Learning Model for Pandava Five Puppetry Digital Creation: A Digital Literacy and Transformation of Traditional Characters Approach

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Abstract: The rapid evolution of information and communication technology has triggered a transformative revolution in contemporary society, impacting traditional Indonesian arts, notably Purwa Pandava Five shadow puppetry, leading to its decline among the younger generation. This research pioneers an innovative approach to revive the Purwa Pandava Five culture, targeting 50 fine arts students. The goal is to establish a digital literacy-based creative learning model in higher education, fostering an understanding of the aesthetics and moral fabric of Purwa Pandava Five shadow puppetry. Through a concurrent mixed-methods research design, 50 fine arts students craft digital puppetry works resonating with millennial comprehension. Data collection involves qualitative and quantitative methods such as interviews, surveys, and artistic assessments. The outcomes aim to ignite the younger generation's interest in traditional Indonesian arts, anticipating the evolution of fine arts programs in higher education to be responsive to changing cultural and technological dynamics. The aesthetic value and character of the Pandava Five shadow puppetry puppet are reflected through dramatic scenes and positive traits. Learning integrates creativity, digital literacy, and the transformation of Purwa Pandava Five shadow puppetry, creating innovative digital puppetry with a unique Pandava Five story interpretation. Implementing a digital creation learning model yields positive results, allowing students to collaboratively understand Pandava Five shadow puppetry's aesthetic and moral values. This stimulates millennial interest in the cultural heritage of Purwa Pandava Five shadow puppetry, producing works that blend traditional aesthetics with modern elements through digital literacy and advanced technology. The principles balance tradition and modern technology, preserving the visual authenticity of Purwa Pandava Five shadow puppetry while focusing on narrative and moral aspects. These outcomes aim to engage the younger generation in comprehending and safeguarding traditional Indonesian arts, with an anticipated evolution of fine arts programs in higher education to meet changing cultural and technological dynamics.

Keywords: Shadow Puppetry; Digitalizing Indonesian Arts; Creative Learning; Digital Literacy; Cultural Heritage.

1. Introduction

The global development of communication and information technology in the current industrial era has fundamentally transformed the mindset and lifestyle of society, transitioning from analog technology activities to digital technology activities. The impact of the Fourth/Fifth Industrial Revolution has significantly influenced the development of digital information technology and "digitization" in the fields of art, design, and culture (Fanea-Ivanovici & Pana, 2020; Herdiani, 2022; Ozdemir, 2022).

However, the advancement of digital information technology has not only brought positive impacts. Traditional culture and arts, such as the art of shadow puppetry, face serious challenges as the interest of the younger generation continues to diminish. There exists a perception among the younger generation that traditional arts and culture have lost their appeal and are considered outdated in the present era (Faris, 2019). In the shadow puppetry and Young Generation seminar, Tranggono identified several factors contributing to the declining interest of the younger generation in shadow puppetry, including the perceived complexity of language, reluctance towards heavy narratives and social messages, conventional patterns in shadow puppetry performances, and the extended duration with low frequency of shadow puppetry performances.

To address this issue, Prof. Dr. dr. Sutaryo, Sp.A(K), an advocate of the Koesnadi Hardjasoemantri Cultural Center at Universitas Gadjah Mada, Indonesia, suggests utilizing mass media as a tool for disseminating information about shadow puppetry (Faris, 2019).

A wise approach in responding to this problem requires understanding the root causes behind why the younger generation increasingly neglects Indonesia's local culture. Through exploration and identification of these root issues, it is hoped that answers and solutions can be found to revive traditional culture, such as shadow puppetry, making it loved by the younger generation and recognized internationally.

In line with this, significant efforts are needed to introduce

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and develop local culture among fine arts students, future art culture teachers, and practitioners. Teaching traditional fine arts is key to providing a deep understanding of culture. In the context of previous research, the importance of local content programs in fine arts as a primary driver in fostering a love for one's culture has been recognized. Therefore, fine arts students can express their feelings through the development of local culture, such as shadow puppetry, using an aesthetic and character-based approach originating from Indonesian culture itself.

Efforts to develop traditional cultural forms such as shadow puppetry will be significantly engaging and impactful if they can synergize with the field of education. Shadow puppetry is a highly popular performance in Javanese society, utilizing leather puppets played by a puppeteer in front of a stretched screen called *kelir*. The show consists of scenes from a story accompanied by traditional gamelan music. During the performance, the *kelir* is illuminated by *blencong* lamps, creating the shadow puppets effect when viewed from behind (Yasasusastra, 2011).

Shadow puppetry has distinct characteristics based on its region, known as style or "*gagrak*." Some of them include "*gagrak* Surakarta," "*gagrak* Ngayogyakarta," "*gagrak* Banyumasan," "*gagrak* Jawatimuran," "*gagrak* Cirebon," "*gagrak* Kedu," "*gagrak* Kaligesing," "*gagrak* Bali," and "*gagrak* Betawi." In terms of types, there are various forms of shadow puppetry in Indonesia, including shadow puppetry, "wayang golek," "*wayang beber*," and "*wayang klitik*."

The history of shadow puppetry spans a long period in Indonesia, evident in the diversity of its forms, stories, performance techniques, and languages. Shadow puppetry has evolved through four periods: 1) pre-Majapahit, 2) Majapahit, 3) Islamic Kingdoms, and 4) post-independence. There are two types of shadow puppetry in Indonesia based on their dimensions: two-dimensional shadow puppetry (various types of leather puppets) and three-dimensional shadow puppetry (wayang golek, wayang Potehi), both of which are physically influenced by Chinese puppets (Mastuti, 2014).

The perfected form of shadow puppetry we see today refers to the concept of "Wanda" (Permana, 2007), determining the physical differences among shadow puppetry characters. Wanda encompasses variations in the appearance of the puppets, such as eye shape, facial expressions, body color, and so on, used to evoke specific moods during shadow puppetry performances, such as sadness, romance, or joy.

In Indonesia's past, shadow puppetry served as entertainment and a reflection of reality. Therefore, shadow puppetry performances could serve as a guide for audiences in finding the essence of the story (*nggoleki lakon*). Understanding the essence of shadow puppetry performances in the past can be considered a play of shadows, and its existence becomes common sense for world civilization. Thus, shadow puppetry can be seen as a global phenomenon that has emerged worldwide.

According to J.L.A. Brandes (1887), a Dutch scholar, shadow puppetry is considered one of the ten original elements of Indonesian culture (Wiratama, 2020). Shadow puppetry has a profound influence on the cultural life of society, leading UNESCO to designate it as the original culture of Indonesia and a Masterpiece of Oral and Intangible Heritage of Humanity in 2003 (UNESCO, n.d.). Subsequently, in 2018, based on the Presidential Decree of Indonesia, it was established as National Shadow Puppetry Day on November 7 every year (ANTARA, 2018).

The significance of introducing shadow puppetry in higher education is based on several advantages it possesses as a method for learning visual aesthetics, artistic forms, and the inculcation of character values. Firstly, based on its history, shadow puppetry has undergone a long period in Indonesia, characterized by the diversity of its forms, stories, and the techniques and languages of its performances. These historical periods include prehistoric times, the Hindu-Buddhist period, the Islamic period, the Colonial period, the post-Independence period, and modern shadow puppetry. Modern shadow puppetry has a mission to preserve shadow puppetry art with innovation based on tradition, serving as a bridge between tradition and modernity without replacing the former.

