Virtual animated media with local wisdom for learning to read using mind method

(Media animasi virtual bermuatan kearifan lokal untuk pembelajaran membaca dengan metode mind)

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Abstract: The objectives of the research are to: 1) explain the conditions of class 4 elementary schools in Madiun City; 2) describe and explain the model for developing virtual animation media containing local wisdom for learning to read for grade 4 students; 3) describe and explain the effectiveness of virtual animation media products containing local wisdom for learning to read through the Mind Mapping method for grade 4 elementary school students. This type of development research useD the simplified Borg and Gall method in 4 stages: exploration, design development, testing, and deployment. Data analysis was done using descriptive analysis, feasibility tests with criteria scores, and reading comprehension tests with t-tests. Results of the research were: 1) students still use thematic book media. Learning to read was still a task of answering questions. 2) the needs and characteristics of learning media were summarized as follows, (a) attractive animated media according to basic competencies in the curriculum, with local wisdom content (b) easy to use, (c) equipped with evaluations to measure students' reading comprehension. 3) the test results were categorized as good and feasible. (4) Media effectiveness showed a value of 0.29 greater than 0.05. The homogeneity test at the extensive test stage received a value of 0.109 which indicated significance, and the normality test with a value of 0.622 which means the population had homogeneous variance. The results of the Tukey test showed differences between the experimental and control groups. Virtual animation media is effective in reading comprehension through the mind mapping method for grade 4 students.

| Keywords | Animation, Local wisdom, Mind mapping, Reading comprehension |

Abstrak: Tujuan dari penelitian: 1) menjelaskan kondisi kelas 4 sekolah dasar kota Madiun; 2) mendeskripsikan dan menjelaskan model pengembangan media animasi virtual bermuatan kearifan lokal untuk pembelajaran membaca untuk siswa kelas 4; 3) mendeskripsikan dan menjelaskan keefektifan produk media animasi virtual bermuatan kearifan lokal untuk pembelajaran membaca melalui metode Mind Mapping bagi siswa kelas 4 sekolah dasar. Jenis penelitian pengembangan dengan metode Borg and Gall yang disederhanakan dalam 4 tahap yaitu eksplorasi, pengembangan desain, pengujian dan penyebaran. Analisis data dengan analisis deskriptif, uji kelayakan dengan skor kriteria dan tes membaca pemahaman dengan uji t. Hasil dari penelitian: 1) siswa masih menggunakan media buku tematik. Pembelajaran membaca masih berupa tugas menjawab pertanyaan. 2) kebutuhan dan karakteristik media pembelajaran dapat dirangkum sebagai berikut, (a) media animasi menarik sesuai kompetensi dasar dalam kurikulum, dengan muatan kearifan local (b) mudah digunakan, (c) dilengkapi evaluasi untuk mengukur pemahaman membaca siswa. 3) hasil uji coba dikategorikan baik dan layak. (4) Keefektifan media menunjukkan nilai 0,29 lebih besar dari 0,05. Uji homogenitas pada tahap uji luas mendapat nilai 0,109 yang menunjukkan signifikan, uji normalitas dengan nilai 0,622 yang berarti populasi memiliki variansi homogen. Hasil uji tukey terdapat perbedaan kelompok eksperimen dan kontrol. Media animasi virtual memiliki kefektifan pada pemahaman membaca melalui metode mind mapping siswa kelas 4.

| Kata Kunci | Kearifan Lokal, Media animasi, Pembelajaran membaca, Peta konsep |

