# The Effects of Integrating Folklore and Mixed Reality toward Student's Cultural Literacy

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## Abstract

Cultural literacy is a very important vehicle in strengthening the identity of a nation. Without cultural literacy skills, students will lose their identity and be uprooted from their character even though character education is the main program being promoted by the government. To overcome this, folklore as a literary work that is full of cultural values and local wisdom should be strengthened in its learning. One of the steps taken in this research is to use mixed reality-based media to teach folklore in elementary schools. This experimental research was conducted in 16 elementary schools in six districts in West Java involving 418 students. Cultural literacy skills were measured by valid and reliable instruments. The results of this study indicated that the use of mixed reality folklore media can improve students' cultural literacy skills. The dimension of cultural literacy that increased the most was the dimension of cultural knowledge, while the dimensions of cultural attitudes and behavior did not increase much. Therefore, by implication, the proposed mixed reality folklore media can be used to improve students' cultural literacy skills in West Java.

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## 1. Introduction

Cultural literacy is an important literacy in human life today. It is required to face the relentless stream of global culture that has the potential to erode local and national culture. Furthermore, cultural literacy is seen as the link between generations so that new and future generations do not lose their way in life. In the Indonesian context, cultural literacy is an important medium for people to maintain Indonesian culture as an enduring national identity.

Despite its great importance, cultural literacy is starting to be forgotten. In fact, it is vital to realize the role of the younger generation in aspects of national development. Younger generations have superior personalities and are equipped to understand the knowledge and technology necessary to compete locally and globally. There are two factors contributing to low literacy, namely the lack of reading materials and literacy practices. The lack of reading materials and inadequate literacy practices are deemed as factors causing the low literacy of the Indonesian people. Cultural literacy refers to an individual's worldview, way of interacting with people, character, personal ethics, values, and lifestyle (Hui & Cheung, 2015). Cultural literacy can also be defined as a context of cultural awareness (Dean, 2017; Linares, 2016; Liu et al., 2007; Schaefer & Lynch, 2017; Shulsky et al., 2017).

Cultural literacy started with the concept of cosmopolitanism, namely as an embodiment of one's identity (ethnic, national, and cultural) and cultural capital accumulated through experience with the educational process (Johnson, 2014). Furthermore, cultural literacy has been used in the development of various perspectives in the teaching process (Mason & Giovanelli, 2017; Reygan & Steyn, 2017). Cultural literacy is a skill that can be honed as the result of understanding and applying inherent skills and concepts. In addition, it can be defined as a process of social interaction in communication and collaboration with local communities (Ochoa et al., 2016). It can be understood that by having cultural literacy skills, a person can improve their social interactions and knowledge of the prevailing norms around them.

One of the ways to build students' cultural literacy is to use folklore as literature teaching materials in schools. Folklore is part of the culture that exists in every region, which is a cultural characteristic of that area. Folklore contains norms of social life based on local customs. Folklore originates from the oral tradition of the people, laden with messages of values and morals that one generation wants to convey to the next generation (Baiduri & Khairani, 2018). Folklore can be used as a means to guide children to behave because they contain a lot of advice that can be used as life lessons. Folklore-based learning is a kind of learning paradigm that lies where students learn by solving problems embedded in almost real situations (Lee et al., 2006).

Folklore is considered to be the earliest form of literature in all human cultures. This covers all beautiful traditions, some of which are verbal in nature and practiced by cultures and subcultures (Buragohain et al., 2019). Therefore, it is important to teach folklore to students as well as develop student's cultural literacy. Through folklore, it is not only 'students' cognition that is sharpened but also their cultural sensitivity. This is reinforced by the statement explaining that folklore has inherent vitality in the indigenous population and the strength of the local language. At the same time, it reveals the life and spirit of ordinary people and depicts their emotions and ways of thinking (Farr, 1940). In addition, learning folklore can improve 'students' cognitive abilities and, at the same time, foster their cultural awareness (Agbenyega et al., 2017).

However, these days learning folklore is considered by students to be uninteresting and boring. Folklore is thought to contain stories that no longer fit life in the 21st century. Students are more interested in modern literary works from abroad presented in the form of films or comics. In fact, they believe that it is not important to learn folklore. Seeing this fact, there needs to be an effort by teachers to carry out folklore learning in schools.