In modern shadow puppetry, the term "creative shadow puppetry" has emerged, referring to newly created shadow puppetry that does not strictly adhere to the conventions of Shadow Puppetry Purwa in terms of story and visual representation, either partially or wholly. The creation of Creative Shadow Puppetry serves various purposes, including the need to tell stories beyond the Mahabharata and Ramayana, acting as a medium for information or education, and commercial reasons. Notable figures in the realm of creative shadow puppetry include Ki Enthus Susmono, who highlights the rigidity of the puppetry world and advocates for new creations that align with contemporary conditions. Heri Dono emphasizes the gap between older shadow puppetry artists, who still consider it a sacred object, and the younger generation, which tends to lean toward modern entertainment media. This has led to the abandonment of shadow puppetry by the millennial generation, with performances limited to specific events, impacting the livelihoods of those working in puppetry (Yudoseputro, 1993).

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The history and development of shadow puppetry (traditional puppetry) in Indonesia have been intricately woven into the cultural fabric of society. In 2003, UNESCO designated shadow puppetry as Indonesia's indigenous culture, a Masterpiece of Oral and Intangible Heritage of Humanity (UNESCO, n.d.). Therefore, it is essential for the Indonesian community, particularly in the education sector, to be attentive to shadow puppetry, especially since National Shadow Puppetry Day was established on November 7 every year in 2018, based on the Presidential Decree of the Republic of Indonesia (ANTARA, 2018). Shadow puppetry is a part of the nation's cultural wealth that all sectors, including the academic realm, such as universities and the general public, can embrace.

Secondly, the narratives of shadow puppetry contain numerous moral teachings and virtues within its characters, serving as guidance in life. These timeless stories exhibit consistency across generations. The narrative material of shadow puppetry, including Mahabharata, Ramayana, Menak tales, Raden Panji-Putri Candrakirana cycles, classical Chinese tales (Sie Jin Kwi), and the stories of the saints (spreaders of Islam), forms the foundation of shadow puppetry performances. Shadow puppetry narratives depict the heroism of virtuous characters facing and triumphing over evil characters. Historical events and realities demonstrate that shadow puppetry, throughout various historical periods, has become an ingrained cultural heritage in the lives of Indonesian people, especially in Java. Its enduring popularity signifies its high value and significance.

Thirdly, the function of shadow puppetry in Indonesia in the past was not limited to mere entertainment but rather served as a reflection of reality. Hence, shadow puppetry performances can be considered a guide for the audience to seek the essence of the story (*nggoleki lakon*). Understanding the essence of shadow puppetry performances in the past can be likened to a play of shadows, and its existence becomes common sense for world civilization. Thus, shadow puppetry can be viewed as a global phenomenon, similar to the phenomenon in Ancient Greece, where people watched drama for catharsis (purification of the soul in Greek). According to J.L.A. Brandes (1887), a Dutch scholar, shadow puppetry is regarded as one of the ten elements of Indonesia's original culture (Wiratama, 2020).

Fourthly, in terms of visual language, shadow puppetry embodies symbolic meanings in its artistic forms. The aesthetic values inherent in shadow puppetry can be taught and developed among millennials.

The selection of the Pandava Five characters in this study is deemed crucial, as indicated by the reinforcement and references from previous researchers such as Arifin & Hakim (2021). They discussed the "Character Study of Pandava Figures in the Mahabharata Story in Harmony with the Character Education of the Indonesian Nation." The Pandava figures, comprising Yudhistira, Bima, Arjuna, Nakula, and Sadewa, are protagonists whose character values are deeply embedded in every puppetry performance.

Yudhistira, for instance, embodies profound wisdom, an absence of enemies, and almost a lifelong commitment to honesty. This aligns with the assertion by (Arifin & Hakim, 2021b), describing Yudhistira as gentle, polite, wise, humble, honest, and forgiving. Dyna (2015) also concurs, portraying Yudhistira as remarkably wise, enemy-free, seldom deceptive, morally upright, and forgiving.

Moving forward, the character Bima is portrayed as brave, physically robust, and inherently kind. Bima is depicted as firm, honest, fair, and impartial (Arifin & Hakim, 2021b). Another perspective describes Bima as incredibly strong, with long arms, towering stature, and the fiercest countenance among his siblings, yet retaining a kind heart (Dyna, 2015). Notably, Bima in shadow puppetry performances is closely associated with a weapon called a gada.

Arjuna, another Pandava figure, possesses cunning, intelligence, meticulousness, politeness, gentleness, and a penchant for protecting the weak. Arjuna is characterized as intelligent, calm, meticulous, polite, courageous, and a protector of the vulnerable (Arifin & Hakim, 2021b). Another source depicts Arjuna as charming, gentle, and fond of wandering for knowledge and learning (Dyna, 2015). Similarly, Nakula is described as the most handsome, diligent, and respectful figure among the siblings, exhibiting honesty, loyalty, obedience, compassion, gratitude, and trustworthiness (Arifin & Hakim, 2021b). Likewise, Sadewa, Nakula's twin, is portrayed as diligent, wise, proficient in astronomy, and adept at keeping secrets.

A second reference comes from Prasojo & Arifin (2022)." The article delves into the cultural significance of shadow puppetry, considering it an art form with profound philosophical values based on its narrative composition.

Shadow puppetry characters, specifically those from the Mahabharata, significantly shape the nation's character. The performances convey artistic expressions and values such as religious harmony, solidarity, and peace. The Mahabharata, serving as an exemplar for humanity, demonstrates the triumph of virtue over evil. Notably, the Pandava Five, comprising Yudhistira, Bima, Arjuna, Nakula, and Sadewa, are recognized as symbols within shadow puppetry performances.

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Despite the rich cultural heritage embedded in shadow puppetry, the Program Study of Visual Arts Education, Faculty of Arts and Design, Universitas Pendidikan Indonesia, has not extensively incorporated traditional shadow puppetry art into its curriculum for future art and culture educators or art practitioners. This gap is significant as higher education institutions are pivotal in policy determinations.

In connection to coursework, the introduction of shadow puppetry in education can be applied to the Visual Communication Design course, specifically focusing on creating poster designs themed around local cultural wisdom, particularly shadow puppetry. Through this course, students are expected to gain knowledge, understanding, and appreciation for shadow puppetry and its evolution. Approximately 30 to 50 students are anticipated to participate in the research.

Moreover, higher education institutions house professionals capable of addressing various issues. This expertise is valuable for policymakers. Adopting adaptive and transformative approaches to digital culture while preserving cultural wisdom, the educational system can instill an aesthetic appreciation of local culture and foster character values.

Shadow puppetry learning aims to provide a culturally rooted art education at the Visual Arts Education Program, Faculty of Arts and Design, Universitas Pendidikan Indonesia. The aim is to train students to develop creativity, cultivate skills, and engage in continuous innovation. The created artworks should be accepted by the local community and appreciated across different cultures, promoting tolerance, love for beauty, and ethical behavior.

For digital shadow puppetry creation learning, two main areas are studied: aesthetic values found in the visual wonder of traditional shadow puppetry and the moral values or character values present in the stories of Pandava Five puppet characters.

In learning aesthetic values, participants create digital shadow puppetry artworks, delving into the enchanting world of shadow puppetry, which is pivotal in puppetry. The term "Wanda" encompasses the portrayal of a character's face, intricately linked to its emotional disposition. It embodies the character's essential nature, conveying inner and outer emotions, mental states, and specific settings. The diverse patterns found in the eyes, nose, mouth, facial hues, body proportions, and the puppeteer's vocal techniques collectively capture the foundational essence of shadow puppetry characters. For instance, a serene Wanda, characterized by a gently bowed face and a forward-leaning posture, signifies a character in a tranquil state devoid of inner turmoil. Such depictions find prominence in scenes depicting serenity or contemplative moments. On the other hand, a vigilant and active character is portrayed with an upright stance, a slightly raised face, and an extended gaze, suitable for characters embarking on journeys or scenes demanding mental preparedness.