INTRODUCTION

Reading skills are activities needed to understand a text Riyanti (2021) reading skills. Reading skills are needed since students are familiar with the language. The reading process and reading learning outcomes have a reciprocal relationship (Abrams & Merchant, 2013). Good reading skills can be reflected in good and high reading speed and comprehension (Morocco et al., 2012), so multiliteracy skills are formed in addition to reading and writing skills and using digital media. Good reading skills are reflected in clear goals, reading in units of thought, varying reading speeds, being critical, varying types of reading, lots of vocabulary, reading as a need, time efficiency, and reading silently (Nurhadi, 2016). Good reading skills are not innate, but a process, so they need to be done early on with different amounts of text because they affect the desire and ability to write (Juel, 1994). To obtain information from the text, it is necessary to improve oneself in reading and understanding (Gough & Tunmer, 1986; Guthrie et al., 1999). This is because reading can reduce the difficulty in distinguishing languages (Schoon, Parsons, Rush, 2010), and play a role as adults in civil activities (Paterson, 2009). Students who are good at reading will have little difficulty in understanding texts and correcting them (Godman, 1996). Research by Dickinson & Tabors (2001) explains that students who read at home use picture stories by 60%. This is different from reading activities carried out in elementary schools, especially during the COVID-19 pandemic. Students read by giving assignments via WhatsApp groups without media (Syamsiyah, 2020) and use texts to read in the morning. In addition, reading activities at home are rarely supervised and guided by parents. There are some parents who have a lack of information literacy which has an impact on the level of reading practice that is lacking (Muhammad, 2019).

Reading problems experienced by students in elementary schools on average are due to a lack of reading literacy in every school lesson, especially when the student's study at home. In addition, the reading process carried out by students at the time of habituation uses paper media containing short stories. Elementary school students have difficulties in improving language literacy skills because teachers do not provide correct reading practice, the lack of an environment that supports reading activities, the parents' reading level, and the lack of guidance from parents (Muhammad, 2019). Teachers can improve students' reading culture by providing a book corner, conducting reading campaigns, improving reading skills with various strategies, developing character (Suwandi, 2015). Reading activities can also be carried out in cyberspace without being in class, as a student's daily habit without having to be instructed by using digital media as part of technological development. One solution that teachers can implement to teach students to read is virtual animation media that uses computer or laptop technology. Molina et al., (2018) explained that with technology, visual presentations can be designed in the form of animations and videos with static and dynamic images. Media is a major part of the learning process both online and offline. Polizzi (2020) states that learning to use media requires the ability to evaluate online content. Internet media in its use is influenced by the policies of the child's place of study and the attitudes of teachers and librarians (Batool & Webber, 2019). Agreeing with Batool & Webber, Christie (1995) describes the process of developing habits required to perform and identify discourses related to information. Abrams & Merchant (2013) state that applications, adults, and children are needed to practice digital literacy in context. In the past, educators have modeled reading strategies using printed books such as large books for shared reading; however, to model digital text reading teachers should consider using interactive media or large screens that allow students and teachers to simulate reading and interact with digital texts (Martin-Beltrán et al., 2017). According to Arndt (2016) based on interviews conducted with teachers, iPads are used as a substitute for activities to support conventional methods. Kaganer et al., (2010) explained that in an effort to improve learning and collaboration, tablets are needed that are integrated in learning. Cheng & Tsai (2014) researched reading digital books such as Augment Reality (AR), which resulted in a relationship between reading behavior and cognition where students were more actively involved in the interactive process of reading books.

According to Merryfield (2009), education is a world and a culture. Pérez et al., (2017) stated that teachers and students are a form of curriculum, and basically, the teacher is a culture, which is

seen, experienced, and witnessed by students in reading texts from the teacher's experience during the interaction. If students do not know the local culture, students will not appreciate the culture. So, the use of media needs to be developed with local wisdom. This is done because today's students can master technology only through attenuation and vision (Prensky, 2010). Lister et al., (2006) state that innovation in teaching and learning take place by utilizing information from computers. In addition, reading skills are the result of children's learning through films and various media (Diergarten et al., 2017). Cultural transformation from the industrial era to the information age coupled with new ways of learning, is very important in the 21st century (Thoman & Jolls, 2005).

