



## **Development of Virtual Reality Based Maritime Literature Learning: Exploring Madurese Local Wisdom in the Folklore of Jokotole**

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### **Abstract**

**Keywords:**

Virtual reality;  
Folklore; local  
knowledge

This study focuses on the development of Virtual Reality (VR)-based language learning media, literature, and teaching to enhance writing skills and facilitate the process of learning literature and local knowledge related to ships, naval warfare strategies, and understanding Jokotole stories while incorporating local wisdom. The research follows the Borg and Gall Research and Development model, consisting of seven stages: problem identification, information gathering, product design, product testing, design revision, design validation, and product revision. The developed learning media is intended for use on android or similar devices, utilizing a virtual box, and integrates Madurese local wisdom from folklore through VR technology. The research aims to address two main questions: (1) How to develop VR-based learning media for maritime literature that focuses on local wisdom related to sailing and naval warfare strategies in Jokotole folklore, and (2) What is the process of reading learning using VR media? The research findings include the development of a storyboard based on the Jokotole legend using unity software and limited to five events. The naval strategy incorporates the influence of the Jokotole figure and their authority. Furthermore, shipping technology and weapons involve the use of sickles, machetes, and whips, while the ship model (Cadik) functions as transportation. The study concludes that the process of learning literature using VR media enhances student enthusiasm and facilitates the formation of writing ideas. VR media is highly engaging for students and can be an alternative approach in literature learning, allowing for the reinterpretation of folklore content.

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### **Abstrak:**

**Kata Kunci:**

Virtual Reality;  
cerita rakyat  
Kerifan Lokal.

Penelitian ini berfokus pada pengembangan media pembelajaran bahasa, sastra, dan pengajaran berbasis Virtual Reality (VR) untuk meningkatkan keterampilan menulis dan memfasilitasi proses pembelajaran sastra serta pengetahuan lokal terkait kapal, strategi perang laut, dan pemahaman cerita Jokotole dengan menggabungkan kearifan lokal. Penelitian ini mengikuti model Penelitian dan Pengembangan Borg dan Gall, yang terdiri dari tujuh tahap: identifikasi masalah, pengumpulan informasi, desain produk, pengujian produk, revisi desain, validasi desain, dan revisi produk. Media pembelajaran yang dikembangkan ditujukan untuk digunakan pada perangkat Android atau sejenisnya, dengan memanfaatkan virtual box, dan mengintegrasikan pengetahuan lokal Madura dari

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cerita rakyat melalui teknologi VR. Penelitian ini bertujuan menjawab dua pertanyaan utama, yaitu (1) Bagaimana mengembangkan media pembelajaran berbasis VR untuk sastra maritim yang fokus pada kearifan lokal terkait pelayaran dan strategi perang laut dalam cerita rakyat Jokotole, dan (2) Bagaimana proses pembelajaran membaca menggunakan media VR? Temuan penelitian meliputi pengembangan storyboard berdasarkan legenda Jokotole menggunakan perangkat lunak Unity dan dibatasi hingga lima peristiwa. Strategi perang laut mencakup pengaruh tokoh Jokotole dan otoritasnya. Selain itu, teknologi perkapalan dan senjata melibatkan penggunaan celurit, parang, dan cambuk, sedangkan model kapal (Cadik) berfungsi sebagai transportasi. Penelitian ini menyimpulkan bahwa proses pembelajaran sastra menggunakan media VR meningkatkan antusiasme siswa dan memudahkan pembentukan gagasan menulis. Media VR sangat menarik bagi siswa dan dapat menjadi alternatif dalam pembelajaran sastra, memungkinkan reinterpretasi konten cerita rakyat.

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## INTRODUCTION

As a form of cultural heritage that is passed down from generation to generation, folklore has extraordinary elements of local wisdom. Madura as a maritime area has the potential to develop local wisdom which at that time was utilized by the community. Salt, tobacco, trade as well as technology and science are still being studied, but regarding maritime affairs, currently the focus on when and strategies for sea warfare originating from folklore is missing from literary research. The use of folklore literature in learning is one way for local wisdom to be used as an intangible heritage of noble knowledge. Talking about jokotole folklore, of course, we see Jokotole's story through its descriptive stories, while fiction, of course, we see through imaginative stories described in descriptive prose. Amil et al., (2019) stated that Jokotole is a figure that can be accepted by all levels of society compared to other figures in Madura. From Jokotole's story, we can read that the maritime literature in this research about the condition of Madura as an archipelago was told before people got to know the land. Madura has a sea background, the movement of people, goods, agricultural commodities, and livestock is moved by sea. Tourism is the sea. Children's greatest potential is the sea, living by the sea so that the knowledge of Madurese's children is good at swimming, fishing, trading, and good at surviving at sea.