One way is to package folklore in a more modern way to appeal to students. That way, passion, and interest are expected to grow in children towards Indonesian folklore with cultural values. One modern technology that can be used to introduce folklore is mixed reality (MR) which combines virtual reality

(VR) and augmented reality (AR). This type of technology was chosen on the ground that it is modern, interesting, and challenging for children.

Based on the above elaboration, this study implemented MR in folklore learning. The main objective was to improve students' cultural literacy both in the realm of knowledge and in the realm of attitudes toward culture. Therefore, Folklore MR was used for packaging folklore teaching materials as a means of innovation in learning so that learning folklore is not only limited to using textbooks that students have considered boring.

## 2. Theoretical Framework

### 2.1. Cultural Literacy

Conceptually, cultural literacy can be seen as a dialogic social practice that involves various alternative perspectives. In this case, it is a dialogic perspective that warrants high tolerance for ambiguity characterized by a positive, flexible, and open attitude towards uncertainty (Cook, 2022). In the context of Indonesia, cultural literacy is the ability to understand and behave towards Indonesian culture.

Cultural literacy is just as important for students as it is for teachers. A study showed that teachers who have less knowledge about students' cultural differences tend to have cultural prejudices. As a result, the teacher does not communicate well with the parents of students, and the teacher will be less sensitive to the culture in the classroom (Kale, 2022).

Cultural literacy is instrumental in the development of one's self-reflection. It functions as introspective information that will develop in a multicultural workplace setting. Students with strong cultural literacy will show their faculty in understanding information, finding and understanding the meaning of race, privilege, and intersectionality between them by navigating through their own cultural identity. Such students will be able to become important agents of change in efforts to increase community inclusivity (Singh, 2022).

Grasp in cultural awareness not only affects one's behavior but also supports the attainment of other literacies. In fact, a study has shown that cultural awareness invokes chemical

literacy in chemistry lesson in schools that uses an ethnopedagogic approach (Rahmawati, 2021). Therefore, nurturing cultural literacy, apart from being aimed at forming students' love for culture, is furthermore very important for developing their competence in various fields of knowledge.

The most urgent role of cultural literacy concerns the effect of globalization on younger generations. Globalization has brought about changes not only in economic, social, and technological order but also in the mentality of people and the way they interact with the world around them. Experts even agree that educational institutions must be able to carry out the learning process by taking into account the multiculturalism of students and continuing to improve students' cultural literacy (Shliakhovchuk, 2021).

### 2.2. Folklore

Folklore is part of a culture that exists in every region and becomes the cultural characteristic of the region. It contains norms of social life based on local customs. There are five concepts of folklore that center on performance with concrete implementations, namely: (1) redefinition of linguistic competence and linguistic community; (2) the view of the text that emerges from the social structure spoken; (3) emphasis on locally determined norms and rules for linguistic behavior; (4) the role of tradition and innovation in folklore; and (5) feminist critique and folklore revision (Morgan-Fleming, 1999).

Folklore consists of a large collection of literature that proves to be of interest to readers. Most of the folklore are presented in direct and simple manners, combining actions and colorful characters that appeal to readers from all levels. It can be used as an educational medium to deliver lessons to students in order to facilitate the teaching-learning process. It can function as a strategic medium to convey brilliant ideas in all aspects of life. It is a vehicle to achieve goals in understanding various aspects of life (Palmer & Davis, 1990).

Folklore as an educational medium is applicable in various disciplines, though its use must correspond to the learning contents to be delivered. The use of folklore helps students understand what is being taught. In its function as an educational medium, folklore functions as

an instrument that stimulates individual thoughts, attention, feelings, and willingness to engage in the learning process (Endraswara, 2013).

## 2.3. Mixed Reality

VR has been shown to have great potential and play an important role in education. MR is a hybrid that combines physical and virtual elements. To refine and improve education systems, communication between instructors and students in class during the learning process is of great importance. Currently, 3D model presentation using MR technology can be used to avoid misinterpretation that may occur with spoken and 2D models. As an independent MR concept and application, MR combines the best of both worlds from VR and AR(Kounlaxay, 2020). VR/MR has been shown to be effective in improving the learning attitudes of middle school students (Tang, 2020).

