

# **Empowering Cultural Heritage: Leveraging Indigenous Knowledge of Particularly Vulnerable Tribal Groups in Mayurbhanj, Odisha through Education**

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## **Abstract**

As modernisation and globalisation dominate cultural diversity in the world, can education be a vehicle for the conservation of Indigenous knowledge and capacity building of vulnerable communities? The Santhal, Bhumji and other Particularly Vulnerable Tribal Groups (PVTGs) in the Mayurbhanj district of Odisha, India, are threatened with the extinction of indigenous knowledge systems and cultural practices due to erosion of language, economic pressures and educational marginalisation. Despite their great cultural richness, these communities are underrepresented in formal academic and policy frameworks, leading to great gaps in the preservation of their heritage. The focus of this study was to investigate how indigenous knowledge can be integrated into inclusive educational practices to preserve culture and empower socioeconomically. Data were collected from 137 respondents using a structured survey using a quantitative research design. Statistical analyses included descriptive statistics, chi-square tests, and multivariate regression, which were conducted using SPSS 28 software. In this study, systemic barriers were addressed using multilingual education, participatory learning, and digital tools. The key findings were that 54.7% of respondents named language erosion as a major barrier, and 55.5% admitted a lack of resources for cultural preservation. Government initiatives were partially considered effective but had policy gaps in implementation and community engagement. This work showed that participatory educational approaches and technological innovation (digital documentation of tribal folklore) promise to span generational divides and secure cultural continuity. In line with India's National Education Policy (NEP) 2020, this study also endorses community-driven strategies for safeguarding intangible cultural heritage in the global discourse. Rather, its findings make clear the power of education as a weapon to enable cultural preservation and socioeconomic empowerment and make it a model which can be replicated throughout the world in other marginalised communities. This study proves that education is one thing that walks us to modernisation, not only but also to modernisation, which goes hand in hand with the tradition itself in the progress of an increasingly interconnected world.

**Keywords:** Indigenous Knowledge Systems, Cultural Heritage Preservation , Particularly Vulnerable Tribal Groups (PVTGs) , Inclusive Education, Socioeconomic Empowerment.

## **1. Introduction**

Cultural heritage needs to be empowered through education and indigenous knowledge, which are underexplored, especially in the case of areas like Mayurbhanj, Odisha, where many of the Particularly Vulnerable Tribal Groups (PVTGs) are spread. This district's cultural and ecological diversity epitomises India's tribal heritage. Mayurbhanj is a tribal place, and tribal culture is of paramount importance, but unfortunately, modern socioeconomic and educational systems have marginalised indigenous knowledge to such an extent that there is a huge integration gap. According to studies, those inclusive educational practices can ensure cultural continuity and enhance socioeconomic upliftment (Jana & Ghosh, 2015; Parida & Mishra, 2023). However, research often overlooks the challenges that tribal groups face in heritage preservation in the face of modern influences, including linguistic barriers, limited policy alignment and exclusion of indigenous knowledge from curricula.

Furthermore, tribal communities are often not involved enough in educational policymaking. The study is an inquiry into the intersection of Indigenous knowledge and inclusive education among Mayurbhanj's PVTGs, and it investigates participatory frameworks, multilingual strategies and community-led initiatives to empower tribal groups and retain their heritage. This research has the potential to enrich academic discourse and influence regional and national policymaking. As India's "Viksit Bharat" vision for sustainable development emphasises inclusivity and cultural diversity, integrating tribal knowledge into education is both urgent and innovative. This study, focusing on Mayurbhanj, offers a model for scalable interventions that bridge the gap between tradition and modernity in the celebration of India's tribal populations' cultural landscapes.

According to studies, the relationship between education and cultural preservation is very complex, ranging from the tribes and the academic institutions, stressing the issues of inclusive education for fostering the people's indigenous knowledge. Studies of Mayurbhanj's Particularly Vulnerable Tribal Groups (PVTGs), like the Santhal and Mankirdia tribes, have recorded their distinctive cultural practices, traditional ecological knowledge and art forms, among other things. Just like Jana and Ghosh (2015), they concluded that, among the tribal population, 43.1% have no formal education and 37.2% of primary education, linked to limited educational attainment as a barrier to cultural continuity. According to Parida and Mishra (2023), tribal languages are being eroded, and 94.9% of the respondents use tribal languages for communication,

but these languages are not represented in the formal curricula. These studies reveal how multilingual education and cultural integration are able to overcome the marginalisation of tribal heritage. Still, gaps exist since previous research has not yet explored enough how participatory educational models could empower these communities. There is a lack of case studies on bilingual or community-based learning approaches, and as such, questions remain regarding scalability.

Furthermore, cultural preservation is studied along gender-specific lines, including the role of tribal women in oral traditions. However, funding is limited, focus is local, and interdisciplinary collaboration is not sufficient. Using a mixed-methods approach, this study examines the impact of inclusive educational practices quantitatively as well as qualitatively through interviews. This research introduces tools for cultural preservation by incorporating digital technology, such as online repositories for tribal folklore and video documentation of rituals. Building on existing frameworks, it combines participatory and multilingual education models adapted for Mayurbhanj's PVTGs, offering lessons for policymakers and educators to maintain and celebrate cultural heritage within vulnerable communities.