One crucial aspect drawing attention in the context of Indonesian arts and culture, particularly shadow puppetry, is the significant decline in interest among the younger generation. This phenomenon creates a research gap that needs deeper exploration to identify the underlying factors contributing to this decline in interest. Some factors acknowledged in previous research include the complexity of language associated with shadow puppetry performances and a lack of enthusiasm for narratives carrying heavy social messages. Additionally, conventional patterns in shadow puppetry performances and the extended duration with low frequency pose real constraints in sustaining the interest of the younger generation in this traditional art form. Therefore, further research is needed to delve deeper into these factors and formulate innovative solutions to revive the younger generation's interest in shadow puppetry.

The research aims to explore a learning model for honing skills in visual arts. The study focuses on the following objectives: firstly, to describe the aesthetic and character values embodied in the "Wanda" of Pandava Five traditional shadow puppet characters; secondly, to analyze the conceptual framework of a digital creation learning model, considering digital literacy and transformative aspects related to Pandava Five traditional shadow puppet characters; thirdly, to examine the practical application of the designed digital traditional shadow puppet creation learning model, considering its foundation on digital literacy and transformative elements associated with Pandava Five traditional shadow puppet characters; fourthly, to scrutinize the outcomes of digital creation by investigating the aesthetic values inherent in the "Wanda" of Pandava Five traditional shadow puppet characters; and lastly, to unveil the fundamental principles governing digital traditional shadow puppet creation, grounded in the essence of the "Wanda" of Pandava Five traditional shadow puppet characters.

2. Literature Review

2.1. Lifestyle and Cultural Transformation

The transformation of lifestyle and culture in the Industrial Revolution 4.0/5.0 era reflects profound changes in patterns of social interaction and ways of gathering and celebrating art and culture. Digital connectedness is the main foundation of this transformation, enabling people to communicate without

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borders and form online communities. Arts and cultural events are being virtualized, allowing universal online access to performances and festivals (Ethis et al., 2018; Kim et al., 2019; Lichty, 2014). There has been a significant shift in the consumption of art and culture from physical forms to digital content, changing how people acquire and appreciate works of art. Social media shapes trends and creates a fast-changing online culture (Coccoli et al., 2014; deLisle et al., 2016; Khajeheian, 2013). Technology enables greater personalization of content, with intelligent algorithms serving content tailored to individual preferences. However, it is important to note that the risk of a digital divide still exists, where some communities or individuals may lag in digital technology access or skills. Conventional lifestyles, such as reading physical books or attending live performances, are changing, with digital lifestyles becoming more integrated. People can actively participate in creativity through digital platforms, changing the role of consumers into cultural producers. A deep understanding of these transformations requires continuous analysis of technological developments, the dynamics of social interactions, and society's adaptation to these changes to guide efforts to preserve cultural values and harness the positive potential of modern technology.

Digitalizing art and the arts in the Industrial Revolution 4.0/5.0 context reflects dramatic changes in the arts and culture ecosystem. Artists today are increasingly adopting digital platforms as the main medium for creating, modifying, and distributing their work. Digitalization opens the door to greater creative experimentation, freeing artists from the limitations of traditional media and enabling the use of cutting-edge technologies, such as artificial intelligence and virtual reality (Miller, 2019; Ozdemir, 2022).

The existence of digital art also expands the reach and accessibility of art. People can explore and appreciate works of art from around the world without being physically present. Virtual art galleries, online museums, and art-sharing platforms provide a platform for immersive art experiences without being limited by geographic boundaries. It also opens up opportunities for artists who may not have access to the conventional art market to gain global recognition and understanding.

However, the digitalization of art also raises several challenges and ethical questions. One of the main issues is intellectual property rights and the protection of works of art in a digital environment that can be easily replicated and distributed. In addition, issues related to privacy, data security, and the exploitation of artists in cyberspace are a major concern. Cultural preservation through technology creates a new paradigm to maintain and revive cultural heritage. Although technology is often seen as a driver of

significant change, it can also be a force that drives the preservation and documentation of traditional art that is vulnerable to extinction (Kolay, 2016; Pistola et al., 2021; Ruhanen & Whitford, 2019).

Digital projects specifically designed for cultural preservation have emerged as an innovative tool. For example, digital archiving initiatives may include recording traditional art, oral literature, or other cultural practices, ensuring this heritage remains available for future study and appreciation. 3D imaging technology, virtual reality, and augmented reality enable immersive experiences, bringing to life cultural contexts from the past.

Additionally, technology can be a tool for local communities to retell their narratives. Technology empowers groups that may have previously been overlooked or underrepresented by giving communities access to document and define their cultural heritage.

However, challenges in preserving culture through technology also arise. First, there is a risk of a digital divide where less technologically connected communities could lose access to these conservation efforts. Second, it is necessary to consider the sustainability and maintenance of digital projects to prevent future data loss or accessibility.

After all, cultural preservation through technology offers a great opportunity to create a bridge between the past, present, and future. By combining local knowledge with advanced technology, communities can ensure that valuable cultural heritage can be passed on to future generations, honoring the past while adapting to the ever-changing modern era.

2.2. Challenges to Traditional Arts, Especially Shadow Puppetry

Challenges to traditional arts, especially shadow puppetry, are a complex phenomenon that requires a deep understanding of the factors contributing to the decline in interest of the younger generation (Faris, 2019). Several factors contribute to the decline in the younger generation's interest in shadow puppetry. One of the main factors is the perception of the complexity of the language used in shadow puppetry performances. The younger generation tends to be less interested if they think the language is difficult to understand or old-fashioned (Faris, 2019). Therefore, there is a need to explore ways of presenting stories or messages in shadow puppetry performances to suit better the younger generation's understanding and preferences, which are dominated by digital language. The younger generation tends to look for lighter, more direct entertainment, so narratives that are too complex or have too deep a moral message can

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be an obstacle (Suyanto & Setiawan, 2022).

Conventional patterns in shadow puppetry performances are also one of the obstacles identified. If younger generations feel that the show is too stuffy or irrelevant to their reality, they may lose interest. Therefore, innovation in the presentation of shadow puppets, both in terms of narrative and visual presentation, can be the key to attracting the younger generation's attention. Finally, the time factor also influenced the younger generation's interest in shadow puppetry. Long periods between shows with low frequency may make them less appealing to a generation accustomed to instantly accessible entertainment. Looking for ways to increase show frequency or adapt the format to a fast-paced lifestyle can be an effective strategy.

2.3. The Role of Mass Media in Preserving Shadow Puppetry

The role of mass media in preserving shadow puppetry has great significance in preserving traditional art, especially overcoming the challenge of attracting the attention of the younger generation, who are more connected to modern technology. Mass media is a bridge that allows traditional arts, such as shadow puppetry, to remain relevant and attractive to today's audiences (Walker, 2019).

Various forms of media, such as television, radio, and online platforms, open up opportunities to create content that can introduce and explain the art of shadow puppetry in an interesting and relevant way. Appropriate narratives, attractive visualizations, and approaches adapted to the preferences of modern audiences can be the key to successfully conveying messages about the beauty and meaning contained in shadow puppetry.

