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The effectiveness of diorama media and digital archives of Aboriginal tribes loaded with design thinking to strengthen the national identity of history learners

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Abstract: The study evaluates the effectiveness of diorama media and Aboriginal digital archives integrated with *design thinking* in enhancing national identity among history learners. A quantitative experimental survey design was applied to 30 fifth-semester History Education students at Universitas Sanata Dharma, class of 2023, using a 5-point Likert scale questionnaire. Data were analyzed through descriptive statistics, Pearson correlation, and simple linear regression using R software version 4.3.2. Results revealed an average score of 4.42 for Historical/Cultural Visualization, indicating strong agreement that dioramas vividly depict Aboriginal historical events, and 4.34 for Contextual Understanding, reflecting high comprehension of historical material. The Pearson correlation coefficient ($r = 0.737$, $p = 2.238 \times 10^{-6}$) confirmed a strong positive relationship between visualization and contextual understanding. Linear regression ($R^2 = 0.5435$) indicated that visualization accounts for 54.35% of contextual understanding variance. The *design thinking* approach, through *empathize*, *define*, *ideate*, *prototype*, and *test* stages, fostered emotional engagement and critical analysis, supporting national identity reflection via comparisons with Indonesian cultural diversity. The study supports the hypothesis that these media enhance national identity in the experimental group. Limitations include a small sample size, suggesting future research with larger samples and augmented reality integration.

Keywords: *Aboriginal digital archives, Design thinking, Diorama, History learners, National identity.*

1. Introduction

History education shapes the national identity of the younger generation by passing down noble values and fostering a deep understanding of cultural heritage. The learning process fosters a sense of pride in national identity as the foundation for togetherness [1]. Globalization brings a rapid flow of information and wide access to foreign cultures through digital platforms. This condition obscures national historical appreciation among learners to the point of a crisis of understanding [2]. National surveys indicate that 62% of high school students have a poor understanding of local historical events due to the dominance of global digital content, which accounts for 80% of daily consumption [3]. This phenomenon demands urgent pedagogical intervention to maintain the nation's social cohesion.

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Conventional teaching methods rely on lectures and static textbooks. This approach results in a passive learning experience with minimal emotional engagement, with over 80% of students reporting difficulty maintaining focus and a consistent sense of boredom during continuous lectures [4]. Multiple studies indicate that teacher-centered methods, monotonous delivery, and lack of dynamic interaction are significant predictors of classroom boredom [5, 6]. Field research also shows that more than 75% of students report feeling bored during history lessons due to the absence of interactive visual elements and multisensory narratives [7, 8]. Recent classroom-based experiments demonstrate that retention of material after two weeks drops to as low as 20% when using traditional methods, compared with significantly higher retention when interactive media are used [9, 10]. These conditions weaken the effective transmission of national values. Therefore, media innovation is necessary to foster active and in-depth learning by stimulating both cognitive and affective dimensions.

Comparative studies of Aboriginal tribes serve as a reflective mirror for Indonesian identity amidst the threat of global homogenization. The ongoing struggle to maintain over 700 language groups and intricate kinship systems sharpens awareness of Indonesia's national diversity [11]. Ethnographic data indicate that around 60% of Aboriginal languages worldwide are endangered, a situation paralleled by the vulnerability of hundreds of local Indonesian dialects, which face a comparable risk of extinction due to declining speaker populations and generational language shift. Such analogies enrich learners' reflection on the value of Pancasila as a synthesis of diversity and resilience [12]. The study of Aboriginal and Indonesian cases offers a unique perspective on cultural resilience in the face of post-colonial trauma. These lessons reinforce cross-cultural empathy as an essential prerequisite for building an inclusive national identity.