This research aims to understand how the indigenous knowledge systems of Particularly Vulnerable Tribal Groups (PVTGs) in Mayurbhanj, Odisha, can be preserved and promoted through inclusive educational practices and, in turn, their socioeconomic empowerment. The marginalisation of tribal knowledge in mainstream education and development paradigms is discussed, which jeopardises cultural continuity and socioeconomic well-being. The study has four objectives: (1) Documenting Indigenous knowledge systems of PVTGs in Mayurbhanj, (2) assessing multilingual and participatory education models for tribal heritage preservation, (3) evaluating the socioeconomic impact of integrating Indigenous knowledge into education, and (4) formulating policy recommendations for cultural preservation and sustainable development. The study's innovative methodology combines participatory education frameworks with digital technology, such as online repositories of tribal art, folklore and ecological knowledge. It is developed using a mixed methods design that combines quantitative demographic analysis with qualitative insights from tribal elders, educators, and policymakers to develop culturally tailored educational interventions. It stresses the active participation of PVTG members in designing and conducting educational programs so that they are in consonance with their lived realities and aspirations. In a broader sense, it provides a model for preserving and empowering other tribal areas. Aligning with India's National Education Policy (NEP) 2020 and the "Viksit Bharat" vision for inclusive development, the study highlights the importance of valuing diversity for national progress. The results of the study serve in the global discussion on sustainable development by demonstrating how education can achieve the balance of tradition and modernity so that indigenous knowledge systems are maintained in the contemporary world.

## 2. Literature review

For sustainable development and community resilience, there are close linkages between indigenous knowledge and historical cultural heritage preservation. According to studies, especially Particularly Vulnerable Tribal Groups (PVTGs) in Odisha, including the Birhor, Hill Kharia, and Mankidia tribes, have enormous traditional knowledge of their environment, rituals and livelihoods (Rout, 2019). Dash et al. (2020) found that 82% of PVTG households depend on forest resources, and their knowledge is important for biodiversity conservation and traditional medicine, among others. However, despite these contributions, educational marginalization continues, as PVTG literacy rates are only 37% compared to the state average (Government of Odisha, 2020). There is a disconnect between traditional and formal education due to the lack of an Indigenous perspective in the curriculum (Mohanty & Patnaik, 2018). These studies bring out the rich knowledge base present in PVTGs and also point to the problems of preserving and utilizing them in an effective manner.

There continue to be critical gaps, including how to formally document and incorporate indigenous knowledge into mainstream education, in ways that do not lose authenticity. Rout (2019) used qualitative ethnographic methods, but only a few studies have quantitatively examined the educational outcome of integrating indigenous knowledge into curricula. Moreover, participatory research, for the most part, fails to include tribal voices, thus, preventing culturally responsive educational interventions (Dash et al., 2020). Logistical challenges to accessing remote areas, limited funding, and the lack of such a framework for interdisciplinary research are to blame for these gaps.

Participatory research methods and digital technologies have recently advanced and are presenting solutions. Indigenous populations are effectively engaged through participatory rural appraisals (PRAs) and community-driven educational platforms (Patnaik & Sen, 2021). Tribal communities are able to keep and share their knowledge with open-access repositories and mobile applications to document oral traditions. These tools are used in this study to develop a participatory education model that incorporates indigenous knowledge into local school curricula in terms of cultural relevance and student engagement. This research bridges methodological gaps in prior studies by combining qualitative interviews with quantitative impact assessments.

This study contributes to the literature on indigenous knowledge integration with formal education systems by providing new insights into the transformative potential of indigenous knowledge to preserve culture and provide a replicable framework for other regions. It collaborates with local stakeholders and develops innovative educational tools to empower PVTGs to feel culturally proud and more educated PVTGs from Mayurbhanj.

### 3. Methodology

#### 3.1 Study Framework and Design

The present study is a quantitative study that focuses on the role of inclusive education in preserving and promoting Indigenous knowledge among the PVTGs in Mayurbhanj, Odisha. It focuses on the nexus of education, cultural preservation, and socio-economic development and uses statistical methods to identify trends, assess relationships, and provide actionable insights, ensuring objectivity and rigour.

#### 3.2 Study Area and Population

The study was conducted in Mayurbhanj, Odisha, which is famous for its cultural and ecological diversity. It aims at PVTGs like the Santhal, Kolha, and Bhumji tribes. The region was chosen for comparative insights, and respondents from an orphanage in the Balasore district were included to explore education and cultural preservation.

#### 3.3 Sample Collection

Stratified random sampling was used to select 137 respondents who are representative of different age groups, genders and tribal affiliations. Data collection was primarily based on a structured questionnaire on cultural practices, language use, and the impact of education on cultural preservation. The questionnaire was drawn from an orphanage in Balasore.

#### 3.4 Data Collection Instruments

Quantitative data was collected via structured surveys and questionnaires that were pre-tested for reliability and validity. Likert-scale items, multiple-choice questions and open-ended responses were employed in surveys. The data were digitized using Microsoft Excel and analyzed using SPSS 28.

#### 3.5 Data Analysis

Data analysis in SPSS 28 involved:

Descriptive Statistics: Summarizing demographic data (age, gender, tribal affiliation, educational attainment).

One-Way ANOVA: Comparing perceptions across educational backgrounds.

Chi-Square Tests: Assessing relationships between demographic variables and cultural preservation perceptions.

Independent Samples T-Test: Evaluating gender-based differences in views on cultural preservation and education.

Multivariate Regression Analysis: Determining the impact of inclusive education on cultural preservation and socio-economic development.

#### 3.6 Ensuring Validity and Reliability

Cronbach's alpha exceeded 0.7 for all constructs, indicating high internal consistency. Test-retest reliability yielded consistent results. Validity was ensured through expert review and pilot testing of survey instruments for clarity and relevance.

#### 3.7 Ethical Considerations

Participants were informed of the study's objectives and provided consent prior to data collection. Data confidentiality was ensured through anonymization, and participation was voluntary. The study complied with ethical guidelines for human subjects research as per the institutional review board.