In science, MR is popular among experts. It is used to present learning materials. Research regarding the packaging of learning materials in the form of MR aims to explore whether the integration of VR and ARused in specially designed science books can improve student learning outcomes of science concepts. The results show that the use MR as a complement to learning in printed books can improve student learning outcomes, especially for students with low spatial abilities (Weng, 2019).

The use of MR as teaching materials is also found among researchers in mining engineering. Teaching materials presented using MR are seen as a way to make difficult materials easier for students to understand. By combining AR and VR, it is possible to overcome current challenges in mining education in an innovative way. This virtual application makes impossible and dangerous situations accessible to students. Classic paper-based teaching materials are enriched with AR content and translated into pedagogical and didactic coherent manuals for integrative use in the classroom. The results of this study prove that AR and VR can be integrated effectively into teaching (Daling, 2020).

In line with several previous studies, the use of MR in language teaching, folklore in particular, has not been found, despite its proven effectiveness in improving learning outcomes and even students' skills in various disciplines. In line with this fact, the researcher saw this void and tried to apply MR in folklore learning to improve 'students' cultural literacy.

## 3. Methodology

### 3.1. Participants

This research was conducted in 6 districts/cities in West Java. The districts/cities where the research was conducted were Bandung Regency, Bandung City, Garut Regency, Ciamis Regency, Sumedang Regency, and Tasikmalaya City. Location selection is made directly based on the presence or absence of teachers who understand the concept of MR.

The study was conducted in 16 elementary schools in West Java, 8 as the experiment class and 8 as the control class. The samples were fifth-grade elementary students from 16 schools, totaling 418 students. The sample was selected nonrandomly, only based on the location of the school. Their average age was estimated to be between 9-12 years. Due to the limitations of the authors, the sampling technique used was nonrandom sampling (purposive sampling). In this technique, the research subjects were visited according to their place of residence. Working closely with teachers, the researchers designed and conducted the study taking into account the diversity of school locations. In detail, the demographic data of the participants in this study are presented in Table 1 as follows.

**Table 1**
*The Demographic Data of Participants*

| Demografik Partisipan | | n | % |
|---|---|---|---|
| Age | 9 | 2 | 0.48 |
| | 10 | 14 | 3.35 |
| | 11 | 360 | 86.12 |
| | 12 | 42 | 10.05 |
| Gender | Male | 164 | 39.23 |
| | Female | 254 | 60.77 |

| | | | |
|---|---|---|---|
| | Bandung City | 64 | 15.31 |
| | Garut Regency | 68 | 16.27 |
| Location | Ciamis Regency | 74 | 17.70 |
| | Sumedang Regency | 72 | 17.23 |
| | Tasikmalaya City | 67 | 16.03 |
| | Bandung Regency | 73 | 17.46 |

### 3.2. Instruments

This was a quantitative study using an experimental method with quasi-experimental and pretest-posttest designs. This design was chosen due to the absence of random choices. In this study, 8 classes were given a pretest (O1), then treatment (X), and then a posttest (O2) (Fraenkel et al., 2012).

The instrument used to collect data was an assessment of cultural literacy, covering three domains, namely knowledge, attitude towards culture, and cultural behavior. The instrument used in the study uses a Likert scale with a score between 1-5 in its measurement. The instrument of this study was first tested for reliability and validity. The reliability test was performed using the split-half method, whose results showed a reliability value on each variable are (r) of 0.800, 0.79, and 0.71, indicating that the instrument items were reliable. The validity test showed that some of the instrument items were not valid (smaller than 0.07), and they were excluded from this study to ensure that the instrument was valid. The instrument (questions and possible answers) is given as follows.