Therefore, learning to write, especially about folklore in schools, needs to get more attention to accommodate efforts to preserve local wisdom (Setiani, 2020). However, today's interest in writing among school-age children in Indonesia tends to decline along with the rapid development of technology in the form of smartphones. Children prefer playing with gadgets rather than reading textbooks or writing. Ramaniar (2017) states that Indonesian children have been familiar with technology since they were young and are

familiar with sophisticated gadgets which indirectly affect their personality. This is also very influential on students' reading habits. Based on the fact that smartphone technology is developing so rapidly, its uses, and its positive impact on children's learning processes, the authors intend to research Virtual Reality (VR) media so that smartphones can be utilized optimally for learning to write. The VR used focuses on folklore sources, especially Madura. This is intended to attract children's interest as well as indirectly introduce them to history, local wisdom, various kinds of folklore, and culture.

Talking about maritime conceptually, it will discuss coastal life, social society, marine exploration science, maritime trade and economy, shipping, maritime-themed literature, maritime-themed art, and the social history of sailors and related communities. The entire region of Madura is an area surrounded by the sea, which underlies that from the sea and human life, Madurese culture is very potential, starting from knowledge, culture, and social life. Maritime is a configuration of the implementation of the values of maritime community life and the spirituality of its people (Aziz & Suhaimi, 2017). Maritime life is described in nautical-themed literary works. Madura must return to its origins looking at the sea as a true stretch of life.

Folklore is a type of oral literature that is prevalent in various regions of Indonesia. Initially, folklore was transmitted through oral culture, often depicted in the form of heroic tales portrayed through wayang performances and other forms of oral presentations. The essence of folklore aligns with Kristanto (2014) assertion that our ancestors in the past imparted ethical values through oral traditions, with folklore being one such tradition. Furthermore, according to Amil et al (2023) it is argued that identity can be explored through the moral values conveyed in written or oral literary works and can be used for character education among students. Our ancestors utilized folklore as a means to teach ethics to their children, as writing was not prevalent during ancient times, necessitating the oral transmission of knowledge. This tradition has been passed down from one generation to another, ensuring that future generations receive these stories through oral means.

According to Sukiman (2012), learning media has three main characteristics which include fixative, manipulative, and distributive properties. Fixative characteristics describe the media for recording, storing, preserving, and reconstructing an event or object. Manipulative nature is the transformation of an event or object because the media has the property of taking advantage of the sequence of events. Distributive characteristics allow an object or event to be moved through digital space, and at the same time, the

event is presented to a large number of students with relatively the same experiential stimulus about the event.

Virtual Reality (VR) is defined as a computer-generated digital environment that can be experienced and interacted with as if the environment were real (Jerald, 2016). The ideal VR system allows users to physically walk around objects and touch them as if they were real. The development of VR began when Morton Heilig 1962 made a prototype called Sensorama. This prototype was made to present the experience of watching a film so that it looks real by involving various senses, in this case, the senses of sight, hearing, smell, and touch (Dellia et al., 2022). VR technology has been applied in various industrial sectors such as education, military, medicine, architecture, entertainment, and so on. For example in the field of education, Saurik at al., (2018) created VR technology which aims as a campus information facility that displays an overview of the buildings, rooms, and facilities owned by the campus. In this research, a virtual reality-based literature text media related to Madurese folklore, specifically Jokotole, will be developed.