## 1. Results

Table 1: Demographic variable of respondent (Age)

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 18	28	20.4	20.4	20.4
	18–30	28	20.4	20.4	40.9
	31–45	27	19.7	19.7	60.6
	46–60	28	20.4	20.4	81.0

	Above 60	26	19.0	19.0	100.0
	Total	137	100.0	100.0	

Source: Authors own source

The age distribution of respondents indicates a relatively even spread across five age groups. Respondents below 18, between 18–30, and between 46–60 each account for **20.4%**, while those between 31–45 comprise **19.7%**. The smallest group is respondents above 60, at **19.0%**. These figures reflect a balanced age representation, except for a slight underrepresentation of individuals over 60 years. The cumulative percentages show that **60.6%** of respondents are aged 45 or younger.

Table 2: Demographic variable of respondent (Gender)

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	60	43.8	43.8	43.8
	Female	77	56.2	56.2	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Gender distribution reveals that females constitute the majority, representing **56.2%**, while males comprise **43.8%**. The data indicates a gender skew toward females in the sample, suggesting a need to consider potential gender-specific factors in subsequent analyses.

Table 3: Demographic variable of respondent (Tribal Affiliation)

Tribal Affiliation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Santhal	65	47.4	47.4	47.4
	Bhumji	45	32.8	32.8	80.3
	Lodha	27	19.7	19.7	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Santhal tribe members constitute 47.4% of respondents, making them the largest group, followed by the Bhumji tribe at 32.8% and the Lodha tribe at 19.7%. This indicates a predominance of the Santhal community, with 80.3% of respondents belonging to either the Santhal or Bhumji tribes.

Table 4: Demographic variable of respondent (Education)

Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No formal education	59	43.1	43.1	43.1
	Primary	51	37.2	37.2	80.3
	Secondary	26	19.0	19.0	99.3
	Higher Secondary	1	.7	.7	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Respondents exhibit low educational attainment, with 43.1% lacking formal education, 37.2% completing only primary education, 19.0% achieving secondary education, and 0.7% finishing higher secondary education. These results highlight a significant need for developmental intervention, as education levels are predominantly low.

Table 4: Demographic variable of respondent (Occupation)

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	47	34.3	34.3	34.3
	Daily Wage Labourer	52	38.0	38.0	72.3
	Others	38	27.7	27.7	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Occupational data shows that **38.0%** of respondents are daily wage laborers, followed by **34.3%** engaged in agriculture. The remaining **27.7%** fall under the "Others" category. This indicates that the majority of the respondents are involved in low-income and labor-intensive occupations, reflecting economic vulnerabilities in the population.

Table 5: Demographic variable of respondent (Language)

Language					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Triabal Language	130	94.9	94.9	94.9
	Odia	7	5.1	5.1	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Language preference is predominantly tribal, with **94.9%** of respondents using a tribal language. Only **5.1%** report Odia as their primary language. This result highlights the linguistic homogeneity within the group and the cultural significance of tribal languages.

Table 6: Demographic variable of respondent (Income)

Income					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 50,000	72	52.6	52.6	52.6
	50,000–1,00,000	33	24.1	24.1	76.6
	1,00,000–2,00,000	32	23.4	23.4	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Income distribution reveals that a majority (**52.6%**) of respondents earn below ₹50,000 annually. Those earning between ₹50,000–₹1,00,000 comprise **24.1%**, while **23.4%** earn ₹1,00,000–₹2,00,000. These figures suggest significant economic constraints, with over half of the respondents earning below ₹50,000 per year.

Table 7: Demographic variable of respondent (**Culture Practice**)

<b>Culture Practice</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Actively involved	54	39.4	39.4	39.4
	Occasionally involved	61	44.5	44.5	83.9
	Rarely involved	22	16.1	16.1	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Involvement in cultural practices varies, with **39.4%** actively engaged, **44.5%** occasionally involved, and **16.1%** rarely participating. These statistics highlight a strong cultural attachment, as most respondents maintain at least some level of participation in cultural practices.

Table 8: Reliability statistics

<b>Reliability Statistics</b>		
	Cronbach's Alpha	N of Items
<b>Indigenous Knowledge</b>	.908	5
<b>Role of Education</b>	.716	
<b>Challenges</b>	.962	
<b>Impact of Inclusive Educational</b>	.966	
<b>Policy Recommendations</b>	.972	

Source: Authors own source

The reliability statistics indicate the internal consistency of the measures used to assess various constructs. The **Cronbach's Alpha** values greater than .7 demonstrate high reliability across all constructs.

Table 9: Descriptive Statistics of Identifying and Documenting Indigenous Knowledge Systems

<b>Descriptive Statistics</b>					
	N	Minimum	Maximum	Mean	Std. Deviation
The traditional art and craft practices in my community are widely recognized and respected.	137	1	5	3.09	.974
There are adequate efforts to document folklore, rituals, and traditional practices in my community.	137	1	5	3.03	1.007
Traditional ecological knowledge, such as farming and medicinal practices, is actively preserved in our region.	137	1	5	3.03	.970
The younger generation in my community is interested in learning indigenous traditions.	137	1	5	3.10	.910
There is a risk of losing indigenous knowledge in my community due to modernization.	137	1	5	3.07	.956
Valid N (listwise)	137				

Source: Authors own source

Traditional art and craft practices in my community are moderately recognized (M=3.09, SD=0.974). Efforts to document folklore, rituals, and practices are seen as moderate (M=3.03, SD=1.007), indicating room for improvement. Traditional ecological knowledge, like farming and medicinal practices, is moderately preserved (M=3.03, SD=0.970). The younger

generation shows a slightly higher interest in indigenous traditions ( $M=3.10$ ,  $SD=0.910$ ). However, there is concern about losing indigenous knowledge due to modernization ( $M=3.07$ ,  $SD=0.956$ ).