**Table 2**
*Research Instruments Tests and Questionnaires*

| No. | Questions | Possible answers | | | | Skor |
|---|---|---|---|---|---|---|
| **Knowledge** | | | | | | |
| 1. | Do you think cultural values are important? Give a reason! | Not at all / A little / Somewhat / A lot | | | | 10 |
| 2. | What cultural values are now fading? | Not at all / A little / Somewhat / A lot | | | | 10 |
| 3. | What causes the melting of cultural values? | Not at all / A little / Somewhat / A lot | | | | 10 |
| 4. | What folklore around you do you know? | Not at all / A little / Somewhat / A lot | | | | 10 |
| 5. | Mention the cultural values of one of the folks that you know. | Not at all / A little / Somewhat / A lot | | | | 10 |
| **Attitude** | | Options | | | | |
| | | SA | A | N | DA | SD |
| 1. | Our nation has good cultural values | | | | | |
| 2. | Cultural values are important to be preserved | | | | | |
| 3. | We must apply cultural values in everyday life | | | | | |
| 4. | Folklore contains cultural values that can be imitated | | | | | |
| 5. | I like folklore from my own country more than from abroad | | | | | |
| 6. | Reading folklore is boring because it isn't interesting | | | | | |
| 7. | One of the ways to preserve our culture is to enjoy reading folklore | | | | | |
| 8. | Politeness is one of our cultural values | | | | | |
| 9. | Greed is an example of good behavior | | | | | |
| 10. | The culture of cooperation is an example that must be applied when taking the test | | | | | |
| **Behavior** | | Options | | | | |
| | | A | O | N | S | N |
| 1. | I do my job seriously | | | | | |
| 2. | I am honest about everything with my parents | | | | | |
| 3. | I help friends who are having trouble | | | | | |
| 4. | I do group work alone | | | | | |
| 5. | I read folklore in the library or at home | | | | | |
| 6. | I prefer reading foreign comics over folklore | | | | | |

| 7. | I feel I work harder than my friends in the group | | | | | |
|----|---------------------------------------------------|---|---|---|---|---|
| 8. | I helped a friend who had trouble doing the test | | | | | |
| 9. | I wash the dishes after eating | | | | | |
| 10. | On Sundays, I spend time playing instead of helping mom/dad | | | | | |

### 3.3. Procedure

#### 3.3.1. Data Collection

This study began with conducting initial measurements using a test for the students. In the next stage, four learning sessions were provided to the students. Learning was carried out using the problem-based learning model using MR media of folklore. In the last stage, measurements were made using a test consisting of three research variables, namely knowledge, attitude towards culture, and cultural behavior. The respondents were assisted by the researchers and their homeroom teachers to help their understanding in filling out the questionnaire.

The learning process was completely delegated to the teachers. The teachers, before carrying out learning, took part in learning workshops organized by the researchers so that they understand the research objectives and master the learning process that has been designed by the researchers. In the final stage, a posttest was carried out by the teachers without the presence of the researchers, and the researchers only received the research data.

Learning in the experimental class was carried out four times. In the first session, the teachers presented a number of cases regarding cultural values in Indonesia. Students were asked in groups to find several cases of the fading of cultural values in the younger generation in Indonesia. At the end of the session, students compiled a report on the cultural value crisis in Indonesia. During the second session, students were presented with cases about the importance of preserving value culture. Students in groups were asked to present their perceptions of local culture that has cultural values. In the next stage, students witness folklore through MR. At the end of the session, students were tasked with writing simple essays on the importance of folklore for the development of cultural literacy.

The third session began with presenting cases on how to package folklore so that it remains attractive to children. Then, students returned to witnessing folklore through MR. After using MR, students are asked to state the importance of technology for the preservation of cultural values. Students also discuss what cultural values are contained in the folklore they have seen. At the end of the session, students were tasked with writing simple essays on how to love folklore and apply cultural values in everyday life. During the fourth session, the students were again treated to folklore through MR. They presented in groups their attitude towards folklore and the cultural values it contains. At the end of the session, students were tasked with writing simple essays on efforts they could make to continue to maintain cultural values in their lives.

The learning process in the control class is almost the same as learning in the experimental class. Learning in the control class was carried out using a problem-based learning model. The number of treatments carried out was the same, namely four times the action. The difference only lies in the use of media, if the experimental class used MR folklore media while the control class used picture storybooks (folklore comics).