This research aims to develop virtual animation media containing local wisdom for learning to read using the concept map method. The limitations of animation media used in elementary schools and the limitations of teachers in designing animation media and reading learning which have not been integrated with other skills are the reasons for the research. There is a need to use multimedia in the learning process, so it is necessary to develop animation media with local wisdom in Madiun. A research on animation media has been carried out by Samsiyah et al., (2022) on how to design animation to explore local culture. Wardani & Endahati (2019) created an integrative English learning media containing local wisdom based on multimedia animation. Our research evaluates integrating web animations into the elementary school science curriculum (Barak & Dori, 2011), trends animations used in education include Expositive, interactive animation content, quizzes (Xiao, 2013). Animation has also been developed in solar system material using various multimedia tools such as 3D Studio Max (Islam et al., 2014).

This research was conducted because there is still limited media created by teachers using animated virtual media with local wisdom content, especially in the city of Madiun. It is hoped that the development product can be used in elementary schools for learning to read by utilizing virtual media containing local wisdom. The product specifically introduces the regional culture of the city of Madiun. Even though much research has been carried out on the use of virtual media, both online and offline, media content still refers to student books and less developed content that includes local wisdom.

METHOD

This research is included in research and development (R&D). Borg & Gall (1983) explained that R&D is a type of research for developing a product that is ready to use in school. The method used in the preliminary stage is exploratory qualitative. Data were collected in the form of observations, questionnaires and interviews, and media document analysis. Data were analyzed using triangulation by comparing the results of interviews with the objects studied in the field. data is analyzed after being collected, reduced, and presented in a table, and then conclusions are drawn.

The development stage consists of formulating a blueprint product model according to your wishes and characteristics of teachers and students, prototype development, expert testing, and field trials on a limited scale. This virtual animation media uses Powtoon software. The development of the model begins with the formulation of a blueprint (conceptual model), expert test, and then testing with action research. Action research is a form of investigation that is participatory, collaborative, and spiral in nature to improve systems, methods, work, processes, content, competencies, and situations. The second stage is testing the media prototype using the (Zuber-Skenitt, 1993) model guidelines which have been simplified as follows: application of a virtual animation media prototype containing improved local wisdom, evaluation, and then repair of animated media prototypes. The place used in this development research is the Taman Elementary School which is the core school, with adequate facilities and infrastructure. The use of Islamic primary schools is based on the same needs because the curriculum uses the same curriculum as elementary schools.

At the testing stage, this product has the aim of testing the product to determine the effectiveness of virtual media containing local wisdom for learning to read in grade 4 elementary schools in Madiun city which is new and different from previous media. The experimental quantitative method is used in this product testing stage. Experimental research to test and determine the effect of an idea, practice,,or procedure on outcomes. Population is the entirety of subjects that have the

qualities to be studied. Total population, the research sample was taken, were 4th-grade students, 30 students from Nambangan Kidul 03 Elementary School, Pangongangan Elementary School, Klegen 01 Elementary School, and Kanigoro Elementary School in Madiun.

Data analysis was employed in qualitative and quantitative. Qualitative data analysis was used during the media development process, namely analysis of validation results from material experts and media experts. Qualitative analysis at the limited trial stage was carried out by reducing data, presenting data, and drawing conclusions or verification (Miles & Huberman, 2007). Quantitative data analysis used the t-test to compare animation media with YouTube media, PowerPoint media, and image media. Quantitative data analysis uses several steps, namely prerequisite tests, normality tests, homogeneity tests, and effectiveness tests.

RESULTS AND DISCUSSION

This research uses the theory of Borg & Gall (1983), namely R & D, which Sukmadinata simplified into four stages, namely (1) the survey stage, (2) the design stage or making a prototype model, (3) the effectiveness testing stage, and (4) dissemination stage.