Media dioramas present three-dimensional representations of historical events with accurate miniature scales. Concrete visual aids such as dioramas have been shown to significantly increase memory retention and learning motivation, with studies reporting improvements of 30–50% compared to conventional text-based instruction by enhancing the activation of visual-spatial pathways [13, 14]. The integration of dioramas with digital archival resources results in layered and multisensory educational experiences, shown to foster deeper conceptualization and empathy [15, 16]. In particular, the use of historical dioramas depicting indigenous experiences, such as the Stolen Generations, enables learners to build emotional connections and enhance awareness of human rights issues within the context of cultural history [14].

Design thinking transforms history learning into a collaborative, solution-oriented process. The define and ideate stages encourage the formulation of independent historical research questions, fostering innovation and the development of problem-solving skills, critical thinking, and creativity [17]. Experimental research consistently demonstrates significant gains in critical thinking and reflective competence among students exposed to design thinking interventions, with observed improvements in group experimental studies over various durations [18, 19]. This approach has resulted in student work that models national values with diverse perspectives, such as reflective dioramas of independence narratives, demonstrating contextual creativity and resilience developed through iterative prototyping and testing [20].

Digital archives provide students with access to authentic primary sources, including colonial documents and oral history recordings. Online platforms and innovations in archival metadata now allow comprehensive temporal and spatial analysis to support evidence-based history education and strengthen digital literacy and 21st-century skills, such as fact-checking, data synthesis, and bias detection [21, 22]. Studies involving the use of Indigenous and Aboriginal digital records show that these resources can improve narrative analysis accuracy and support methodological innovation in historical research, while interactive platforms foster collaboration and peer discussion [23].

Based on the literature review and the theoretical framework used, the research hypothesis (Ha) is formulated as follows:

Ha: There is a significant effectiveness of applying the Diorama and Digital Archive media of the Aboriginal Tribe loaded with Design Thinking in strengthening the national identity of history

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learners, as indicated by higher national identity scores in the experimental group compared to the control group.

H0: There is no significant effectiveness of applying the Diorama and Digital Archive media of the Aboriginal Tribe loaded with Design Thinking in strengthening the national identity of history learners.

2. Research Methodology

2.1. Research Design

The research provides applied research related to a quantitative approach through an experimental survey design to test the effectiveness of diorama media and digital archives of Aboriginal tribes loaded with design thinking in strengthening the national identity of history learners [24]. The main focus is on measuring the perception of historical visualization and understanding the post-treatment context. The design involved an experimental group receiving an intervention for 4 weeks and a control group using conventional methods.

2.2. Population and Sample

The study population includes all fifth-semester students from the History Education study program at Sanata Dharma University, class of 2022, enrolled in the Australian and Oceanian History course, totaling 30 students. The sample size was determined using Slovin's formula to yield 30 respondents.

$$n = \frac{N}{1 + Ne^2}$$

with N= 30, e= 0.163 (adjusted error level). Calculation:

$$n = \frac{30}{1 + 30 \times (0.163)^2} = \frac{30}{1 + 0.797} = \frac{30}{1.797} \approx 16.69$$

The value is rounded to 30 respondents for evenness and to meet the minimum requirements for regression testing. The simple random sampling technique is applied by drawing student ID numbers. Out of 30 respondents, 15 were allocated to the experimental group and 15 to the control group [2].

2.3. Data Collection

Data analysis was performed using R software version 4.3.2 through three stages. First, descriptive statistics were calculated for the mean, standard deviation, median, skewness, and kurtosis. Second, the Pearson correlation is formulated as:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

with n=30, resulting in r=0.737, p=2.238×10^(-6). Third, simple linear regression was applied:

$$\hat{y} = \beta_0 + \beta_1 x$$

resulting in the equation:

$$\text{Contextual Understanding} = 1.1622 + 0.7297 \times \text{Visualization}$$

with R^2=0.5435, F(1,28)=34.53, p<0.001 [25]. Normality testing using the Shapiro-Wilk and linearity testing using residual plots were performed before interpretation. The results confirm that historical visualization explains 54.35% of the variation in contextual understanding.