#### 3.3.2. Data Analysis

The hypothesis of the study was tested, namely the effectiveness of the use of MR on 'students' cultural literacy skills. The tests were performed using SPSS 20 for Windows. This study investigates if the use of MR has an effect on the cultural literacy skills of fifth-grade elementary school students in West Java. With this analysis, the researchers were able to proceed to the data interpretation process and discussion (Coladarci & Cobb, 2013).

### 4. Results

The study was conducted through several stages. In the first stage, a pretest was conducted on knowledge, attitude toward culture, and cultural behavior. Afterward, the experimental classes received four learning sessions with the main instructional media MR folklore. Then, the posttest was conducted for the class. The research data are presented in Table 3 as follows.

**Table 3**
*MR Folklore Implementation Trial Results*

| Group/Variable | Pretest | Posttest |
|---|---|---|
| *Experiment* | | |
| Knowledge Cultural | 12.39 | 40.89 |
| Attitude | 15.51 | 34.71 |
| Behavior | 12.09 | 31.81 |
| Cultural Literacy | 39.99 | 107.41 |
| *Control* | | |
| Knowledge Cultural | 12.12 | 24.93 |
| Attitude | 15.62 | 20.34 |
| Behavior | 12.05 | 16.65 |
| Cultural Literacy | 39.79 | 61.92 |

Table 3 shows that the data generated in this study were cultural literacy data from 418 students from 16 schools in West Java. Cultural literacy data were built upon three components, namely cultural knowledge, attitude towards culture, and cultural behavior. The unity of the three data forms cultural literacy data. Measurements were made on students twice, namely the pretest, which was carried out before learning using MR folklore, and the posttest, after students had received four lessons using MR folklore. In each learning, different MR folklore were used, namely Situ Bagendit, Sangkuriang, Kalapa Genep, Tampomas, and Ciung Wanara.

Between the pretest data and posttest data difference in mean was found. The mean during the pretest was relatively lower than the mean during the posttest. To test the difference, a two-mean difference test in each data group was performed. The test began with analysis prerequisite testing, whose results are presented in the following Table 4.

**Table 4**
*Data Normality Test of One-Sample Kolmogorov-Smirnov Test*

| Variabel | Kolmogorov-Smirnov Z | Asymp. Sig. (2-tailed) | Interpretation |
|---|---|---|---|
| Cultural Knowledge | 2.667 | 0.57 | Normal |
| Cultural Attitude | 2.021 | 0.12 | Normal |
| Cultural Behavior | 2.495 | 0.68 | Normal |
| Cultural Literacy | 3.106 | 0.94 | Normal |

The data in Table 4 above show that all research data, both the primary variable cultural literacy or the sub-variables cultural knowledge, cultural attitude, and cultural behavior, had a normal distribution. It is shown by the Kolmogorov-Smirnov test with an Asymp. Sig (2-tailed) value is higher than the alpha value.

Based on these results, then different tests were carried out on all the variables studied. The test results are as follows.

**Table 5**
*Results of the Difference Test*

| Variables | Statistical Results | | | | |
|---|---|---|---|---|---|
| | f | Sig. | t | Sig. | Mean Difference |
| Cultural Knowledge | 3.758 | .053 | 23.834 | .000 | 15.957 |
| Cultural Attitude | 2.675 | .103 | 31.007 | .000 | 14.364 |
| Cultural Behavior | 1.340 | .248 | 36.463 | .000 | 15.163 |
| Cultural Literacy | 3.701 | .054 | 46.497 | .000 | 45.483 |

Table 5 above shows that the cultural knowledge data were homogeneously distributed. It is evidenced by Levene's test with an F value of 3.758 with a significance level of 0.053, greater than the alpha value (0.05). After determining that the data were homogeneously distributed, a mean difference test was conducted, producing a t-value of

23.834 with a significance value of 0.00, lower than the alpha value (0.05). Based on these results, it can be concluded that the mean of students' cultural knowledge between the two classes learning has a difference of 15,957 positive points, meaning that their cultural knowledge improved after the folklore learning using the MR Folklore media.