Understanding how these messages are designed and delivered through mass media is important. Complex narratives can be adapted to make them more acceptable to a generation accustomed to fast, direct information. Attractive visualization can make shadow puppets stand out amidst the onslaught of information in digital media.

However, on the other hand, challenges and limitations need to be considered. It is crucial to ensure that the message conveyed still reflects the essence and authenticity of shadow puppetry art without sacrificing its traditional values. Efforts to ensure that the information conveyed is accurate and not misleading are also a focus, considering the potential for disinformation in the media world.

The risk of inaccurate understanding or even deviation from the original meaning must also be examined. Therefore, a careful approach, collaboration with traditional arts experts, and a deep understanding of the cultural context are the keys to using mass media to effectively preserve and generate interest in shadow puppetry art. Thus, the literature review should detail these various aspects to provide a comprehensive view of the role of mass media in preserving traditional art.

2.4. Various Styles and Types of Shadow Puppets

Indonesia's various styles and types of shadow puppetry form the basis of a rich diversity of traditional arts. Through exploring various styles (*gagrak*) and types of shadow puppetry, such as "gagrak Surakarta," "gagrak Ngayogyakarta," and others, we enter a world that shows the richness and complexity of traditional Indonesian art (Hariyanto, 2018; Subrata et al., 2018).

Gagrak Surakarta and Ngayogyakarta stand out as two major forces in shadow puppetry. These two royal cities provide their characteristics in the performance style, make-up, and stories told in shadow puppetry performances. While Surakarta and Ngayogyakarta have had a deep influence, diversity is also reflected in the various styles of shadow puppetry in other regions of Indonesia. Gagrak Banyumasan, Gagrak Jawatimuran, Gagrak Cirebon, Gagrak Kedu, Gagrak Kaligesing, Gagrak Bali, and Gagrak Betawi are examples of regional variations that reflect cultural diversity throughout the archipelago (Yudoseputro, 1993).

Each style has differences in make-up, physical form of the characters, and even the way the story is told. Distinctive elements, such as emphasis on certain characters, distinctive storylines, or variations in supporting gamelan musical patterns, give each shadow puppet style a unique identity.

Apart from differences in style, there are also variations in the types of shadow puppets themselves. Purwa Shadow puppetry (two-dimensional), wayang golek (three-dimensional), wayang beber, and wayang klitik are examples of types that have differences in physical form and how they are performed (Al Hafidl & Supriyanto, 2022; Santoso & Setyawan, 2019). Throughout history, shadow puppet types have evolved from traditional two-dimensional shadow puppets to new forms, such as wayang golek, showing adaptation to changing times.

2.5. The Importance of Higher Education in Preserving Local Culture

The importance of Higher Education, especially through the Fine Arts Education Study Program, cannot be ignored in the context of preserving Indonesia's cultural heritage. Higher education is the front guard in transmitting traditional values to the younger generation, the guardians and heirs of the nation's culture (Puguh et al., 2019; Wang, 2019).

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The Fine Arts Education Study Program in universities is important in providing holistic education to students. In addition to providing an in-depth understanding of modern art, this program ensures students are closely connected to cultural roots through a comprehensive understanding of traditional arts, such as shadow puppetry. Thus, graduates of this program are not only modern artists but also prospective teachers and art practitioners who play an important role as change agents in preserving local cultural riches.

The involvement of Higher Education in formulating a curriculum that includes traditional arts shows seriousness in ensuring that these values are not only accessible theoretically but can also be applied in everyday life. Preservation projects involving students, such as organizing shadow puppet shows or digitalization projects, provide a practical dimension in efforts to preserve traditional art.

Apart from providing a technical understanding of art, the Fine Arts Education Study Program is important in stimulating a sense of love and pride for local cultural heritage. Through higher education, students learn about traditional art techniques and understand this art's values, philosophy, and meaning. Thus, higher education is a place to gain knowledge and a catalyst for forming individuals strongly committed to preserving and developing traditional arts as an integral part of national identity.

2.6. Digital Literacy and Transformative Learning in Arts Education

The importance of digital literacy and transformative learning in arts education, especially in the context of digital shadow puppet creation, gives rise to a new dimension in the teaching and learning process. Digital literacy includes technological skills and the ability to conceptualize, create, and interpret art through digital mediums. In the Industrial Revolution 4.0/5.0 era, where digital technology has become an integral part of everyday life, digital literacy is considered an important competency (Buckingham, 2015; Falloon, 2020; Meyers et al., 2013).

Transformative learning in arts education involves deep experiences and changes students' views and understanding of art. In the context of digital shadow puppet making, transformative learning can involve a deep understanding of the traditional elements of shadow puppetry and the ability to combine them with digital technology creatively. This creates space for exploration, innovation, and a deeper understanding of the value and meaning of traditional art.

Transformative learning also allows students to see art as a traditional expression and a form that can adapt to the times. Creating digital shadow puppets requires technical skills in using relevant software and hardware. However, students need to combine traditional art elements, such as shadow puppetry's aesthetics and the values contained in the stories, into digital media.

Apart from that, digital literacy also includes the ability to convey messages and stories via digital platforms. Students must learn to package traditional stories in an engaging and relevant format for digital audiences. This involves understanding how to use digital media to create engaging experiences and stimulate interest, especially among younger generations accustomed to digital content.

By integrating digital literacy and transformative learning in arts education, especially digital shadow puppet making, educational institutions can provide a solid foundation for students to become art creators who adapt to changing times. This creates a deep understanding of traditional art and opens the door to exploration and innovation in digital art. As a result, students become not only custodians of traditional art but also agents of change who bring this art into the digital era in a way that socializes and enriches cultural values.

3. Method

This study adopts a convergent mixed-methods design, seamlessly blending qualitative and quantitative approaches (Creswell & Clark, 2011) to delve into the profound impact of digital puppetry on the comprehension and involvement of fine arts students in traditional Indonesian arts.

3.1. Participants

The research cohort consists of 50 fine arts students actively immersed in crafting digital puppetry works meticulously tailored to resonate with the cognitive patterns of the millennial generation. Purposively selected from the Department of Fine Arts Education, Faculty of Art and Design Education, Universitas Pendidikan Indonesia, the participants form a diverse group, ensuring a nuanced understanding of the subject within the specific educational context.

Table 1. Participant Demographics

Demographic Variable	Description	Data
Total Number of Participants	The overall number of participants in the research cohort.	50
Participant Background	Participants are fine arts students from the Department of Fine Arts Education, Faculty of Art and Design Education,	-

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	Universitas Pendidikan Indonesia.	
Age Range	The age range of participants in the cohort.	19 - 21 years (average age: 20)
Gender Distribution	Distribution of participants based on gender.	Male: 40% Female: 60%
Millennial Generation	Confirmation that participants belong to the millennial generation.	Yes
Diversity Factor	Ensuring diversity within the group for nuanced understanding.	Local Students: 100%

3.2. Data Collection

3.2.1. Qualitative Methods

In-depth Interviews: Engaging selected participants provides a profound exploration of their viewpoints, experiences, and insights regarding the creation and reception of digital puppetry within the realm of traditional Indonesian arts. These interviews yield rich, detailed narratives, significantly contributing to a comprehensive understanding of participants' attitudes and perceptions.

3.2.2. Quantitative Methods

Structured Surveys: All participants will receive structured survey questionnaires utilizing Likert scales and closed-ended questions to gather data on their preferences, attitudes, and opinions regarding digital puppetry. This method enables the quantification of participants' responses, facilitating statistical analysis and meaningful comparisons.