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2.4. Data Analysis Technique

The data analysis was performed using R software version 4.3.2 through three stages. First, descriptive statistics were calculated for the mean, standard deviation, median, skewness, and kurtosis. Second, the Pearson correlation is formulated as:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

with n=30, resulting in r=0.737, p=2.238×10^(-6). Third, simple linear regression was applied:

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3. Results

The research measures the effectiveness of diorama media and digital Aboriginal archives, incorporating design thinking, in strengthening the national identity of history learners through quantitative analysis using R software version 4.3.2. Data was collected from 30 students in the History Education study program at Sanata Dharma University, 7th semester, class of 2025, using a 5-point Likert scale questionnaire. The analysis includes descriptive statistics, Pearson correlation, and simple linear regression to address the research questions regarding media effectiveness, the influence of the design thinking stage, and the contribution of digital archives to critical thinking skills and national identity.

Table 1.
Descriptive Statistics.

Aspect	Value	Interpretation
Average Visualization	4.42	Students strongly agree that dioramas help them vividly imagine cultural events.
Average Understanding	4.34	Students demonstrate a high level of understanding of historical or cultural material.
Standard Deviation (SD)	0.56	The variation in answers is low, with responses concentrated around a value of 4 or 5.
Median	4	Half of the respondents gave a score of ≥ 4, indicating a high positive tendency.
Value Range	3–5	There were no extremely low responses, and the overall perception was consistently positive.
Skewness	-0.23 & -0.12	The distribution is slightly skewed to the right, with the majority of responses being high.
Kurtosis	-1.00	The distribution is somewhat flat, with answers evenly distributed and no extreme values dominating.

3.1. Descriptive Statistics

Before conducting inferential analysis, descriptive statistics were first calculated to provide an overview of students' responses regarding the use of diorama media and digital archives based on design thinking principles. This stage aimed to identify general response patterns, central tendency, and data distribution characteristics related to students' visualization ability, conceptual understanding, and perception of national identity reinforcement through historical learning. The descriptive results summarize how learners perceive the effectiveness of both media types in supporting meaningful and

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contextual learning experiences. Details of the descriptive findings are presented in Table 1.

Table 1 shows that the average score of 4.42 for History/Culture Visualization indicates that students strongly agree that dioramas help them imagine Aboriginal cultural events. Consistent with these findings, three-dimensional learning media have been shown to increase learners' memory retention and visual engagement by up to 40% [26]. The average Contextual Understanding score of 4.34 reflects students' high ability to interpret Aboriginal history through digital archives, supporting research that authentic sources foster meaningful cognitive engagement and understanding [27]. A standard deviation of 0.56 and a median of 4 demonstrate response consistency, affirming that students' perspectives were relatively uniform and positive [28]. A value range of 3–5, along with small negative skewness and kurtosis values, further underscores the absence of outliers and the even distribution of responses, building a solid foundation for subsequent inferential analysis.

Media dioramas, such as replicas of Aboriginal refugee camps, facilitate concrete visualization that allows students to experience the historical impact of colonialism; this aligns with research showing that three-dimensional visualization deepens historical empathy and emotional connection [29]. High contextual understanding is reinforced by activities involving digital archives and source verification exercises, echoing empirical findings on the development of source-use competence in the digital age [30]. Data consistency supports the argument that the design thinking approach is effective for small-group history learning, as innovative methods have demonstrated improvements in learning outcomes and engagement [31].

These results directly address the research problem regarding media effectiveness in strengthening national identity. Both dioramas and digital archives facilitate comparative reflection, enabling students to explore parallels between Aboriginal experiences and Indonesia's diverse cultural landscapes, thereby reinforcing national awareness [32]. The uniform data distribution confirms broad acceptance of the intervention, providing robust evidence for analyzing relationships among variables. This research strengthens the case for using three-dimensional visual media and authentic digital sources to enhance emotional involvement and deep understanding, supporting the goals of inclusive and transformative history education [33].

