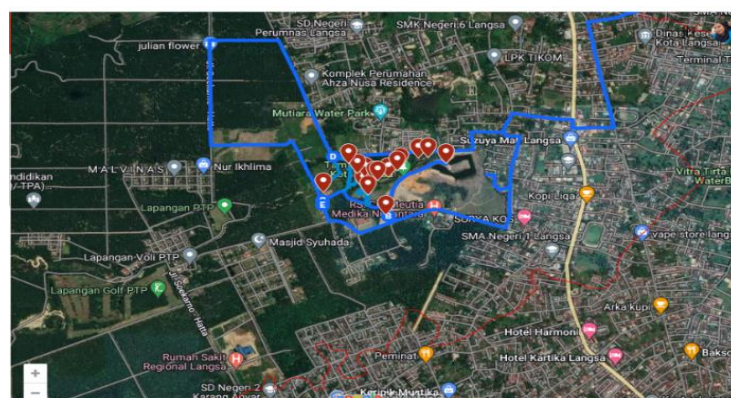

Figure 1. Initial View of the 3D Street Story Map

Third, Development Stage. Before the practicality and effectivity test was carried out, the researcher conducted an expert assessment. The media and material experts were given an assessment sheet consisting of media assessment indicators, namely the suitability of the physical aspects of the media, the suitability of the buttons and the utilization, the suitability of the illustrations, the suitability of the colors, the suitability of the writing. Material experts are given material indicators consisting of the

depth of the material mapping and presentation of the material, the correctness of data and facts, the correctness of the concept, the suitability of the image with the concept or description. The results of the evaluation of media experts in Table 2, while the material experts can in Table 4.

Table 4. Media Expert Validation Results

Indicator	Percentage	Criteria
Physical suitability	80%	Good
Button compatibility with utilization	82%	Excellent
Conformity of image illustration	90%	Excellent
Color match	85%	Excellent
Writing suitability	89%	Excellent
Average Score	85%	Excellent

Based of media expert assessment in Table 4, it is known that the highest score from the media experts assessment is on the aspect of conformity of image illustration while a good score is 90% on the assessment in terms of physical sustainability. Furthermore, suggestions from media experts are presenting picture/real picture that have high resolution. The aim of providing a high resolution picture for real experience when using 3D image display devices so that the images look real and look attractive. Furthermore, the material expert validation result in Table 5.

Table 5. Material Expert Validation Results

Indicator	Percentage	Criteria
Depth of material mapping and presentation of material	84%	Excellent
truth of data and facts	91%	Excellent
concept truth	85%	Excellent
suitability of the image with the concept or description	89%	Excellent
Average Score	87%	Excellent

Based on the material experts assessment in Table 5, it is known that the truth of data and facts occupies the highest rating value (91%) because the data provided real data where researchers develop learning media according to the concept of material in high school. The material that researchers have developed is related to the material "Environment". Furthermore, the assessment of the material expert also stated that the image was in accordance with the concept description.

Based on the conclusions of the two expert assessments, it found the 3D street story map learning media has fulfilled the adequacy of media and material experts. We then refine the results from expert comments and judgments by shooting directly at the object. We do 360 photography of attraction objects in tourist attractions. We then input data into google my map and determine the coordinates of the object being photographed.

The coordinate points in Figure 1, if clicked, will display information related to tourist objects and important information on the object. The display of the 3D street story my map learning media on the tourist attraction site information display in Figure 2.

Figure 2. Map Display When Opening A Description of Each Location

In the tour display section, the display will change to a 360° image. 360° images are at each point of the location of the tourist attraction site and the journey to the tourist object site so that the view becomes a 360o tour. A 360o image display on the tourist site of a traditional Aceh house in Figure 3.