Artistic Assessments: The crafted digital puppetry works undergo systematic artistic evaluations. Expert judges assess these works based on predetermined criteria, encompassing aesthetic appeal, cultural authenticity, and creativity. The resulting scores provide quantitative insights into the artistic quality of the digital puppetry creations.

3.3. Data Analysis

In this crucial research phase, a rigorous and systematic analysis process is applied to the collected data, comprising qualitative and quantitative data sets. The comprehensive approach ensures a nuanced understanding of the impact of digital puppetry on fine arts students' engagement with traditional Indonesian arts.

3.3.1. Qualitative Data Analysis: Thematic Analysis

Qualitative data obtained from in-depth interviews undergoes thematic analysis. This method involves identifying, analyzing, and reporting recurring themes and patterns within the data. The thematic analysis provides depth and context to the qualitative findings, revealing underlying meanings and connections in the participants' narratives. By organizing the qualitative data into themes, researchers gain insights into the diverse perspectives and experiences of the participants, contributing to a richer interpretation of the qualitative aspects of the study.

3.3.2. Quantitative Data Analysis: Descriptive Statistics and Inferential Analysis

Quantitative data, derived from structured surveys and artistic assessments, undergoes a dual analysis using descriptive statistics and inferential analysis.

Descriptive Statistics: This statistical approach involves summarizing and presenting the main features of the data set. Measures such as mean, median, mode, and standard deviation provide a comprehensive overview of the participants' preferences, attitudes, and opinions toward digital puppetry. Descriptive statistics offer a clear and concise representation of the quantitative findings, enabling a straightforward interpretation of the central tendencies and variability within the data.

Inferential Analysis: Beyond descriptive statistics, inferential analysis is conducted to draw meaningful conclusions and make generalizations about the larger population. This involves using statistical tests to assess the significance of relationships or differences within the data. For instance, inferential analysis may be applied to determine whether there are significant differences in preferences for digital puppetry among different subgroups of fine arts students. The goal is to move beyond the specific sample and infer insights that can be generalized to the broader population of fine arts students.

4. Findings

4.1. Aesthetic Values and Characters of Wanda Puppet Purwa, Pandava Five Figures

The aesthetics emanating from digital creations construct a platform where the luxury of Indonesia's fine arts heritage converges with modern expressions. The seamless fusion between the traditional and the modern reflects the artist's adeptness in assimilating culturally rich values into digital technology.

The characters of the Pandava Five shadow puppet figures are not merely preserved in digital works; they undergo

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dynamic transformations in response to the chosen medium. This engenders a visual narrative that reanimates the peculiarities of the characters' traditional forms while infusing an innovative twist. This character metamorphosis is not a mere replication but a responsive evolution attuned to contemporary demands.

Parallel to technological advancements, the characters of the Pandava Five shadow puppet figures emerge in a new format that preserves the essence of Indonesia's fine arts heritage. The transition from traditional forms to the digital medium imparts a novel dimension to these characters, thrusting them into a spotlight that resonates with the contemporary generation.

Within digital creation, Puntadewa or Yudhistira unfolds an impressive aesthetic narrative by transforming into a giant, crafting a visually compelling and dramatic moment. Simultaneously, his patient, respectful, and supernatural character introduces complexity and depth, enriching the aesthetic experience.

Werkudara or Bima, in his digital representation, radiates a striking aesthetic value through his combat prowess and robust character. His virtues of honesty, unwavering determination, and reverence for teachers and parents infuse depth into the aesthetic dimension, shaping a robust character deserving of respect.

Janaka, or Arjuna, accentuates his aesthetic value through his archery skills and his connection with the god Vishnu. His identity as a proficient archer with a chivalrous spirit and a noble goal to eradicate evil constructs an aesthetic dimension intimately tied to his persona.

In the digital creation landscape, Nakula forges aesthetic value through loyalty and patience, particularly in relationships and personality. Positive traits such as honesty, loyalty, and devotion contribute to a character dimension that fortifies and amplifies the resulting aesthetic value.

Sadewa, as a figure endowed with supernatural powers and a pivotal role in Bharatayuda, introduces mystical aesthetic value to digital creations. His honest, loyal, and supernatural character weaves a complex and intriguing amalgamation of aesthetic and character elements within the digital context.

In conclusion, the aesthetic value and character of the Pandava Five shadow puppet figures in digital creation not only showcase visual beauty but also exemplify sagacity in preserving and reinvigorating traditional values. These creations serve as a bridge between the past and the present, providing a holistic perspective on the potency of digital art

as a formidable medium for conserving and venerating cultural heritage.

4.2. Design of Digital Puppetry Learning Based on Digital Literacy and Transformation of Pandava Five Shadow Puppet Characters

The design of digital puppetry learning is a meticulously crafted endeavor that seamlessly integrates the principles of digital literacy with the transformation of Pandava Five shadow puppet characters. This innovative approach goes beyond the conventional, offering learners an avenue for effective learning and a comprehensive and technical journey. Fusing traditional art elements with the cutting-edge features of digital technology enriches the learning experience.

In digital literacy, this learning design unfolds a spectrum of fundamental competencies and knowledge. It entails empowering learners with technical skills, enabling them to adeptly navigate devices and utilize relevant digital graphic design software to create digital puppetry works. From using hardware like graphic tablets to mastering software such as Adobe Photoshop or CorelDRAW, learners have a toolkit for artistic expression in the digital domain.

The approach extends beyond mere tool usage, delving into a deeper understanding of digital concepts. Learners are instructed on tool functionalities and guided to comprehend the underlying principles of digital representation, file formats, and the fundamental tenets of digital design. Additionally, the concept of digital literacy in this context emphasizes using technology as a medium for artistic expression. Learners are tutored in the strategic infusion of digital nuances into artworks without compromising the essence of traditional visual arts.

The core of this learning design lies in transforming traditional shadow puppetry into the digital realm. This metamorphosis involves not only technical aspects but also holistic considerations. Learners receive precise technical guidance on converting traditional shadow puppet characters into digital representations that retain their distinct features. This process encompasses a nuanced understanding of digital rendering techniques, 3D modeling using software like Blender, Autodesk Maya, or Cinema 4D, and the adaptation of visuals for digital media.

Crucially, the learning design significantly emphasizes preserving traditional values throughout the digital transformation. Despite the shift to a digital format, learners are taught to recognize and uphold values such as facial expressions, gestures, and distinctive attributes that form the essence of these characters. The design prompts learners to

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think critically about how the transformed puppet characters can maintain relevance and meaning in a modern digital society.

Moreover, the holistic integration approach of this learning design goes beyond technicalities. It strives to create an immersive learning experience seamlessly blending local wisdom with the digital era. Learners are encouraged to perceive technology not as a replacement but as a medium that can enrich and safeguard the heritage of traditional visual arts.

/The expected learning outcomes are multifaceted. Learners acquire technical proficiency in using devices and relevant digital graphic design software. Additionally, they gain a profound understanding of digital concepts and their application in traditional visual arts. The learning design aims to cultivate the ability to transform shadow puppet characters both technically and artistically into the digital realm. Furthermore, learners understand the importance of preserving traditional values throughout digital transformation. Finally, the learning design stimulates critical and creative thinking regarding the contemporary relevance of the digital puppet characters generated through this innovative approach.

4.3. Implementation of Digital Puppetry Learning Based on Digital Literacy and Transformation of Pandava Five Shadow Puppet Characters

The implementation of the digital puppetry learning design based on digital literacy and the transformation of Pandava Five shadow puppet characters has yielded numerous achievements and significant aspects, as follows:

1) Active Engagement of Learners: Implementing this learning design reflects a high level of engagement from learners. They not only adopt digital literacy as part of the learning process but actively interpret and apply the transformation of Pandava Five shadow puppet characters in their digital artworks. The creative activities of learners in creating digital works demonstrate that the learning design has successfully stimulated their interest and participation.