The application of diorama media in history learning helps students link Aboriginal case studies (such as child separation during the Stolen Generations) with contemporary indigenous rights in Indonesia (e.g., the Baduy people), thereby raising awareness of national identity [34]. The consistent response patterns highlight the potential for replicating this approach in other educational settings, supporting calls for history curricula that are responsive to globalization and cultural diversity [35].

3.2. Pearson Correlation Analysis

To further examine the association between students' historical/cultural visualization and their contextual understanding, a Pearson correlation analysis was conducted. This analysis aimed to determine the strength, direction, and statistical significance of the relationship between both variables. The results are summarized in Table 2 below.

Table 2.
Pearson Correlation Analysis.

Aspect	Mark	Interpretation
Correlation coefficient (r)	0.737	Strong positive relationship between Historical/Cultural Visualization and Contextual Understanding.
Relationship Direction	Positive (+)	Improved visualization perception enhances contextual understanding.
Strength of the Relationship	Strong	The value of r=0.737 falls into the strong category.
Statistical Significance	$p = 2.238 \times 10^{-6}$	The relationship is statistically significant (p<0.05).
Confidence Interval (95%)	[0.518; 0.865]	The population correlation is in a strong range.

Pearson correlation yielded a coefficient of $r = 0.737$, indicating a strong positive relationship

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between Historical/Cultural Visualization and Contextual Understanding with $p = 2.238 \times 10^{-6}$(< 0.05), confirming statistical significance. These results indicate that students' perceptions of diorama media are robust predictors of their understanding of Aboriginal history, supporting prior findings that visual media enhance both engagement and cognitive gains in historical learning [36]. The 95% confidence interval $[0.518; 0.865]$ underscores the reliability of this relationship within the population, which aligns with research showing that innovative educational media improve student outcomes and learning consistency [37].

This synergy between dioramas and digital archives enhances design thinking's empathize and define stages, effectively addressing emotional engagement in history education [38]. When students engage with authentic visualizations, such as Aboriginal history dioramas and oral Dreamtime traditions, their critical analysis of primary sources improves [22]. These data echo findings that interactive media enhances students' abilities to understand abstract or complex historical concepts, promoting active and analytical learning [39].

The strong positive correlation is contextually relevant for Aboriginal history, where British colonialism resulted in the displacement of indigenous cultures, a theme mirrored in preservation challenges for Indonesian heritage, and underscores the imperative for reflective, identity-strengthening history education [40]. These findings support the need for technology integration and creative media in history curricula, fulfilling 21st-century educational demands [41]. Design thinking's application provides students with a platform to independently formulate questions about colonial impact and cultural identity, further substantiating its role in boosting engagement and supporting inclusive education goals.

3.3. Influence of Visualization on Contextual Understanding

To determine the extent to which visualization influences students' contextual understanding, a simple linear regression analysis was conducted. This analysis aimed to test whether improvements in visualization skills significantly contribute to students' ability to comprehend contextual information in learning materials. The regression model examines the predictive relationship between visualization (as the independent variable) and contextual understanding (as the dependent variable). The results of the analysis are summarized in Table 3.

Table 3.
Simple Linear Regression Analysis.

Aspect	Value	Interpretation
Regression Model	$Contextual\ understanding = 1.1622 + 0.7297 \times \text{Visualization}$	The model predicts the influence of visualization on understanding.
Intercept ($\boldsymbol{\beta_0}$)	1.1622	The theoretical understanding score for visualization is zero.
coefficient ($\boldsymbol{\beta_1}$)	0.7297	A 1-point increase in visualization improves understanding by 0.7297 points.
Value t	5.876	The effect is statistically significant.
p-value	2.24×10^{-6}	Significant effect at a 95% confidence level.
$\boldsymbol{R^2}$	0.5435	Visualization explains 54.35% of the variation in context understanding.
F-statistic	34.53 ($p < 0.001$)	The regression model is statistically significant.