The cultural attitude data were homogeneously distributed. It is evidenced by Levene's test with an F value of 2.675 with a significance level of 0.103, greater than the alpha value (0.05). After determining that the data were homogeneously distributed, a mean difference test was conducted, producing a t value of 31.007 with a significance value of 0.00, lower than the alpha value (0.05). Based on these results, it can be concluded that the mean of students' cultural knowledge between the two classes learning has a difference of 14,364 positive points, meaning that their cultural attitude improved after the folklore learning using the MR Folklore media.

The cultural behavior data were homogeneously distributed. It is evidenced by Levene's test with an F value of 1.340 with a significance level of 0.248, greater than the alpha value (0.05). After determining that the data were homogeneously distributed, a mean difference test was conducted, producing a t value of 31.007 with a significance value of 0.00, lower than the alpha value (0.05). Based on these results, it can be concluded that the mean of students' cultural knowledge between the two classes learning has a difference of 15,163 positive points, meaning that their cultural behavior improved after the folklore learning using the MR Folklore media.

The data in Table 5 above show that the cultural behavior data were homogeneously distributed. It is evidenced by Levene's test with an F value of 3.701 with a significance level of 0.54, greater than the alpha value (0.05). After determining that the data were homogeneously distributed, a mean difference test was carried out, producing a t Equal variance not assumed value of 46.497 with a significance value of 0.00, lower than the alpha value (0.05). Based on these results, it can be concluded that the mean of students' cultural literacy between the two classes learning has a difference of 45,483 positive points, meaning that their cultural

literacy after folklore learning using the MR Folklore media bigger than using comics.

## 5. Discussion

This study was motivated by the need to enhance students' cultural literacy. The reason is the fact that cultural literacy is an important literacy in human life today. One way to achieve that is through the field of education by using folklore as literature teaching materials in schools. Efforts to cultivate students' cultural literacy are carried out through learning. Attractive learning should also use attractive media. Therefore, this study used MR as the learning medium. MR coupled with a good learning process is expected to enhance students' cultural literacy.

Based on the results of the data processing above, it can be said that, in general, the MR Folklore developed can improve students' cultural literacy. Improvement was observed across all cultural literacy dimensions, whether cultural knowledge, attitude towards culture or cultural behavior. The increase in cultural literacy, in general, was 45 463, while the increase in cultural knowledge was 15,957, the increase in cultural attitudes was 14,364, and the increase in cultural behavior was 15,163. The reason for this is that knowledge is easier to change than attitudes and behavior.

The success of folklore learning using MR is influenced by a number of factors. One of the primary factors is that MR has the ability to present real VR that can help students build their perception of the object being explored. MR is the result of mixing the physical world with the digital world, enabled by technological advancement. MR is the next evolution in interactions between humans, computers, and the environment. AR uses a virtual model of the real world, assisted by a computer, to view the real environment through a special display device. The use of AR increases participants' understanding according to certain criteria and can be adopted as a learning method (Aziz, 2020).

Based on the description above, students can virtually interact directly with folklore. In general, experts agree that the most important development of technology in the field of education is primarily related to the ability of this technology to create an educational

environment, namely reality technology. There are three important reality technologies, namely VR, augmented reality, and MR. MR is a combination of virtual and augmented reality; it is the reality technology that has the most influence on learning outcomes (Sinoplu & Yilmaz, 2021).

The use of MR directly facilitates students' needs in learning. At the minimum, with its use, students can learn both auditorily and visually. Both learning styles complement each other, enhancing students' skill levels. Although AR and VR, in general, have been shown to have different impacts on students' abilities, the use of MR can complement each other. Thus, it can be argued that VR is a technology that uses visual modalities that will build students' experiences, and AR uses auditory modalities that can be used to build student cognition. The combination of AR and VR, called MR, is a technology that can help students learn with their multimodal concepts (Sinoplu & Yilmaz, 2021).

The use of mixed reality in learning has actually grown and boosted students' self-efficacy. Students are motivated to learn and enthusiastic about watching and exploring objects presented in MR. Despite the time limit for watching VR shows, the MR media in this study was packed into a 15-minute show, far below the maximum limit that has been tested, which is 30 minutes. The implication of this is that MR developers must develop MR for learning with a duration of fewer than 30 minutes so that students' self-efficacy can be maintained. (Gundel et al., 2019).