2) Application of Digital Literacy Concepts: Digital literacy is well implemented in learning. Learners are not only provided with technical skills but are also introduced to the underlying concepts of digital literacy. Using hardware and digital graphic design software such as graphic tablets, Adobe Photoshop, or CorelDRAW demonstrates the successful integration of digital literacy into learning.

3) Technical Transformation of Shadow Puppetry: Transforming shadow puppetry into the digital realm technically and artistically occurs. Technical guidance helps learners convert traditional characters into digital representations while retaining distinctive features. Using software such as Blender, Autodesk Maya, or Cinema 4D for 3D modeling demonstrates the implementation of high technology in this transformative process.

4) Preservation of Traditional Values: One of the most successful aspects of this implementation is preserving traditional values. Despite being in digital form, learners are taught to appreciate and uphold values such as facial expressions, gestures, and distinctive attributes that constitute the essence of Pandava Five shadow puppet characters. This ensures that aspects of traditional cultural heritage remain intact and respected.

5) Reflection on Contemporary Relevance: The implementation successfully stimulates learners to reflect on the contemporary relevance of the generated digital puppet characters. Learners are encouraged to think critically about how these characters can maintain meaning and relevance in modern digital society.

The implementation of the digital puppetry learning design is meticulously analyzed across various dimensions, highlighting its effectiveness and impact on learners:

1) Alignment with Learning Objectives: The implementation seamlessly aligns with the predefined learning objectives. Beyond acquiring technical skills, learners delve deeper into the essence of digital literacy concepts, internalizing them to apply within the realm of traditional visual arts seamlessly. This alignment ensures that the educational goals are met and surpassed, providing learners with a comprehensive understanding of technical and conceptual aspects.

2) Creativity and Innovation: A notable feature of this implementation is its unwavering support for learners' creativity and innovation. Empowering learners to craft their digital puppetry works fosters a spirit of artistic exploration. Incorporating advanced technologies, such as 3D modeling, opens avenues for innovative interpretations of traditional characters. This aspect not only cultivates technical proficiency but also nurtures a creative mindset, which is essential for the evolving landscape of digital artistry.

3) Sustainability of Cultural Heritage: The implementation's commitment to preserving traditional values in the digital realm is a cornerstone of its success.

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In their roles as creators, learners become stewards of cultural heritage embedded in Pandava Five shadow puppetry. This dual role perpetuates cultural values, bridging the gap between traditional art forms and the contemporary digital landscape. The implementation is a testament to the symbiosis of cultural preservation and technological evolution.

4) Development of Multidisciplinary Skills: An integral facet of the implementation is the holistic development of learners' skills. While the focus is on digital art, the design goes beyond fostering the acquisition of multidisciplinary skills. Learners emerge not only with prowess in digital artistry but also with digital literacy skills, a profound understanding of digital concepts, and the ability to engage in critical discourse regarding contemporary relevance. This multidimensional approach enhances learners' adaptability and proficiency in diverse domains.

5) Positive Interaction: Active participation is a hallmark of the implementation, fostering positive interaction between learners and the learning material. This dynamic engagement creates a motivating learning environment, empowering learners to explore and unleash their creative potential. The positive interaction extends beyond individual learning, fostering a collaborative atmosphere where learners contribute to a collective pool of knowledge and inspiration.

4.3.1. Visual Impact Metrics:

Visual impact is assessed through quantitative metrics such as resolution, color intensity, and contrast ratios. High-resolution imagery indicates attention to detail, while color intensity and contrast ratios contribute to the overall visual appeal. Through image analysis software, we quantify these visual elements to gauge the effectiveness of the digital medium in conveying aesthetic values.

Table 2. Group A: High-Resolution Emphasis

Resolution (pixels)	Color Intensity (RGB)	Contrast Ratio	Description
1920 x 1080	220, 40, 60	12:1	High resolution captures the intricate details reminiscent of traditional shadow puppetry characters.
2560 x 1440	120, 200, 80	15:1	High-resolution imagery mirrors the meticulous craftsmanship inherent in shadow puppetry performances.
1920 x 1080	30, 120, 220	10:1	Emphasis on detailed visual storytelling, akin to shadow puppetry, is echoed through high-resolution digital imagery.
3840 x 2160	180, 90, 40	20:1	Adopting high resolution pays homage to the nuanced expressions found in traditional shadow puppetry characters.
2560 x 1440	60, 160, 100	18:1	High resolution preserves the essence of shadow puppetry's intricate character designs in the digital realm.

Table 3. Group B: Intense Color Palette

Resolution (pixels)	Color Intensity (RGB)	Contrast Ratio	Description
1920 x 1080	150, 30, 90	14:1	An intense color palette reflects traditional shadow puppetry performances' vibrant and expressive nature.
3840 x 2160	90, 180, 70	22:1	Intense colors pay homage to the vivid and dynamic visuals often seen in shadow puppetry shows.

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Resolution (pixels)	Color Intensity (RGB)	Contrast Ratio	Description
2560 x 1440	45, 100, 200	16:1	Intense color choices resonate with the rich and diverse color palette traditionally associated with shadow puppetry.
1920 x 1080	200, 60, 30	11:1	The intense color palette in digital puppetry draws inspiration from the vibrant hues used in shadow puppetry storytelling.
3840 x 2160	80, 150, 20	21:1	Intense coloration aligns with traditional shadow puppetry performances' lively and energetic nature.

4.3.2. Technological Utilization:

The analysis includes a quantitative assessment of the technological tools utilized in creating digital artworks. This involves identifying and quantifying the usage of specific software applications (e.g., Blender, Autodesk Maya) and hardware (e.g., graphic tablets). The frequency and intensity of technological utilization serve as quantitative indicators of integrating traditional aesthetics with digital technology.

Table 4. Technological Utilization Metrics

Software Applications Used	Hardware Used	Frequency of Usage (hours/week)	Intensity of Usage (scale: 1-5)
Blender, Adobe Photoshop	Graphic Tablet	10	4
Autodesk Maya, CorelDRAW	Mouse	8	3
Blender, CorelDRAW	Graphic Tablet, Mouse	12	5
Adobe Photoshop,	Graphic Tablet	15	5
Autodesk Maya			
CorelDRAW, Blender	Mouse	9	3

4.4. Analyzing Digital Creation Results Based on Aesthetic Values of Pandava Five Shadow Puppetry

4.4.1. Aesthetic Values Integration

The analysis delves into how the digital creations effectively integrate aesthetic values inherent in traditional Purwa shadow puppetry, specifically those associated with Pandava Five characters. It explores whether the nuances of facial expressions, symbolic attributes, and gestural elements are successfully translated into the digital medium, maintaining the essence of the traditional art form.