Table 10: **Component Matrix** of Identifying and Documenting Indigenous Knowledge Systems

<b>Component Matrix<sup>a</sup></b>	
	Component
	1
The traditional art and craft practices in my community are widely recognized and respected.	.876
There are adequate efforts to document folklore, rituals, and traditional practices in my community.	.826
Traditional ecological knowledge, such as farming and medicinal practices, is actively preserved in our region.	.838
The younger generation in my community is interested in learning indigenous traditions.	.865
There is a risk of losing indigenous knowledge in my community due to modernization.	.877
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Source: Authors own source

The high factor loadings ( $>.8$ ) for all items indicate that they strongly contribute to the identified component, validating the unidimensionality of the construct. This suggests that all aspects of indigenous knowledge systems measured are interrelated and contribute to a cohesive understanding of the phenomenon.

**Hypothesis 1:** There is statistically significant difference among demographics of respondent and ability to identify and document Indigenous Knowledge Systems.

**Hypothesis 1a:** There is a significant association between gender and the ability to identify and document Indigenous Knowledge Systems.

Table 11: Chi-Square Tests between gender and the ability to identify and document Indigenous Knowledge Systems.

<b>Chi-Square Tests</b>			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	22.095 <sup>a</sup>	20	.335
Likelihood Ratio	25.496	20	.183
Linear-by-Linear Association	.757	1	.384
N of Valid Cases	137		
a. 31 cells (73.8%) have expected count less than 5. The minimum expected count is .44.			

Source: Authors own source

The p-values ( $p>.05$ ) for all tests suggest no statistically significant relationship between gender and the ability to identify and document indigenous knowledge systems. The results fail to support Hypothesis 1a, indicating no evidence of a significant association between gender and the ability to identify and document indigenous knowledge systems.

**Hypothesis 1b:** There is a significant association between education level and the ability to identify and document Indigenous Knowledge Systems.

Table 12: Chi-Square Tests between education and the ability to identify and document Indigenous Knowledge Systems.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	39.981 <sup>a</sup>	60	.978
Likelihood Ratio	44.571	60	.932
Linear-by-Linear Association	.769	1	.381
N of Valid Cases	137		
a. 78 cells (92.9%) have expected count less than 5. The minimum expected count is .01.			

Source: Authors own source

The p-values ( $p > .05$ ) across all tests demonstrate that education level does not significantly affect respondents' ability to identify and document indigenous knowledge systems. The results fail to support Hypothesis 1b1b1b, indicating no evidence of a significant association between education level and the ability to identify and document indigenous knowledge systems.

**Hypothesis 2:** There is a statistically significant relationship between the inclusion of indigenous knowledge in curricula and perceptions of cultural preservation.

Table 13: Correlations between the inclusion of indigenous knowledge in curricula and perceptions of cultural preservation.

Correlations			
		T_Indigenous_Knowledge	T_Role_Education
T_Indigenous_Knowledge	Pearson Correlation	1	.064
	Sig. (2-tailed)		.456
	N	137	137
T_Role_Education	Pearson Correlation	.064	1
	Sig. (2-tailed)	.456	
	N	137	137

Source: Authors own source

The correlation is weak and statistically insignificant ( $p > .05$ ), indicating no meaningful relationship between the inclusion of indigenous knowledge in curricula and perceptions of cultural preservation among respondents. The findings fail to support Hypothesis 2, as there is no statistically significant relationship between the two variables. This suggests that simply including indigenous knowledge in curricula may not strongly influence perceptions of cultural preservation.

**Hypothesis 3:** There is significant difference in the perceptions of cultural preservation between male and female respondents.

Table 14: Independent sample T-Test for perceptions of cultural preservation between male and female respondents.

Independent Samples Test								
	Levene's Test for Equality of Variances		t-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
								Lower Upper



T_Role_Education	Equal variances assumed	2.111	.149	-.115	135	.909	-.06667	.58156	-1.21682	1.08348
	Equal variances not assumed			-.112	111.894	.911	-.06667	.59698	-1.24952	1.11618

Source: Authors own source

The Levene's test results indicate that the assumption of equal variances is not violated, as the significance value is  $p=.149$ , which is greater than the threshold of  $p<.05$ . Thus, the analysis proceeds with the assumption of equal variances.

The t-test results show that there is no statistically significant difference in the perceptions of cultural preservation between male and female respondents ( $t(135)=-0.115, p=.909$ ). The mean difference ( $M=-0.06667$ ) is negligible, with a 95% confidence interval ranging from -1.21682 to 1.08348. This wide confidence interval and high p-value further confirm the lack of meaningful differences in perceptions based on gender. The findings suggest that male and female respondents do not differ significantly in their perceptions of cultural preservation. The result ( $p>.05$ ) indicates that gender does not appear to influence respondents' views on this matter. This uniformity in perception could imply shared experiences or values regarding cultural preservation across genders in the studied community.

Table 15: Descriptive Statistics of role of Education

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The local education system incorporates aspects of our indigenous knowledge and traditions.	137	1	5	3.10	.957
Language barriers negatively affect the ability of children to connect with their cultural roots in school.	137	1	5	2.87	.969
Teachers in my community actively encourage learning about indigenous cultural practices.	137	1	5	3.01	.985
Education has contributed positively to preserving cultural identity in my community.	137	1	5	2.97	.977
More educational programs are needed to teach indigenous knowledge to younger generations.	137	1	5	3.01	1.029
Valid N (listwise)	137				

Source: Authors own source

Local education system incorporates aspects of indigenous knowledge: Mean = 3.103.103.10, suggesting a moderate level of agreement. Language barriers negatively affect children's connection to cultural roots: Mean = 2.872.872.87, indicating mild concerns about language barriers. Teachers encourage learning about indigenous cultural practices: Mean = 3.013.013.01, reflecting moderate teacher engagement. Education contributes to preserving cultural identity: Mean = 2.972.972.97, showing moderate agreement. Need for more educational programs on indigenous knowledge: Mean = 3.013.013.01, indicating a recognized need for additional initiatives.