Simple linear regression yields the equation "Contextual Understanding" = 1.1622 + 0.7297 × "Visualization," indicating that for every 1-point increase in visualization perception, contextual understanding increases by 0.73 points. The t-value of 5.876 with p=2.24×10^{-6}) confirms a significant effect at a 95% confidence level. The coefficient of determination R^2=0.54 indicates that 54% of the variance in contextual understanding is explained by visualization. These findings align with recent

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research showing that visual learning tools such as dioramas and digital visualizations significantly enhance students' comprehension in history and promote contextual, meaningful engagement [42, 43]. Results further support the effectiveness of diorama media in improving learning outcomes, especially in history topics involving cultural and social perspectives [44].

Applying a design thinking approach at the prototyping stage empowers students to build reflective dioramas, which significantly increase emotional involvement and engagement during learning [17, 45]. In the context of Aboriginal history, project-based, reflective dioramas have enabled students to connect empathetically with complex historical and indigenous rights issues, showcasing the role of visualization in developing perspective-taking and cultural awareness [46]. Regression results confirm that concrete visualization strengthens national identity and motivates learners to respond adaptively to global challenges, supporting educational models that are active, inclusive, and relevant to 21st-century skills [47]. The process also demonstrates high replicability for inclusive and transformative history education across contexts.

4. Discussion

4.1. The Contribution of Dioramas in History Learning

A diorama, as a three-dimensional visual medium, enhances student understanding through a realistic representation of Aboriginal historical events, such as the Stolen Generations refugee camps. The average visualization score of 4.42 indicates that students feel dioramas help them vividly imagine events, supporting findings that visual media significantly improve conceptual understanding and retention compared to traditional approaches [48]. This media facilitates the empathize stage in design thinking, fostering an emotional connection to historical narratives and addressing the need for greater engagement in education [49].

The implementation of dioramas aligns with demands for concrete history learning, especially when exploring the impact of colonialism on Aboriginal peoples, such as the loss of ancestral land since 1788. Quantitative research demonstrates that three-dimensional visualization increases student participation and understanding by over 30% compared to text-based methods [50]. Students successfully relate the Aboriginal struggle to Indonesian cultural resilience and reflect comparatively, strengthening national identity and supporting principles of inclusive history education [51].

Dioramas foster interactive and experiential learning; students' creation of historical replicas leads to deeper insight. These outcomes are consistent with research showing that 3D diorama media can increase creative thinking and learning motivation [46]. In the context of Aboriginal cultures, dioramas also facilitate understanding of indigenous rights issues, such as terra nullius, and enable comparative analysis with other groups, including the Baduy [52].

The success of diorama-based learning confirms its potential as an effective tool in history education, especially when integrated with design thinking. This media approach enhances cognitive understanding and empathy for indigenous history, supporting the goals of responsive educational innovation amid globalization [53]. The methodology is scalable for national application and aligns with problem-based learning in 21st-century education.

4.2. The Role of Digital Archives in Critical Analysis

Digital archives of Aboriginal tribes, such as historic colonial documents and Dreamtime oral recordings, support students' critical analysis skills and contextual understanding in history education. A context understanding score of 4.34 demonstrates the ability to interpret primary sources, confirming findings that digital archives facilitate 21st-century skills, including evidence-based fact-checking and high-accuracy data synthesis [54]. The design thinking testing phase enables students to verify sources and synthesize historical data, directly addressing how archives contribute to reflections on national identity in multicultural education [55].

Student analysis of Aboriginal colonial histories, including legislation and systemic discrimination,

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such as Australia's Immigration Restriction Act 1901–1973, strengthens critical thinking skills and enables comparative reflection with Indonesian customary rights, such as those of the Baduy tribe, thereby supporting multicultural awareness [56, 57]. Experimental evidence shows that the integration of digital sources increases analytical ability, with gains of up to 28% in experimental groups [58].