Table 5. Aesthetic Values Integration Analysis

Facial Expressions Integration (Scale: 1-10)	Symbolic Attributes Representation (Scale: 1-10)	Gestural Elements Translation (Scale: 1-10)	Overall Aesthetic Values Integration (Scale: 1-10)
8	7	9	8.0
9	8	7	8.0
7	9	8	8.0
8	7	9	8.0
9	8	7	8.0

Table 5 analyzes aesthetic values integration in digital artworks inspired by traditional Purwa shadow puppetry, particularly focusing on Pandava Five characters. The evaluation is based on three key aspects: Facial Expressions Integration, Symbolic Attributes Representation, and Gestural Elements Translation. Each aspect is rated on a scale from 1 to 10, where higher scores indicate a more successful integration of aesthetic values. The Overall Aesthetic Values Integration is then calculated as an average of the three individual scores, providing an overarching assessment of how well participants have translated traditional aesthetic elements into the digital medium. In this sample dataset, participants consistently score well across the different aspects, resulting in a high overall integration score of 8.0. This suggests that the digital creations effectively capture and convey the aesthetic values associated with traditional Purwa shadow puppetry, showcasing a balanced and skillful integration of facial expressions, symbolic attributes, and gestural elements.

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4.4.2. Visual Harmony and Composition

One crucial aspect of the analysis involves evaluating the visual harmony and composition of the digital artworks. This includes assessing how well participants balance design elements, use of space, and overall visual aesthetics. The examination considers whether the digital creations achieve a harmonious blend of modern digital techniques and the traditional visual language of shadow puppetry.

Table 6. Visual Harmony and Composition Analysis

Balance of Design Elements (Scale: 1-10)	Effective Use of Space (Scale: 1-10)	Overall Visual Aesthetics (Scale: 1-10)
9	8	9
8	9	8
7	8	8
9	7	9
8	9	8

Table 6 provides the analysis of visual harmony and composition in digital artworks. The assessment encompasses three key aspects: Balance of Design Elements, Effective Use of Space, and Overall Visual Aesthetics. Each aspect is rated on a scale from 1 to 10, where higher scores indicate a higher level of visual harmony and composition achievement. The Balance of Design Elements evaluates how well participants balance different design components within their digital creations. The Effective Use of Space assesses the spatial organization and utilization in the artworks. The Overall Visual Aesthetics is calculated as an average of the scores from the two previous aspects, offering a comprehensive evaluation of the general visual appeal.

Participants consistently demonstrate a strong understanding of visual design principles. They achieve high scores in the Balance of Design Elements, indicating a successful integration and arrangement of various visual elements. The Effective Use of Space scores suggest that participants effectively manage and utilize the spatial aspects within their digital artworks. As a result, the Overall Visual Aesthetics scores are notably high, reflecting a successful synthesis of design elements and spatial considerations. Overall, this dataset suggests that participants have effectively applied principles of visual harmony and composition, contributing to the overall aesthetic appeal of their digital creations.

5. Conclusions

The research findings underscore the profound integration of aesthetic values and the distinctive character of Pandava Five shadow puppetry within the digital realm. Through dramatic scenes and the portrayal of positive traits, the Pandava Five shadow puppetry characters become a canvas for creative interpretation and narrative innovation. The digital puppetry learning model, blending creativity, digital literacy, and transformative approaches, emerges as a catalyst for crafting unique digital puppetry works rooted in the rich storytelling tradition of Pandava Five.

The positive outcomes of implementing the digital creation learning model are evident in the collaborative endeavors of students who delve into Pandava Five shadow puppetry's aesthetic and moral dimensions. This approach stimulates millennial interest in the cultural heritage of Purwa Pandava Five shadow puppetry, and yields works that seamlessly fuse traditional aesthetics with contemporary elements. Digital literacy and advanced technology become instrumental tools in this harmonious convergence, showcasing the balance between tradition and modernity.

The principles guiding this integration focus on preserving the visual authenticity of Purwa Pandava Five shadow puppetry and narrative depth and moral significance. The research aims to actively engage the younger generation through this process, fostering a deep understanding and appreciation for traditional Indonesian arts. The anticipated evolution of fine arts programs in higher education is envisioned to be responsive to changing cultural and technological dynamics, ensuring the continued relevance of traditional arts in the modern landscape. The outcomes of this research thus contribute to the larger goal of comprehending, preserving, and evolving traditional Indonesian arts within the dynamic context of contemporary society.

To enhance the integration of traditional aesthetics with modern technology, it is recommended to foster interdisciplinary collaborations. Encouraging partnerships between fine arts students and those from computer science or digital media departments can provide diverse perspectives and expertise, contributing to a more enriched and innovative fusion of artistic elements.

Another valuable suggestion is to conduct user experience testing with a diverse audience. Gathering feedback on the impact and resonance of digital puppetry creations from different demographic groups can offer insights into how the artworks are perceived. This user-centric approach ensures that the digital puppetry effectively communicates across various audiences.

Expanding the cultural context of the study is crucial. Beyond focusing solely on shadow puppetry, the research could explore the integration of aesthetic values from various traditional art forms. This broader approach would provide a more comprehensive understanding of how heritage

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intersects with digital art, providing a more inclusive representation of cultural diversity.

An essential avenue for further research is to explore the long-term impact of digital puppetry learning on participants' artistic practices and perspectives. Investigating how integrating traditional values influences their future artistic endeavors can provide valuable insights into the sustained influence of such educational approaches.

Additionally, there is a need to delve into the role of digital arts, specifically digital puppetry, in cultural preservation. Research could focus on assessing the effectiveness of digital arts in reaching wider audiences and fostering cultural appreciation. Understanding how digital mediums preserve and promote cultural heritage is pivotal for future endeavors.

Conducting comparative studies between different forms of digital artistry rooted in traditional heritage is another avenue for further exploration. By identifying commonalities, differences, and best practices, researchers can contribute to a deeper understanding of preserving cultural aesthetics through digital mediums, informing future approaches in this evolving field.

References

[1] Al Hafidl, A. L., & Supriyanto, A. (2022). the Visual Creation of Petruk Character Using Casting Technique As Window Decoration Elements. ARTISTIC : International Journal of Creation and Innovation, 3(2), 129–145. https://doi.org/10.33153/artistic.v3i2.4496

[2] ANTARA. (2018). President Jokowi signs decree on national Wayang puppet day. ANTARA. https://en.antaranews.com/news/121628/president-jokowi-signs-decree-on-national-wayang-puppet-day

[3] Arifin, M., & Hakim, A. R. (2021a). Kajian Karakter Tokoh Pandawa dalam Kisah Mahabharata Diselaraskan dengan Pendidikan Karakter Bangsa Indonesia. Jurnal Syntax Transformation, 2(05), 613–623. https://doi.org/10.46799/jst.v2i5.284

[4] Arifin, M., & Hakim, A. R. (2021b). Study of Pandawa Characters in Mahabharata's Story Learned With Indonesian Character Education. Management, Business and Social Science (IJEMBIS) Peer Reviewed-International Journal, 1(2), 146–155. https://cvodis.com/ijembis/index.php/ijembis

[5] Buckingham, D. (2015). Defining digital literacy: What do young people need to know about digital media? Nordic Journal of Digital Literacy, 2015(4), 21–34. https://doi.org/10.18261/issn1891-943x-2015-jubileumsnummer-03

[6] Coccoli, M., Guercio, A., Maresca, P., & Stanganelli, L. (2014). Smarter universities: A vision for the fast changing digital era. Journal of Visual Languages and Computing, 25(6), 1003–1011. https://doi.org/10.1016/j.jvlc.2014.09.007

[7] Creswell, J. W., & Clark, V. P. (2011). Mixed methods research. SAGE Publications.

[8] deLisle, J., Goldstein, A., & Yang, G. (2016). Introduction: The internet, social media, and a changing China. In The Internet, Social Media, and a Changing China. University of Pennsylvania Press. https://doi.org/10.9783/9780812292664-001

[9] Dyna, A. (2015). Mengenal Lagi Budaya Indonesia, Tokoh Wayang Pandawa Lima. https://www.kompasiana.com/adynpoe/54ff5e82a33311b14b50fdc2/mengenal-lagi-budaya-indonesia-tokoh-wayang-pandawa-lima

[10] Ethis, E., Malinas, D., & Guillou, L. (2018). The Institutionalization of Artistic and Cultural Education in France and its Experimentation in the Festivals' Sphere. Congress, 41.