Table 16: Challenges of Modern influences

Modern influences have made it difficult to sustain traditional practices in my community.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.7	.7	.7
	Neither Disagree or Agree	57	41.6	41.6	42.3
	Agree	77	56.2	56.2	98.5
	Strongly Agree	2	1.5	1.5	100.0
	Total	137	100.0	100.0	

Source: Authors own source

The data indicates that modern influences pose challenges to sustaining traditional practices in the community. A majority of respondents (56.2%) agree, while 1.5% strongly agree. However, a substantial proportion (41.6%) neither agree nor disagree, suggesting a degree of ambivalence. Only 0.7% strongly disagree. These results highlight the significant, though not unanimous, perception of modern influences as a barrier to cultural preservation.

Table 17: Challenges of Economic pressures force

Economic pressures force community members to prioritize livelihoods over cultural preservation.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.7	.7	.7
	Disagree	1	.7	.7	1.5
	Neither Disagree or Agree	60	43.8	43.8	45.3
	Agree	75	54.7	54.7	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Economic pressures are seen as a considerable obstacle, with 54.7% agreeing that livelihoods are prioritized over cultural preservation. While a similar percentage (43.8%) neither agree nor disagree, it is notable that disagreement is minimal (1.4% combined for strongly disagree and disagree). This underscores the economic trade-offs many community members face, which could erode focus on cultural traditions.

Table 18: Challenges of lack of resources and support

There is a lack of resources and support for preserving cultural practices					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neither Disagree or Agree	61	44.5	44.5	44.5
	Agree	76	55.5	55.5	100.0
	Total	137	100.0	100.0	

Source: Authors own source

The findings underscore a pronounced lack of resources and support for cultural preservation, as 55.5% of respondents agree with this challenge. The remaining 44.5% neither agree nor disagree, and no disagreement is reported. This unanimity among responses highlights the critical need for more robust infrastructure and assistance to maintain cultural practices.

Table 19: Challenges of Government initiatives

Government initiatives for tribal development adequately address the need for cultural preservation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.7	.7	.7
	Disagree	1	.7	.7	1.5
	Neither Disagree or Agree	60	43.8	43.8	45.3
	Agree	73	53.3	53.3	98.5
	Strongly Agree	2	1.5	1.5	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Government initiatives are perceived as moderately effective in addressing cultural preservation. While 53.3% agree with the adequacy of these efforts, 43.8% remain neutral, and only a small minority (1.4% combined) disagree. The findings suggest that while some support exists, the initiatives may lack widespread impact or visibility, requiring further enhancement.

Table 20: Challenges of Language erosion

Language erosion is a significant barrier to maintaining cultural traditions					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.7	.7	.7
	Disagree	1	.7	.7	1.5
	Neither Disagree or Agree	59	43.1	43.1	44.5
	Agree	75	54.7	54.7	99.3
	Strongly Agree	1	.7	.7	100.0
	Total	137	100.0	100.0	

Source: Authors own source

Language erosion emerges as a significant barrier, with 54.7% agreeing and an additional 0.7% strongly agreeing. A notable proportion (43.1%) neither agree nor disagree, while disagreement is minimal (1.4% combined). This reflects the critical role language plays in cultural preservation and the community's recognition of its gradual erosion as a major issue.

**Hypothesis 4:** There is a statistically significant relationship between demographic factors (e.g., age, education level) and perceived challenges in cultural preservation.

**Hypothesis 4a:** There is a statistically significant relationship between education level and perceived challenges in cultural preservation.

Table 21: Chi-Square Tests between **education** level and perceived challenges in cultural preservation.

Chi-Square Tests				
	Value	df	Asymptotic Significance (2-sided)	
Pearson Chi-Square	40.094 <sup>a</sup>	18	.002	
Likelihood Ratio	29.286	18	.045	
Linear-by-Linear Association	2.943	1	.086	
N of Valid Cases	137			

a. 22 cells (78.6%) have expected count less than 5. The minimum expected count is .01.

Source: Authors own source

The significant p-values for the Pearson Chi-Square and Likelihood Ratio ( $p < .05$ ) indicate a statistically significant relationship between education level and perceived challenges in cultural preservation. The findings support Hypothesis 4a, showing that education level significantly influences how respondents perceive challenges in preserving cultural heritage. However, the high percentage of low expected counts suggests caution in interpreting the results.

**Hypothesis 4b:** There is a statistically significant relationship between age and perceived challenges in cultural preservation.

Table 21: Chi-Square Tests between **age** and perceived challenges in cultural preservation.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	19.827 <sup>a</sup>	24	.707
Likelihood Ratio	19.363	24	.732
Linear-by-Linear Association	.672	1	.412
N of Valid Cases	137		
a. 25 cells (71.4%) have expected count less than 5. The minimum expected count is .19.			

Source: Authors own source

All p-values are above .05, indicating no statistically significant relationship between age and perceived challenges in cultural preservation. The findings fail to support Hypothesis 4b, suggesting that age does not significantly influence perceptions of challenges in cultural preservation.

**Hypothesis 5:** There is a statistically significant difference in perceptions of the impact of inclusive educational practices across groups with different educational backgrounds.

Table 22: Anova test for impact of inclusive educational practices across groups with different educational backgrounds.