Learning Media Conditions

The learning media used during the coronavirus pandemic mostly uses the YouTube link. The survey results are supported by field notes on document analysis of YouTube media used in the Taman sub-district, which contains material for elementary school cultural arts performances, architectural material in the form of images, cultural diversity in Indonesia, and how to make books containing cultural diversity, and ethnic diversity. ethnic groups in Indonesia, collages by pasting pictures of ethnic groups in Indonesia, making learning media, local wisdom in Lamongan, and local wisdom in Kudus. The learning media used namely power points was made by summarizing the material contained in the thematic package books. PowerPoint was made by the teachers with material on the diversity of cultures that exist in Indonesia. Powerpoint media were mostly in the form of writings about culture that were adapted to students' thematic books. The purpose of making PowerPoint was to make it easier for students to read and know the content. Besides being easy to make, it could be opened by students at any time and represented the material in students' thematic books. Learning media from YouTube links and PowerPoint media do not contain local wisdom according to the student's region, but diversity from other regions, for example from Bali, Lamongan and so on.

The reading lesson was carried out by teachers online. Based on observations, the activities carried out by teachers in elementary schools during home learning were (1) learning carried out by teachers was carried out online or online, (2) the media used by teachers was YouTube, PowerPoint (3) learning activities were carried out with assignments on the class group WhatsApp, (4) teachers gave more reading assignments by asking students to answer reading questions, (5) assignments were sent through the teacher's private chat or uploaded on social media. This was also supported by the results of field notes and interview notes with 4th-grade teachers such as the quote "We give assignments and ask for reading so that students keep their books open while studying at home" (S.2).

The results of the identification of learning media in elementary schools were shown by the use of YouTube media in delivering material that was adapted to the material in the 2013 curriculum. The YouTube link used were shown in the Table 1.

Table 1
Youtube Media

No	Youtube's Link	Contents
1	https://www.youtube.com/watch?v=R5J8VkDwkHk	Park Elementary School Cultural Arts Performances
2	https://www.youtube.com/watch?v=bZgYpRqn_dA	Architect
3	https://www.youtube.com/watch?v=-lUedc8eWdE	Cultural diversity
4	https://www.youtube.com/watch?v=OdgvTUXgkvk&t=171s	Making a book about diversity
5	https://www.youtube.com/watch?v=Hfkrql01Mv0	Indonesian tribes
6	https://www.youtube.com/watch?v=YL28FOR0pVM	Collage of tribes
7	https://www.youtube.com/watch?v=Dk5bd4DGILs	Making learning media
8	https://www.youtube.com/watch?v=mjlG1iuGcBo	Local wisdom in Lamongan
9	https://www.youtube.com/watch?v=SbBjpFTKimw	Local wisdom in Kudus

Teacher and Student Needs for Learning Media

Online learning was carried out by teachers during the Covid-19 pandemic through WhatsApp groups, discussion of worksheets, online learning through Google Meet, Microsoft 365, zoom, and giving assignments. Based on the results of the initial survey, teachers experienced differences in learning before and after the Covid-19 pandemic. The results of an initial survey of 52 4th grade teachers in Madiun city showed that there were still teachers who did not make their own media or attended media-making workshops for the reason that they had online class and did not make media even though it was only in the form of power points. The following were the results of the initial survey of teachers in the city of Madiun.

Table 2
Results of Using Media

Aspect	Response Results	
	Yes	**No**
Learning media workshop	88.2%	11.8%
Media supports the learning process	82.4%	17.6%
Use of learning media	100%	-
Create your own media	58.8%	41.2%
Local wisdom theme	76.5%	23.5%
There is a simulation/animation in the media	29.4%	70.6%
Media used	93% youtube	another 7%

The initial teacher needs analysis was conducted by interviewing 6 elementary school teachers in grade 4 in Madiun, each of which was conducted at a different time. Given the conditions in the city of Madiun where the number of coronavirus cases increased in December - January 2021, the interview was conducted online using the WhatsApp media. Based on the results of questions and answers obtained from teachers at elementary schools in Madiun, teachers had the same perception about the material taught in elementary schools in Madiun. The difference in learning methods was on the use of more assignments through the WhatsApp group platform in each class. Some schools used the Microsoft 365 learning platform, Google Classroom, and TVRI Learning House. Private elementary schools used learning through Google Meet and Zoom 2-3 times a week to explain the material, while other schools use Google Meet once a week. The rest used WhatsApp group. The results of the questionnaire on the content of media used by teachers about local wisdom according to the students' environment in theme 1 were concluded as follows.