## **METHOD**

This research is development research using the development model developed by Borg and Gall. The Borg and Gall development model consists of ten steps which are limited by the seventh step by the researcher. The Borg and Gall development model was chosen because it can be used to develop VR media. This development was carried out using the Borg and Gall development with modifications by (Emzir, 2008). The product developed in this research is the development of VR-based reading learning media for the development of learning maritime literature which originates from the local wisdom of the Madurese people about ships and war strategy in the Jokotole folklore. Learning media in the form of VR is expected to motivate students' interest in reading folklore material. Jokotole folklore is packaged in episodes of shipwrecks and war strategies sourced from local wisdom packaged through episodes in VR so that students' local wisdom insights about maritime affairs are truly real.

## **RESULTS AND DISCUSSION**

The results of this study include the Borg and Gall method with a focus on development through the following stages: (1) Episode division, (2) VR media characters and geographic formations, (3) VR media and development, (4) Naval warfare strategy and local wisdom of shipping technology, and (5) Learning process. These sections are presented sequentially as follows.

This story tells about the first-person singular point of view (Jokotole, Adipoday, Dampo Abang, *mega remeng* (horse), and the second person (Madura people, the soldiers' brothers of Dampo Abang). There are image modifications to facilitate students' understanding. The story is divided into 5 episodes of storytelling: (1) Jokotole and Adipoday meet at the hermitage of Mount Geger, (2) Adipoday gives Jokotole a *mega remeng* horse to fight, (3) The war begins and Jokotole suffers defeat, (4) Jokotole and the people discuss (war strategy) how to defeat Dampo Abang, (5) The war ends, and Jokotole and the people emerge victorious.

The depiction of Jokotole's story character is very clear in the story. Starting from birth, youth, adulthood, and death. His birth was marked by the event that both his parents were both human beings who were good at asceticism (*tirakat*), the process of his marriage was physical and spiritual so two extraordinary humans emerged namely Jokotole and Jokowedi, and spiritual education. a master who also practices *tapa*, namely Empu Kelleng, until he serves in Majapahit and succeeds thanks to his ability to train mentally and spiritually, his journey from Majapahit, Gresik, Socah Bangkalan, his fight with Dampo Abang, the ability to lead Madurese, until his death has the heroic character of people who are good at *tirakat*, has strong minds, self-defense abilities, to spiritual abilities make the depiction refer to the character of a knight (Abdurrachman, 1988). An interesting depiction of the story's characters is that Jokotole's character has a balanced life starting from spirituality, family leaders, and society.

If we consider the concept of *Tanean Lanjang* as a house, then its back represents a farm consisting of salt, corn, and tobacco ponds. Tanean Lanjang is a type of housing predominantly inhabited by farmers, and it is situated within a complex. This public housing provides complete facilities, including residences, a surau (prayer room), a cowshed, and a kitchen. The houses in the complex are carefully located and intricately designed with various colors (Wiryoprawiro, 1986). From an animal husbandry perspective, particularly concerning Madura cattle, Rosida (2010) suggests that traditional art concepts were inspired by the way of life of the Madurese farming community, thus promoting the culture of *karapan sapi* (bull racing). This explanation highlights the fact that Madura's environment is characterized by both maritime and agricultural elements, with agriculture being a prominent feature. Additionally, marine resources play a significant role in the lives of the Madurese people. The sea serves as a vital source of sustenance and serves as an effective conduit for the exchange of knowledge, technology, and connections with the outside world.

Amil et al (2020) discovered that Jokotole, a coastal region in Madura, exhibits a strong connection with the marine environment. Historical records recount the arrival of Prince Dampo Abang, who reportedly launched an aggressive attack on Madura with an extraordinary army. However, being a maritime society, the Madurese did not passively endure this aggression; instead, they actively resisted. Utilizing local technologies like sickles, machetes, and whips, the Madurese engaged in marine resistance efforts. Furthermore, boats, particularly outriggers, served as crucial modes of transportation during these conflicts. These instances underscore the Madurese's possession and application of local wisdom as a coastal community during that era.

Jokotole A War Virtual Reality Display. Media is displayed as needed and filtered according to start and center views. The contents are as follows.