Figure 3. A 360^0 view of the Aceh Traditional House (Destination Object)

After developing the 3D Street Story Map, a practicality test was carried out. The practicality test aims to assess the attractiveness of learning media and the ease of use of learning media for high school students. We conducted a practicality test at SMA Negeri 5 Langsa. The practicality test results were then analyzed and presented. Furthermore, the practicality test results of the 3D street story map media provide the results presented in Table 6.

Tabel 6. Practical Test Result

Indicator	Percentage	Criteria
The effectiveness of the media on learning objectives	80%	Good
Interactive media on students	90%	Excellent
Ease of use of media	86%	Excellent
Media helps students learn	89%	Excellent
Average Score	86%	Excellent

Based on the practical results, students agree that learning media can be used and is suitable for students learning to know the spatial conditions of an area. The presentation of the media which took place in Langsa City Forest which was familiar to the students made it very easy for students to understand the condition of the place. On the effectiveness of learning media towards goals, getting good criteria with a score of 80%. This is because students have not tested the effectiveness of learning media so that learning objectives cannot be concluded by students. However, in the practicality test results related to 3D Street Story Map learning media on interactive media indicators, students get an excellent score with a score of 90%. This means that the learning media is very interactive for students. Students can choose and interact with learning media.

The media effectiveness test was carried out after receiving input from the results of the practicality test and revising the results. We conducted an effectiveness test on 40 high school students on tourism material which was divided into 20 students taught using textbooks and 20 other students taught using 3D street story maps. Previously we distributed pretest questions to find out students' initial spatial intelligence. Then apply learning with 2 different treatments. After learning is complete, we do a posttest test. The results obtained are that the normality test meets the requirements with a significance value of normality Shapiro Wilk 0.587 > 0.05. The homogeneity test yields 0.680 > 0.05 which means the data is homogeneous. So that the prerequisites for the ANOVA test are met. The results of the ANOVA test in Table 7.

Tabel 7. ANOVA Test Result

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10304.100	1	10304.100	51.400	0.000
Within Groups	7617.800	38	200.468		
Total	**17921.900**	**39**			

Based on the results of the ANOVA test (Tabel 7), it is known that there are differences in the spatial intelligence of students who learn using 3D Street Story Map learning media with students who are

only taught using textbooks. This proves the effectiveness of 3D Street Story Map learning media in accelerating the spatial thinking skills of high school students according to their cognitive level.

Discussion

The research results have produced an interactive map based on a 360 visual display that can be accessed using the internet. Interactive maps integrated with Google My Maps make it easy for students to access. Using the map my map can be accessed via mobile phones, laptops and tablets. This will make it easy to carry and accessible to students and according to student needs (Liu et al., 2020; Oersen et al., 2020). These results are supported by findings stated that digital-based media is suitable for use with 21st century students according to their needs (Gonsalves et al., 2019; Malik & Nugraheni, 2020).

The results of this study can be presented in the form of 360 Portrait Images, Street View Maps, and descriptive. 360^0 portraits provide the experience of seeing the virtual world as if it were real when recording potrait (Gunkel et al., 2019; Iglesias et al., 2021). The results are presented in the form of a Virtual Tour which is displayed containing information in the form of how to use the application, location plans, navigation buttons, and panoramic lists. To provide descriptions and information, there will also be voice narration that will be displayed on this virtual tour. In the 3D media view, the story map contains several points in the form of hotspot distribution from sites located at the Langsa City Forest location. This distribution allows the user to move from one point to another with an explanation of the information on each site that the student clicks on. Buttons that are easy to use to click, will make it easier for students to move around and find information on each site and site locations so that students can attract and understand their position (Staden et al., 2020; Wibowo et al., 2021). The overall appearance of the map which allows students to interact virtually with the tool, will make it easier for students to realize the student's position and the location of the place shown on the map (Browder et al., 2015; Dickinson & Telford, 2020; Elsayed et al., 2019).