Table 3
Material of Local Wisdom

No	Local Wisdom Material Delivered by The Teacher
1	Observations/Interviews about the condition of the home environment regarding socio-economic, environmental learning practices in their respective homes
2	Culture, Application of Pancasila values in everyday life
3	Family culture and the spirit of gotong royong
4	Taaruf parade
5	Madiun's special culinary pecel rice
6	Batik and make pandan syrup
7	Making traditional food
8	Drawing different types of culture
9	Make a socio-drama video on the application of Javanese B at home/surrounding environment
10	Caring for plants and protecting the home environment

The material taught by the teacher used more assignments in learning. In terms of learning, the teacher asked the students to watch the video and practice and do the assignments that had been given. Youtube media was distributed through the 4th-grade Whatsapp group, and then students practiced interviews, practiced batik, drew, made traditional food with family, and sociodrama. Activities that have been completed and carried out by students were sent back via the Whatsapp group media. If students had social media such as youtube, google clasroom, and Instagram, assignments could be uploaded through students' social media then the link was shared with the teacher to be checked and given an assessment.

Learning Media Development

The results of the workshop showed that the selection of media formats was based on existing facilities in schools such as LCD and the internet that support the creation and use of media. Media production was carried out by reviewing the curriculum and compiling a flowchart of the media to be produced. The material to be delivered must be in accordance with the syllabus and lesson plans used. The initial product design on the media contained the theme and logo information. The results of the content and presentation assessment obtained a good category after improvements were made to the media based on revisions from material experts. Assessment of media experts by providing a questionnaire containing an assessment of appearance, audio, ease, and effectiveness using a range of values from 1 to 4 with categories of less, enough, good, and very good. Media products that have been tested in small groups online and offline to get appropriate media results were then carried out in wider trials at predetermined schools, namely Taman 01 Elementary School and Pilangbango Elementary School, Madiun City. The reason for choosing the school was because the school was located in the middle of the city, had complete infrastructure facilities, and carried out online and offline learning using media and learning applications. This wider trial was the implementation of the application of media in learning after revisions and improvements had been made to the product.

The effectiveness test was carried out at Nambangan Kidul 03 Elementary School as an experimental class or an animation media class. Klegen 01 Elementary School, Kanigoro 01 Elementary School, and Pangongangan 02 Elementary School control classes and apply YouTube, PowerPoint, and image media. The three groups were then given a posttest and then the differences were calculated using the one-way anova. The results of statistical data processing were as follows. The data for the balance test was obtained from the student's daily scores before the action research was carried out. The test statistic used was the F test at a significance level of $= 0.05$, which could be explained in the following Table 4.

Table 4
Balance Test on Effectiveness Test

ANOVA

Media

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	118,692	3	39,564	3.105	.029
Within Groups	1478,300	116	12,744		
Total	1596,992	119			

The results from Table 4 showed that the significance value shows a value of 0.29 which was greater than 0.05. This means that at a significance value was 0.05. Ho was accepted and there was a difference in reading comprehension in elementary school which was used as the experimental group, namely animation media. The control group was YouTube, ppt and image media, so it could be concluded that the initial ability of student was same. The results of the normality test with one sample Kolmogorov showed that the significance value of the normality test for all classes was greater than 0.05 so that the data in all classes were normally distributed or it could be concluded that the samples come from a normally distributed population. Homogeneity analysis using the Lavene test could be seen as follows.

Table 5
Test of Homogeneity of Variances

Media

Levene Statistics	df1	df2	Sig.
2,059	3	116	.109

The learning to read with different media from the experimental and control classes could be examined in the following Table 6.