In line with that, other studies have also found that learning in virtual and mixed environments produces levels of performance similar to traditional learning. Participants reported higher levels of engagement in the VR and MR conditions compared to the traditional learning conditions and higher levels of positive emotions in the VR conditions. In any case, VR produces a heightened sense of presence that MR. All things considered, the findings show a number of benefits from using VR and MR for education (Allcoat, 2021)

The improved cultural literacy as the learning outcome of folklore learning is inseparable from the improved student's learning motivation. During the study, students were very enthusiastic about using the device containing the MR program. MR evokes 'students' curiosity and encourages students to actively discuss after watching folklore long before the discussion session begins. This condition is in line with the finding of previous studies, concluding that MR is able to display visual, interactive, and realistic ways to convey complex or abstract learning content. The use of MR in learning is able to generate student motivation. The combination of these two trends is a harmonious combination capable of forming a gamification concept, thereby increasing student learning success (Schiffeler, 2019).

Mixed reality-based folklore learning has been shown to be an effective way to enhance the process and outcome of learning. This indicates that this technology will be a widespread trend in the future. The design and implementation of VR, AR, and MR have various scenarios so that this application can be not only used in ordinary schools but also for inclusive engineering, and medical schools. VR, AR, and MR also perform very well in knowledge presentation and assessment. Game-based and visualization learning processes make it easier for students to receive and acquire knowledge. Therefore, the construction of a virtual learning environment plays an important role in the learning process. This condition of course requires high technological literacy for both teachers and students (Zhang, 2020).

In line with the findings above, a long-term study conducted between 2006 and 2017 on the use of VR AR, or MR technology in teaching students in elementary, middle, or high schools has also been conducted. This study revealed common themes, including critical thinking, collaboration, attitude, communication, motivation, learning, engagement, performance or achievement, and technology (used or proposed). This literature study contributes to the field by providing clarity on definitions of VR, AR, and MR technologies with educational use in mind, presenting an overview of existing research on VR, AR, and MR specifically for K-12 educational settings and identifying future research needs and directions (Maas, 2020).

In fact, based on several studies, MR in the learning process can improve students' thinking and reasoning skills, create collaborative learning, as well as develop conceptual

knowledge (Tolentino et al., 2009). Furthermore, the opportunities for meaningful learning through the use of MR are exciting, and there is value in exploring the facilities of this learning opportunity through the redistribution of cognitive load (Essmiller et al., 2020). Therefore, the use of MR in learning should improve various aspects of students' skills. In addition, the implementation of MR can support the STEM learning approach (Barrett et al., 2018; Yannier et al., 2020).

In line with the elaboration above, various studies have utilized MR in primary and secondary education (K-12). However, there is relatively no explicit focus on the large number of studies that were systematically reviewed to present and suggest the educational benefits of MR technology for education. Other studies have also been successful in informing educators and scholars about the insights and evidence gained from previous findings on current research, thereby contributing to scientific knowledge and innovation using MR environments in different learning subjects. Finally, MR has the potential to influence student engagement, skill acquisition, participation, and embodied learning experiences for knowledge transfer in the context of well-structured instructional designs (Pellas, 2020).

One of the weaknesses of this research is the limited scope of the research area and the limited number of developed folklore that only originates from West Java. Therefore, future researchers can package folklore that exists in various regions in Indonesia and its application in various regions. In addition, psychological aspects and the readiness of teachers and students to use MR in the learning process still need to be studied. Another concept that needs to be studied is the emo-sensory load of the class environment in light of the MR (Akbari & Pishghadam, 2022; Naji Meidani et al., 2022; Pishghadam et al., 2022). It happens that the environment may positivize emotions making students behave differently, which needs to be examined in further studies (Al-Badi & Khan, 2022).

Based on our study and data analysis, this study concludes that MR has a significant effect on students' cultural literacy skills. With the use of MR, their cultural knowledge, attitudes towards culture, and cultural behavior show improvement. The most significant improvement is observed in students' cultural knowledge. This shows that MR is proven to improve students' cognitive skills. Based on this conclusion, the implication of this study is that MR can be used in folklore learning to students' cultural literacy.

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