The 3D Maps page contains a map of the Langsa City Protected Forest location in 3D shape. Locations can be shifted and accessed by moving the mouse or touchpad so that students can easily operate the map (Muharam et al., 2021; Apriyanti, 2022). The part that want to see in more detail can be done by scrolling to enlarge and reduce the part. Through this virtual tour, students can improve spatial thinking (Kim, 2021; Kyrlitsias, et al., 2021). To solve a problem, find answers, and express solutions for students and teachers, it is necessary to have a spatial concept that will enable students and teachers to think spatially as a special part of intelligence. So to understand the meaning of spatial, we can use size, continuity, proximity , separation (Cullen & Metatla, 2019; Elsayed et al., 2019).

Geography lessons do not only cover cognitive aspects of knowledge and spatial patterns. Geography also requires spatial attitudes which are part of spatial intelligence (Juliansyah Noor, 2019; Mulyadi et al., 2018). Intelligence related to one's ability to read maps, the ability to develop real life through internalization into mental or visual images related to the formation of spatial intelligence (Putra et al., 2020; Li et al., 2020). Through the use of 3D street story map learning media, it will make it easier for students to access everything in the destination object with a virtual tour that can be opened anytime and anywhere. Therefore, using geographic information systems can improve spatial thinking skills (Duarte et al., 2022; Vojteková et al., 2021). In addition, students' initial perceptions of the environment and geo-literacy also have an influence on students' spatial intelligence (Karolčík et al., 2021; Putra et al., 2020).

Interactive media presents clear and up-to-date images. Images are recorded through field studies without taking images from image search sites. This adds to the attractiveness of the media, because the presentation of real images in the form of 360 degree provides students with experiences as if they were tourism objects in learning media. Students can also take virtual journeys through learning media and learn through learning media through object-related information features.The results of this response are also supported by research which describes that the quality of images in image media will affect the attractiveness of students to study further learning media (Marhamah & Mulyadi, 2020; Mystakidis et al., 2021). Furthermore, in the material instrument, it provides suggestions that the material should be adapted to the information contained in the urban forest. Presentation of contextual material will increase students' motivation to learn and make learning about space easier (Arrhenius et al., 2022; Purwanto et al., 2021; Sari et al., 2020; Sejati et al., 2019).

Media is also interactive where students are free to choose destinations or locations in urban forest locations. Then from the menu you can get a 360 degree image which can give a real picture of the environment. This research also reveals that media that can be operated and interactive for students will improve learning outcomes and students' understanding of the material (Agustina & Elan, 2021; Malik & Nugraheni, 2020; Ridhwan & Sari, 2022).

Based on the results of the analysis of the applications that have been carried out, it can be concluded that the 3D Street Story Map learning media is equipped with a 3D map feature with a description of each site and is integrated into a website story map. This learning media was chosen based on several advantages, namely the ease of accessing learning media. This is due to the support of the selected application features which can contain a clear description of the location and an attractive 360 view. In addition, the application made contains information about the various locations that are on the Langsa City Protected Forest Park tour so it's easy to understand. The practicality results also reveal some of the ease with which students and teachers can operate the application. Several questions related to spatial intelligence can also be understood by students through the 3D street story map learning media. In addition, the display of media in the form of pictures and videos keeps students from getting bored.

4. CONCLUSION

The results of the development have produced 3D Street Story Map learning media to accelerate the spatial intelligence of high school students. The research process carried out consists of define, design, and development stages to produce learning media that are valid, practical, and effective in accelerating spatial intelligence. The resulting research can be implemented by providing teachers and students understanding and skills in using technology. The goal is to increase the effectiveness of learning media to optimize spatial intelligence. In addition, this research is still limited to the development stages and spatial intelligence in high school students with a limited scope. Suggestions for further research are to develop learning media that are suitable for use at higher levels of education such as undergraduate and for training prospective geography teachers. In addition, research dissemination is needed to a wider scope. For geography teachers and developer researchers to be able to advertise geography learning innovations, so that learning geography can be more interesting and meaningful.

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