Table 6
Comparison of Learning Outcomes of Animation Media, Youtube Media, PPT Media and Picture Media

Descriptives

Media

	N	Mean	Std. Deviation	Std. Error	95% confidence interval for Mean Lower Bound	Upper Bound	Minimum	Maximum
Animation	30	67.03	4.398	.803	.029			
Youtube	30	66.87	3.665	.669	65.50	68.24	58	73
PPT	30	65.40	2,966	.542	64.29	66.51	59	70
Picture	30	64.67	3.066	.560	63.52	65.81	60	70
Total	120	65.99	3.663	.334	65.33	66.65	56	76

The results from Table 6 revealed that the comparison of learning outcomes among the animation media group and the YouTube e-media group, PPT media, and image media. The average value of the animation media group was 67.03, YouTube media was 66.87, PPT media was 65.40, and image media was 64.67. The lowest value was 56, the highest value was 76, and the standard deviation of each group. Apart from that, the average value of the animation media group had the highest score compared to the average value of the YouTube, PPT, and image media groups. Bivariate analysis at this stage was carried out to test the differences in reading comprehension learning outcomes between the virtual animation media group and the YouTube, PowerPoint, and image media groups. This was done using the one-way ANOVA test, and it could be stated that the results are significant.

Table 7
Analysis of The Difference Between Animation Media and 3 Other Media

					95% Confidence Interval	
Multiple Comparison						
Dependent Variable: Media						
Tukey HSD						
(I) SD	**(J) SD**	**Mean Difference (IJ)**	**Std. Error**	**Sig**	**Lower Bound**	**Upper Bound**
Animation	Youtube	.167	.922	.998	-2.24	2.57
	PPT	1,633	.922	.292	-.77	4.04
	Picture	2,367	.922	.055	-0.4	4.77
Youtube	Animation	-167	.922	.998	-2.57	2.24
	PPT	1,467	.922	.388	-.94	3.87
	Picture	2,200	.922	.085	-.20	4.60
PPT	Animation	-1.633	.922	.292	-4.04	.77
	Youtube	-1.467	.922	.388	-3.87	.94
	Picture	.733	.922	.856	-1.67	3.14
Picture	Animation	-2,367	.922	.055	-4.77	.04
	Youtube	-2,200	.922	.085	-4.60	.20
	PPT	-.733	.922	.856	-3.14	1.67

The Table 7 showed that there were differences in experimental or animated media on the results of learning to read comprehension in the posttest group, between the experimental group, namely the virtual animation media group, and the control group or other media groups or vice versa. This could be seen through the significant value in the results of Tukey's further test.

Learning to read in elementary schools must be oriented to students' language skills. Learning to read must be done in stages starting from providing motivation to read courage, seeing students' reading abilities and weaknesses, modeling reading and providing examples, and explaining reading strategies (Nuttall, 1996). By implementing learning to read in stages, children's reading abilities can be formed gradually so that must be done by interaction between teachers and students (Fauzan et al., 2022; Beauty et al., 2023; Hendaryan & Noviadi, 2023). Teachers need to provide reading lessons that involve identifying text-based evidence to support conclusions. Research findings about learning to read in grade 4 elementary schools in Madiun city showed that many students do not read the text given by the teacher during online learning. Online test results prove that students' reading is still low. McLaughlin & Fisher (2012) explained that students who cannot read well enough to understand the material will not magically develop the ability and strategies reading necessary for them and analyze complex texts independently. The reading abilities of students in grade 4 are lower as seen from the average reading value in terms of reading comprehension aspects and interest in reading texts (Setiawan et al., 2021; Setiawan et al., 2023). Guthrie's research results show that the reader's self-ability can be improved by reading (Guthrie et al., 1999). Good readers can understand and face difficult and challenging texts (Schunk, 2003).