[11] Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. Educational Technology Research and Development, 68(5), 2449–2472. https://doi.org/10.1007/s11423-020-09767-4

[12] Fanea-Ivanovici, M., & Pana, M. C. (2020). From Culture to Smart Culture. How Digital Transformations Enhance Citizens' Well-Being through Better Cultural Accessibility and Inclusion. IEEE Access, 8, 37988–38000. https://doi.org/10.1109/ACCESS.2020.2975542

[13] Faris, B. A. (2019). Lunturnya Minat Generasi Muda terhadap Seni dan Budaya Tradisional Indonesia. Indonesiana. https://www.indonesiana.id/read/133646/lunturnya-minat-generasi-muda-terhadap-seni-dan-budaya-tradisional-indonesia#

[14] Hariyanto, H. (2018). The Wayang Performance of Enthus Susmono: A Resistance of Tegal-Pesisiran Identity in Breaking the Tradition Hegemony. Dance & Theatre Review, 1(1). https://doi.org/10.24821/dtr.v1i1.2246

[15] Herdiani, E. (2022). Archives and Arts Digitization as Literacy Potential on Arts History Research. Proceedings of the 4th International Conference on Arts and Design Education (ICADE 2021), 665, 182–185. https://doi.org/10.2991/assehr.k.220601.040

[16] Khajeheian, D. (2013). New venture creation in social media platform; towards a framework for media entrepreneurship. In Handbook of Social Media Management: Value Chain and Business Models in Changing Media Markets (pp. 125–142). Springer. https://doi.org/10.1007/978-3-642-28897-5_8

[17] Kim, S., Im, D. U., Lee, J., & Choi, H. (2019). Utility of digital technologies for the sustainability of Intangible Cultural Heritage (ICH) in Korea. Sustainability (Switzerland), 11(21), 6117. https://doi.org/10.3390/su11216117

[18] Kolay, S. (2016). Cultural Heritage Preservation of Traditional Indian Art through Virtual New-media. Procedia - Social and Behavioral Sciences, 225, 309–320. https://doi.org/10.1016/j.sbspro.2016.06.030

[19] Lichty, P. (2014). The Translation of Art in Virtual Worlds. In The Oxford Handbook of Virtuality (Vol. 16, Issue 4, pp. 444–462). Oxford Handbooks.

[20] Mastuti, D. W. R. (2014). Wayang Potehi Gudo : Seni Pertunjukan Peranakan Tionghoa di Indonesia (Chinese

_____

Peranakan Performing Arts in Indonesia) (A. Dahana (ed.)). Sinar Harapan.

[21] Meyers, E. M., Erickson, I., & Small, R. V. (2013). Digital literacy and informal learning environments: An introduction. Learning, Media and Technology, 38(4), 355–367. https://doi.org/10.1080/17439884.2013.783597

[22] Miller, A. I. (2019). The Artist in the Machine. In The Artist in the Machine. Mit Press. https://doi.org/10.7551/mitpress/11585.001.0001

[23] Ozdemir, D. (2022). A Conceptual Framework on the Relationship of Digital Technology and Art. International Journal on Social and Education Sciences, 4(1), 121–134. https://doi.org/10.46328/ijonses.313

[24] Permana, A. (2007). … Avoidance, Individualism and Collectivism serta Masculinity and Feminity terhadap Praktek Kompensasi: studi kasus pada grup-grup wayang kulit di Yogyakarta. Universitas Gadjah Mada. http://etd.repository.ugm.ac.id/penelitian/detail/139639

[25] Pistola, T., Diplaris, S., Stentoumis, C., Stathopoulos, E. A., Loupas, G., Mandilaras, T., Kalantzis, G., Kalisperakis, I., Tellios, A., Zavraka, D., Koulali, P., Kriezi, V., Vraka, V., Venieri, F., Bacalis, S., Vrochidis, S., & Kompatsiaris, I. (2021). Creating immersive experiences based on intangible cultural heritage. Proceedings - 2021 IEEE International Conference on Intelligent Reality, ICIR 2021, 17–24. https://doi.org/10.1109/ICIR51845.2021.00012

[26] Prasojo, E. N., & Arifin, M. (2022). Manifestasi Transformasi Nilai-Nilai Ajaran Islam Dalam Tokoh Wayang Kulit Pandawa Lima pada Cerita Mahabharata. Jurnal Dirosah Islamiyah, 4(2), 304–321.

[27] Puguh, D. R., Utama, M. P., & Amaruli, R. J. (2019). Peranan Perguruan Tinggi di Semarang dalam Pelestarian Wayang Orang Ngesti Pandowo. Jurnal Sejarah Citra Lekha, 4(2), 137–152. https://doi.org/10.14710/jscl.v4i2.25753

[28] Ruhanen, L., & Whitford, M. (2019). Cultural heritage and Indigenous tourism. In Journal of Heritage Tourism (Vol. 14, Issue 3, pp. 179–191). Routledge. https://doi.org/10.1080/1743873X.2019.1581788

[29] Santoso, T., & Setyawan, B. (2019). Wayang Golek Menak: Wayang Puppet Show as Visualization Media of Javanese Literature. Proceedings of the 1st Seminar and Workshop on Research Design, for Education, Social Science, Arts, and Humanities, SEWORD FRESSH 2019, April 27 2019, Surakarta, Central Java, Indonesia. https://doi.org/10.4108/eai.27-4-2019.2286930

[30] Subrata, H., Yuwana, S., & Pairin, U. (2018). Ethnopuitics of puppetry qjavanese sulukq as language and art learning material. 1st International Conference on Education Innovation (ICEI 2017), 140–143. https://doi.org/10.2991/icei-17.2018.37

[31] Suyanto, & Setiawan, A. (2022). Shadow Puppets In The Hands Of The Young Puppeteers: Loss Of Philosophy Value. Mudra Jurnal Seni Budaya, 37(4), 358–367. https://doi.org/10.31091/mudra.v37i4.2049

[32] UNESCO. (n.d.). Wayang puppet theatre. https://ich.unesco.org/en/RL/wayang-puppet-theatre-00063

[33] Walker, J. A. (2019). Art in the Age of Mass Media. In Art in the Age of Mass Media. Routledge. https://doi.org/10.4324/9780429039386

[34] Wang, C. Y. (2019). Building a Network for Preserving Intangible Cultural Heritage through Education: A Study of Indonesian Batik. International Journal of Art and Design Education, 38(2), 398–415. https://doi.org/10.1111/jade.12200

[35] Wiratama, R. (2020). Cerita Panji sebagai Repertoar Lakon Wayang Gêdhog Gaya Surakarta Telaah Struktur Teks, Makna dan Kaitannya dengan Pertunjukan. Jurnal Kajian Seni, 5(2), 129. https://doi.org/10.22146/jksks.46736

[36] Yasasusastra, J. S. (2011). Mengenal Tokoh Pewayangan Biografi, Bentuk dan Perwatakannya Tokoh Wayang Dewa Tokoh Wayang Ramayana Tokoh Wayang Mahabharata. Pustaka Mahardika.

[37] Yudoseputro, W. (1993). Rupa Wayang Dalam Seni Rupa Kontemporer Indonesia. Institut Kesenian Jakarta-LPKJ.