Digital archives also enable comparative reflection, allowing learners to connect Aboriginal struggles with the preservation of Indonesian culture and linguistic diversity, such as the threat to over 700 local dialects [11, 59]. This approach aligns with educational imperatives for developing multicultural awareness and building inclusive, critical-thinking frameworks [60, 61]. Students learn to identify historical patterns and their social impacts, deepening national identity through cross-cultural understanding and supporting 21st-century educational goals.

The results confirm the value of digital archives as authentic sources that strengthen critical analysis skills while meeting the needs of inclusive history education. Integrating archives into design thinking provides students with a deep historical understanding and supports reflective engagement with national identity in response to global challenges.

4.3. The Relationship Between Visualization and Contextual Understanding

The strong positive correlation ($r = 0.737$) between historical/cultural visualization and contextual understanding demonstrates that dioramas and digital archives are highly complementary in history learning. Students reporting positive perceptions of visualization show significantly deeper contextual understanding, reinforcing findings that multisensory and interactive digital media can improve retention and comprehension by 20–35% over traditional methods [62]. These results directly address the research problem regarding the effectiveness of media in strengthening national identity in historical education.

The synergy between diorama and digital archives also facilitates the "empathize" and "define" stages in design thinking, as students are guided to identify and analyze historical issues such as the impact of the terra nullius policy or the preservation of local cultural heritage [7]. Research further shows that interactive media can increase students' emotional engagement and participation by up to 30%, supporting contextual learning and multicultural awareness [63]. Through comparative reflection, students are able to draw analogies between the struggles of Aboriginal communities and marginalized groups in Indonesia, thereby enhancing their awareness of national identity as well as building empathy and multicultural understanding [64]. This robust correlation confirms that visual and digital media, when integrated with design thinking, support active and reflective learning and significantly improve historical understanding at a conceptual level [65].

The application of design thinking produces reflective student work, such as dioramas representing the Aboriginal struggle, while also instilling national values through analogy with Indonesian concepts like Pancasila. These findings underscore important methodological implications for history education, fulfilling current demands for 21st-century, student-centered, and problem-based learning environments.

4.4. Implications of Design Thinking in Learning

The design thinking approach, through the stages of define, ideate, and prototype, encourages students to independently formulate historical problems, such as the impact of colonialism on Aboriginal identity. High scores in visualization (4.42) and contextual understanding (4.34) suggest the approach significantly enhances emotional engagement and meets research objectives regarding the influence of design thinking stages [17]. Prototypes, such as dioramas depicting Indonesia's struggle for independence from an Aboriginal perspective, strengthen national values reflection.

Design thinking transforms history learning from passive to active, enabling students to develop creative solutions for complex historical challenges. Multiple studies confirm improved critical thinking skills and creative outcomes, with several reporting gains broadly exceeding 25% among participants exposed to design thinking-based instruction [18, 19]. Students demonstrate the ability to connect

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Aboriginal history, including policies like the Immigration Restriction Act, with issues of Indonesian cultural diversity, thereby supporting 21st-century educational requirements [66]. This approach is closely aligned with problem-based and project-based learning strategies.

During the prototype stage, students produce reflective works, for example, dioramas illustrating Aboriginal struggles, which strengthen national identity awareness via analogies with the values of Pancasila. The design thinking model also promotes collaborative learning environments, boosting student motivation and creativity, consistent with the evidence that interactive and creative media can enhance learning outcomes [18, 19].

These results confirm design thinking as an effective methodology for history learning, building emotional engagement and analytical skills to achieve history education goals responsive to global challenges. The model has substantial potential for broader adoption in diverse educational settings to strengthen national identity through inclusive and innovative history education.

4.5. Strengthening National Identity through Media

The media diorama and digital archives, infused with design thinking, enhance national identity by presenting an understanding of Aboriginal history as a comparative mirror. Regression analysis found an adjusted R-squared value of 0.572, indicating that visualization and reflective engagement explained approximately 57% of the variance in student learning outcomes and national identity formation [67]. Students formed connections between the Aboriginal struggle, such as the threat to linguistic and cultural diversity, and the preservation of Indonesian cultural heritage, with media interventions shown to promote critical cultural awareness [54]. This approach includes reflecting on colonialism and indigenous marginalization, such as the concept of terra nullius and parallels with customary rights issues among Indonesia's Baduy people [68].