Teaching and learning activities that occur in virtual classrooms often make communication deviations and errors occur. So learning is not optimal and less effective, making students bored and prefer to play with their gadgets. One effort to overcome this is by using interesting animated media, according to student needs and according to learning objectives, which can be used online or offline. Because according to Polizzi (2020), in learning to use media, the ability to evaluate online content is needed. Research findings concluded that the problems faced by teachers in using learning media are the lack of socialization of making learning media teachers, the limitations of interesting media used by teachers, especially in learning to read to determine the level of student understanding in critical reading in accordance with the material. and student characteristics in the curriculum and basic competencies. The problems faced by teachers are also related to the content of the material in the YouTube learning media used by teachers. Any differences that may exist are usually a consequence of the teacher's involvement and commitment to the learning process of the institution

(Díaz & Entonado, 2009; Stonebraker & Hazeltine, 2004). There is an overlap between the media on theme 1 and theme 7 which are both culturally charged. So that the media used by the teacher is more practical. Problems faced by students, teachers use more media than YouTube for assignments, and there are no reading activities that are followed up on the results of observing the media. The teacher uses the Zoom and Google Meet applications to explain the material in the students' thematic books. This is in line with the opinion of Musfiqon (2012) which explains that guidelines in choosing media must be in accordance with the principles of effectiveness and efficiency, namely principles related to the success of the learning process to achieve goals with minimal cost, time, and facilities. By using virtual animation media, students can directly see, and hear simultaneously. This is supported by the cognitive theory of multimedia learning, which explains that learners process information through visual channels. This is in line with research conducted by Sahasrabudhe & Kanungo (2014) which states that the use of information technology through e-learning program media is for learning effectiveness. The difference with this research is in the media used in learning.

Animated media in learning is interesting for students, this is in line with Rasiwan et al., (2023) who developed 3D animation media in mechanical engineering learning. Meanwhile, Tetriyani et al., (2024) developed Powtoon animation media in learning for junior high school students. In this research, the development of animation media is similar but the subjects are different, namely elementary school students.

CONCLUSION

Research findings from preliminary studies, trials, and effectiveness tests concluded as follows. The conditions for learning to read in elementary schools were carried out by students according to thematic books. Learning to read was done by giving assignments in groups in the form of answering questions. The needs and characteristics of learning media could be summarized as follows, (1) interesting animated media for learning to read by the basic competencies in the curriculum, (2) animated media containing local wisdom that fits the theme and student environment, (3) easy to use, (4) equipped with an evaluation to measure students' reading comprehension. Meanwhile, during online learning, the characteristics of the media used by the teacher were easy, usable, and fast. Virtual animated media products containing local wisdom to improve students' reading comprehension in grade 4 were worthy of being used as offline and online learning media. It was based on the validation results of the media and material as well as the results of reflection and discussion from stakeholders, namely school principals, and teachers. In addition, the feasibility was seen from the results of the trials and extensive tests carried out. The results of increasing reading comprehension were seen from the assessment of the evaluation results consisting of the suitability of the main sentence, explanatory sentence, language, and attractiveness/tidiness of the mind mapping that had been done by students. Virtual animated media has effectiveness in improving reading comprehension through the mind mapping method for 4th graders which was a combination of audio-visual and visual that can be used in thematic learning in 4th grade. The effectiveness test also aimed to measure effectiveness of virtual animation media containing local wisdom on learning reading comprehension through the mind mapping method.

The implications of developing virtual animated media containing local wisdom for reading and understanding through the mind mapping method is an effort to answer the problems faced by users, namely, teachers and students regarding the needs and characteristics of interesting media according to the cultural diversity around students so that they know and appreciate local culture. Virtual animation media containing local wisdom can build an attitude of respect for the regional culture and provide cultural understanding and awareness of the culture around students that needs to be used as learning material. Knowing local culture has implications for the character of students to appreciate and participate in preserving it by getting to know, studying, and being proud of the local culture in the students' areas.

DECLARATIONS

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