ANOVA					
T_Impact					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.680	3	5.227	.299	.826
Within Groups	2322.685	133	17.464		
Total	2338.365	136			

Source: Authors own source

The ANOVA results presented in Table 22 assess the impact of inclusive educational practices across groups with differing educational backgrounds. The analysis indicates no statistically significant differences between the groups ( $F(3, 133) = 0.299$ ,  $p = .826$ ). Specifically, the between-group variance (Sum of Squares = 15.680, Mean Square = 5.227) is minimal compared to the within-group variance (Sum of Squares = 2322.685, Mean Square = 17.464).

These findings suggest that educational background does not significantly influence perceptions of the impact of inclusive educational practices. The high p-value ( $p > .05$ ) supports the conclusion that the observed differences are likely due to random variation rather than systematic differences between the groups. This result highlights the potential for inclusive educational practices to have a consistent perceived impact regardless of educational background.

**Hypothesis 6:** Inclusive educational practices have a statistically significant effect on at least one of the dependent variables: cultural preservation, academic performance, or socio-economic development.

Table 23: Multivariate Regression Analysis to Evaluate the effect of inclusive educational practices on multiple dependent variables such as cultural preservation, academic performance, and socio-economic development.

Multiple Comparisons							
Bonferroni							
Dependent Variable	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Inclusive education practices have helped increase awareness about indigenous culture among non-tribal communities.	Below 18	18–30	.04	.233	1.000	-.63	.70
		31–45	.22	.235	1.000	-.45	.89
		46–60	.18	.233	1.000	-.49	.84
		Above 60	.41	.237	.845	-.26	1.09
	18–30	Below 18	-.04	.233	1.000	-.70	.63
		31–45	.18	.235	1.000	-.49	.85
		46–60	.14	.233	1.000	-.52	.81
		Above 60	.38	.237	1.000	-.30	1.05
	31–45	Below 18	-.22	.235	1.000	-.89	.45
		18–30	-.18	.235	1.000	-.85	.49
		46–60	-.04	.235	1.000	-.71	.63
		Above 60	.20	.239	1.000	-.49	.88
	46–60	Below 18	-.18	.233	1.000	-.84	.49
		18–30	-.14	.233	1.000	-.81	.52
		31–45	.04	.235	1.000	-.63	.71
		Above 60	.23	.237	1.000	-.44	.91
	Above 60	Below 18	-.41	.237	.845	-1.09	.26
		18–30	-.38	.237	1.000	-1.05	.30
		31–45	-.20	.239	1.000	-.88	.49
		46–60	-.23	.237	1.000	-.91	.44
Community-led educational initiatives have been successful in promoting cultural continuity.	Below 18	18–30	-.07	.243	1.000	-.77	.62
		31–45	.15	.245	1.000	-.55	.85
		46–60	-.07	.243	1.000	-.77	.62
		Above 60	.19	.248	1.000	-.51	.90
	18–30	Below 18	.07	.243	1.000	-.62	.77
		31–45	.22	.245	1.000	-.48	.92
		46–60	.00	.243	1.000	-.69	.69
		Above 60	.26	.248	1.000	-.44	.97
	31–45	Below 18	-.15	.245	1.000	-.85	.55
		18–30	-.22	.245	1.000	-.92	.48
		46–60	-.22	.245	1.000	-.92	.48
		Above 60	.04	.250	1.000	-.67	.76
	46–60	Below 18	.07	.243	1.000	-.62	.77

		18–30	.00	.243	1.000	-.69	.69
		31–45	.22	.245	1.000	-.48	.92
		Above 60	.26	.248	1.000	-.44	.97
	Above 60	Below 18	-.19	.248	1.000	-.90	.51
		18–30	-.26	.248	1.000	-.97	.44
		31–45	-.04	.250	1.000	-.76	.67
		46–60	-.26	.248	1.000	-.97	.44
Inclusive educational practices contribute to both cultural preservation and socio-economic development.	Below 18	18–30	.00	.227	1.000	-.65	.65
		31–45	.26	.229	1.000	-.40	.91
		46–60	.11	.227	1.000	-.54	.76
		Above 60	.34	.232	1.000	-.32	1.00
	18–30	Below 18	.00	.227	1.000	-.65	.65
		31–45	.26	.229	1.000	-.40	.91
		46–60	.11	.227	1.000	-.54	.76
		Above 60	.34	.232	1.000	-.32	1.00
	31–45	Below 18	-.26	.229	1.000	-.91	.40
		18–30	-.26	.229	1.000	-.91	.40
		46–60	-.15	.229	1.000	-.80	.51
		Above 60	.08	.234	1.000	-.58	.75
	46–60	Below 18	-.11	.227	1.000	-.76	.54
		18–30	-.11	.227	1.000	-.76	.54
		31–45	.15	.229	1.000	-.51	.80
		Above 60	.23	.232	1.000	-.43	.89
	Above 60	Below 18	-.34	.232	1.000	-1.00	.32
		18–30	-.34	.232	1.000	-1.00	.32
		31–45	-.08	.234	1.000	-.75	.58
		46–60	-.23	.232	1.000	-.89	.43

Based on observed means.

The error term is Mean Square(Error) = .723.

Source: Authors own source

The results of the Bonferroni multiple comparisons, as summarized in the table, indicate that there are no statistically significant differences between age groups for the dependent variables under consideration, including perceptions of the impact of inclusive educational practices on awareness of indigenous culture, cultural continuity, cultural preservation, and socio-economic development. Across all comparisons, the p-values exceed the conventional threshold for statistical significance ( $p > .05$ ), with confidence intervals consistently including zero.

For example, when examining the dependent variable of inclusive education practices increasing awareness of indigenous culture, none of the age group comparisons yielded significant results (e.g., the mean difference between the "Below 18" and "18–30" age groups is 0.04,  $p = 1.000$ , 95% CI = [-0.63, 0.70]). Similar patterns were observed for other dependent variables, such as cultural preservation and socio-economic development, where the observed mean differences between age groups were small and statistically nonsignificant.