Figure 1. Initial View



Figure 2. VR box

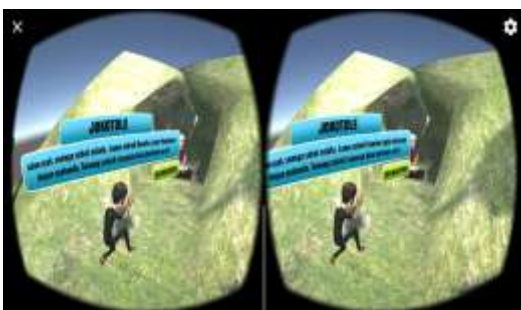


Figure 3. Jokotole Meets the Adipoday



Figure 4. Sea Battle

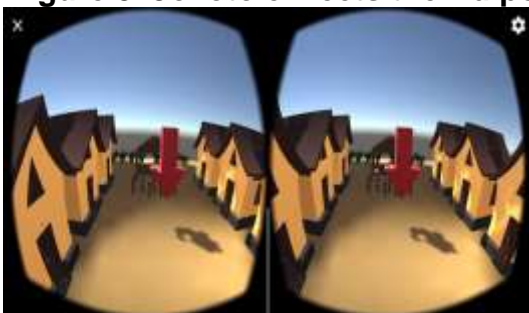


Figure 5. Tanean Lanjang



Figure 6. And of Story

One fascinating aspect of the story involves maritime events, specifically the account of the assault on the Chinese naval fleet led by Admiral Sam Po Tua Lang, also known as Dampo Abang. The battle unfolded along the coastline, with Jokotole

showcasing their prowess in both aerial and naval combat against the well-armed Dampo Abang's ships, equipped with cannons and arrows. Notably, Jokotole displayed their skill and strategic acumen in maneuvering their majestic mega-remeng horses, effectively evading airborne attacks. They demonstrated knowledge of naval warfare, exploiting the vulnerabilities of the enemy's ships and using a whip to destroy the hull of the Dampo Abang's vessel. Jokotole emerged victorious, forcing Admiral Dampo Abang to retreat westward.

Another intriguing aspect of Jokotole's war strategy involved a cultural approach employed by the Madurese people at the time. They employed a strategy to persuade the Madurese that a fleet of ships would land on Madura, with the intention of marrying Madurese women. This approach proved successful in mobilizing troops and igniting the fighting spirit of the Madurese people, who were willing to make sacrifices with their bodies and souls. This event highlights the significant value placed on honor within Madurese culture, and Jokotole effectively harnessed this cultural strategy in their struggle.

The process of learning literature is integrated through learning to read to test the ability of VR media in learning Indonesian. The process of implementing the learning went well and with the feedback in the form of interviews with students and teachers who stated that they were very enthusiastic and happy with the VR Jokotole A War mediation. This is because VR media can be an alternative medium for learning literature, especially reading in the midst of the Covid-19 pandemic. The trial was carried out at SMP Negeri 1 Pasean Pamekasan with limited students because they had to implement health protocols. The implementation of VR Jokotole A War learning can be described as follows.



**Figure 7. Trial Process**



**Figure 8. Practical Student**

The learning process is carried out in the midst of the Covid-19 pandemic so researchers must implement health protocols with a limited number of students and keep their distance. From the results of interviews during the learning process, students felt enthusiastic and happy because they had never tried VR media in the Indonesian

language learning process before. The learning process can also be carried out by creating dialogue narratives between students because in this medium war creates a dialogue between figures, namely Jokotole, Adipoday, the Madurese community, and Dampo Abang. In addition, students can also carry out the process of learning to read by discussing and retelling the contents of folklore in VR Jokotole A War.

## CONCLUSION

It can be concluded that VR media can be applied to learning literature. Making VR is built by dividing episodes which consist of five episodes, followed by folklore in VR Jokotole A. War is built through the formation of characters, places of residence, and geography (cultivation of corn, tobacco, salt, and sea), *tanean lanjang*. The VR media development section, it is carried out using storyboards and Unity software. Its relation to sea warfare strategy and local wisdom of war technology, Jokotole folklore contains a strategy to influence the authority of the Jokotole character and his influence because of his cleverness to win the hearts of the Madurese through the characters of responsibility, spirituality, fighting spirit, and love for the country. In terms of seafaring technology and weapons of war, use sickles, machetes, and whips. Not forgetting that boats (outriggers) became a mode of transportation to fight, this shows that local wisdom as a coastal community already existed and was owned by the Madurese at that time. In the learning aspect, VR media can be used as the main alternative in integrated literary learning with the sub-topic of reading skills to retell the contents of folklore.

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