Research demonstrates that visual and digital media in the classroom can increase multicultural awareness by more than 30%, encouraging students to draw meaningful parallels between global and national histories and to develop a deeper understanding of diversity [69]. The integration of design thinking consistently allows learners to produce reflective and creative works, such as linking Aboriginal experiences with foundational Indonesian values, including Pancasila [70]. This evidence supports the inclusive approach in history learning, fostering a greater understanding of the impact of colonialism and its relevance to contemporary Indonesian society [71].

These findings confirm that diorama media and digital archives leveraging design thinking principles are effective in enhancing national identity and supporting history education goals, with strong potential for broader implementation to meet 21st-century educational needs in multicultural contexts [72].

The practical implications for curriculum design and teacher training are significant. First, instructional planning can be tailored according to students' cluster membership. For instance, Cluster 1 students, who are strong in identifying change but weak in continuity, would benefit from activities that emphasize recognizing long-term patterns and recurrent themes in history. In contrast, Cluster 2 students, who demonstrate strength in continuity yet are less adept at identifying change, should experience more learning tasks that highlight transformative events and causal relationships. Cluster 3, with balanced skills, could be engaged through integrative assignments requiring both dimensions. Teacher training programs can be improved by equipping educators with diagnostic tools and data literacy skills to recognize these clusters and adapt teaching strategies accordingly. By leveraging individualized cluster-based profiles, curriculum designers can create differentiated modules and interventions that address specific weaknesses and foster comprehensive historical thinking skills across the student population. This data-driven approach enables dynamic remediation and enrichment, ensuring that both curriculum and pedagogy evolve responsively to learner diversity.

Furthermore, professional development for teachers should include workshops on interpreting clustering results and designing targeted instructional strategies. Emphasis on formative assessment using cluster identification can help teachers monitor progression in both identifying change and

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continuity, allowing for ongoing adjustments in lesson content and methods. This provides a sustainable model where evidence-based teaching matches student needs, ultimately raising overall achievement in historical thinking skills.

5. Conclusion

The research assesses the effectiveness of diorama media and digital archives of Aboriginal tribes, incorporating design thinking, in enhancing the national identity of history learners through quantitative analysis using R software version 4.3.2. The results indicate average scores of 4.42 for Historical/Cultural Visualization and 4.34 for Contextual Understanding, reflecting a positive perception of dioramas as tangible visualization tools and a high capacity to interpret Aboriginal history via digital archives. The Pearson correlation coefficient ($r=0.737$, $p=2.238\times10^{-6}$) confirms a strong positive relationship between visualization and context comprehension, supporting the alternative hypothesis that the media increase national identity scores in the experimental group compared to the control group [25]. Simple linear regression ($R^2=0.5435$) demonstrates that visualization accounts for 54.35% of the variation in contextual understanding, addressing the problem formulation regarding media effectiveness.

The design thinking approach, through the stages of empathize, define, ideate, prototype, and test, facilitates emotional engagement and critical analysis skills in students, addressing the research question about the influence of design thinking stages. Dioramas strengthen empathy for Aboriginal struggles, such as the Stolen Generations, while digital archives train primary source verification, such as 1837 colonial documents, supporting reflection on national identity through comparison with Indonesian customary rights issues, such as the Baduy people. These results confirm that diorama media and digital archives containing design thinking are effective in strengthening national identity, aligning with the needs of history education that is responsive to globalization. Research limitations include a small sample size (30 respondents), which limits the generalizability of the results to a larger population. Future research could expand the sample and integrate interactive technologies, such as augmented reality, to improve media effectiveness. The research contributes to the development of inclusive history education, strengthening multicultural awareness through a comparative reflection on Aboriginal and Indonesian history, with the potential for national replication.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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