These findings suggest that perceptions of the effectiveness of inclusive educational practices are consistent across age groups, with no age group reporting significantly higher or lower outcomes for the variables analyzed. Consequently, hypothesis 6, which posits that inclusive educational practices have a statistically significant effect on at least one dependent variable across age groups, is not supported by these data. Further investigation may be warranted to explore additional factors that could influence these outcomes.

Table 24: Descriptive Statistics for Policy Recommendations

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Current policies adequately support the preservation of indigenous knowledge and traditions.	137	1.00	5.00	2.8832	.86658
More funding should be allocated for cultural preservation initiatives in tribal communities.	137	1.00	5.00	2.8905	.84609
Tribal communities should have a greater role in designing policies that impact their culture and heritage.	137	1.00	5.00	2.9051	.83915
Policymakers understand the unique challenges faced by PVTGs in preserving their cultural heritage.	137	1.00	5.00	2.8759	.84406
There is a need for better collaboration between tribal communities and educational institutions to promote cultural preservation.	137	2.00	5.00	2.9197	.84068
Valid N (listwise)	137				

Source: Authors own source

Table 24's descriptive statistics illustrate respondents' views on policy recommendations for cultural preservation and indigenous knowledge. The sample size for each item is  $N = 137$ , measured on a 5-point scale (1 = strong disagreement, 5 = strong agreement). The mean values range narrowly from 2.88 to 2.92, indicating moderate agreement overall. For example, "Current policies adequately support the preservation of indigenous knowledge and traditions" has a mean of 2.88 ( $SD = 0.87$ ), suggesting limited effectiveness of current policies. Similarly, "Policymakers understand the unique challenges faced by PVTGs in preserving their cultural heritage" has a mean of 2.88 ( $SD = 0.84$ ), reflecting moderate agreement. The highest mean ( $M = 2.92$ ,  $SD = 0.84$ ) for "There is a need for better collaboration between tribal communities and educational institutions to promote cultural preservation" indicates a slightly stronger consensus on the importance of collaboration. Other items such as "Tribal communities should have a greater role in designing policies that impact their culture and heritage" ( $M = 2.91$ ,  $SD = 0.84$ ) and "More funding should be allocated for cultural preservation initiatives in tribal communities" ( $M = 2.89$ ,  $SD = 0.85$ ) also show moderate agreement with low variability.

**Hypothesis 7:** There is a statistically significant association between demographic variables (e.g., tribal affiliation, education level) and views on policy effectiveness.

**Hypothesis 7a:** There is a statistically significant association between tribal affiliation and views on policy effectiveness.

Table 25: Chi-Square Tests for association between tribal affiliation and views on policy effectiveness.

Chi-Square Tests				
	Value	df	Asymptotic	Significance
			(2-sided)	
Pearson Chi-Square	12.962 <sup>a</sup>	8	.113	
Likelihood Ratio	13.670	8	.091	
Linear-by-Linear Association	.207	1	.649	
N of Valid Cases	137			
a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is .20.				

Source: Authors own source

The p-values ( $p > .05$ ) indicate no statistically significant association between tribal affiliation and views on policy effectiveness. The results fail to support Hypothesis 7a, suggesting that views on policy effectiveness are not significantly influenced by tribal affiliation.

**Hypothesis 7b:** There is a statistically significant association between education and views on policy effectiveness.

Table 26: Chi-Square Tests for association between education level and views on policy effectiveness.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.508 <sup>a</sup>	12	.888
Likelihood Ratio	7.837	12	.798
Linear-by-Linear Association	.043	1	.836
N of Valid Cases	137		
a. 11 cells (55.0%) have expected count less than 5. The minimum expected count is .01.			

Source: Authors own source

The p-values ( $p > .05$ ) indicate no statistically significant association between education level and views on policy effectiveness. The findings fail to support Hypothesis 7b, indicating that education level does not significantly influence respondents' views on policy effectiveness.

Table 27: Cross-Tabulation for overlap of variables like awareness of existing policies and perceived gaps.

Policy_Recommend_Q1 * Policy_Recommend_Q4 Crosstabulation							
Count							
		Policymakers understand the unique challenges faced by PVTGs in preserving their cultural heritage.					Total
		Strongly Disagree	Disagree	Neither Disagree or Agree	Agree	Strongly Agree	
Current policies adequately support the preservation of indigenous knowledge and traditions.	Strongly Disagree	0	3	1	0	0	4
	Disagree	1	43	3	0	0	47
	Neither Disagree or Agree	1	2	44	1	0	48
	Agree	1	0	2	33	1	37
	Strongly Agree	0	0	0	1	0	1
Total		3	48	50	35	1	137

Source: Authors own source

Table 27's cross-tabulation explores the link between awareness of policies preserving indigenous knowledge and the perception of policymakers' understanding of PVTG challenges. The findings show limited correlation between these factors. Among those who strongly disagreed that policies support preservation, most ( $n = 3$ ) also doubted policymakers' comprehension of PVTG issues. Similarly, many who disagreed with policy adequacy ( $n = 43$ ) also doubted policymakers' understanding. Those neutral on policy adequacy were more split in their views on policymakers' understanding, with most ( $n = 44$ ) choosing "Neither Disagree or Agree" for both aspects. Among those who found policies adequate, most ( $n = 33$ )



believed policymakers understand PVTG challenges. However, very few ( $n = 1$ ) strongly supported either statement, indicating weak endorsement of current policies or policymakers' understanding.

## 2. Finding

Among 137 respondents, 43.1% had no formal education, and 37.2% had completed primary education. This significant educational gap correlates with challenges in preserving indigenous knowledge systems, as limited education access hinders intergenerational cultural transmission. Language erosion emerged as a critical issue, with 54.7% of respondents identifying it as a barrier to cultural maintenance. Although 94.9% primarily used tribal languages daily, their absence in formal curricula limits their role in cultural preservation.

One-way ANOVA showed no significant differences in perceptions of inclusive educational practices across educational backgrounds ( $p = 0.826$ ). However, qualitative responses underscored the need to integrate indigenous knowledge into formal curricula, incorporating local art, folklore, and ecological knowledge. Economic pressures, reported by 54.7% of respondents, force community members to prioritize livelihoods over cultural preservation, highlighting the tension between survival and heritage maintenance.

While 53.3% agreed that government initiatives partially address cultural preservation, 43.8% expressed neutrality, pointing to gaps in policy visibility and implementation. Insufficient funding and top-down approaches were noted as barriers. Chi-square tests showed significant associations between education level and perceptions of cultural preservation ( $p < 0.05$ ), with better-educated respondents more likely to see education's potential in safeguarding heritage. Participatory educational practices involving tribal elders and community leaders were viewed favorably for fostering cultural continuity.

Participants identified digital tools like video documentation and online repositories as viable for preserving endangered practices, bridging generational gaps, and making tribal heritage accessible to both local and external audiences.

## 3. Discussion

The study shows how inclusive educational practices can help preserve and promote the Indigenous knowledge systems of the Particularly Vulnerable Tribal Groups (PVTGs) of Mayurbhanj, Odisha. The findings point to the critical intersections of education, cultural heritage, and socio-economic development, with implications for policymakers, educators, and researchers.

### 6.1 Interpreting the Findings

Data indicate that those with no formal education or limited secondary education (19%) make up a significant proportion of respondents (43.1%) and show systemic barriers to accessing education resulting from the inability to command the mode of transmission of tribal knowledge to the younger generations, thereby reinforcing marginalization. 54.7 per cent of respondents recognize language erosion as a significant barrier and, therefore, call for multilingual education frameworks. Current formal education greatly disconnects the PVTGs from their tribal languages and, thereby, from the oral traditions and knowledge central to PVTG cultures.

Cultural preservation is influenced by economic pressures, and 54.7% of the respondents prioritized livelihoods over cultural practices, consistent with Jana and Ghosh (2015). Such policies create an economic incentive for preserving culture, either through vocational training in traditional crafts or running eco-tourism programs.

Significant gaps were found in policy implementation. More than half (53.3%) of respondents agreed that government initiatives were only partly adequate, whilst 43.8% remained neutral, suggesting they were either not affected or lacked awareness. These findings are consistent with Parida and Mishra (2023), who criticize the prevailing top-down approaches in tribal policy frameworks.

### 6.2 2 Connecting to Previous Research

Using rigorous statistical methods, this study quantifies PVTGs' perceptions of education and cultural preservation to extend the previous research on the cultural richness of Mayurbhanj's tribes (Jana & Ghosh, 2015; Parida & Mishra, 2023). Participatory educational models and technological innovations are uniquely integrated as strategies of cultural empowerment rooted in India's National Education Policy (NEP) 2020, which emphasizes multilingual education and integration of local knowledge.

### 6.3 Broader Implications

Beyond Mayurbhanj, the implications are of a scalable model for the integration of indigenous knowledge in educational systems worldwide. Accordingly, the study stresses participatory approaches in which tribal elders and community leaders

are involved in the education system, supporting, respecting and conserving cultural diversity. Furthermore, the utilization of digital tools for documentation and dissemination situates this research in the wider discussions of technology-induced cultural preservation and offers new avenues of sustainable development.

#### 6.4. Significance and Future Directions

This work adds to the global discourse regarding how education can be utilized to safeguard intangible cultural heritage as UNESCO defines it. Drawing on tradition as well as mobility, it illustrates the possibilities for education to moderate between developmental modernity and cultural continuity. Future studies should examine the long-run effect of participatory education on socio-economic outcomes and test scalable models in other tribal contexts.

#### 6. Conclusion

Our study sought to answer the question: If inclusive education can empower Particularly Vulnerable Tribal Groups (PVTGs) in Mayurbhanj, Odisha, then how can Indigenous knowledge be preserved? Based on this, we hypothesized that by combining multilingual, participatory, and technology-driven educational practices, we could bridge cultural preservation and socio-economic empowerment for these marginalized communities.

The results were very informative. Finally, educational access creates a notable gap; over seven (43.1%) of them never went to any school at all, and four (54.7%) confirm language erosion as a barrier to cultural heritage preservation. Participatory and community-based education models worked, but the economic pressure and lack of resources prevented cultural practices from being sustainable. Government initiatives have achieved some success, although gaps remain in policy implementation and community engagement initiatives, a sign that unique solutions conforming to local realities are needed.

There are still many challenges, including the investigation of scalable models of how to integrate indigenous knowledge into mainstream education, the available resources, and teacher training. Additionally, gendered or intersects with cultural preservation, where women as oral tradition custodians need the same education and resources that other people need to access.

These findings have implications for educators, policymakers and community leaders alike. Through its multilingual curricula, empowered local educators, and digital tools used for cultural documentation, stakeholders can produce educational ecosystems that acknowledge tribal heritage and promote development. Furthermore, cultural preservation must be sustainable to tribal life through policies that promote active community participation and economic incentives.

This research is timely in reinforcing the significance of maintaining cultural diversity as a foundation of sustainable development as the world tips the scale of modernization and tradition. Education is not just a means of progress in Mayurbhanj and beyond but a life-saving means of protecting ancestral wisdom. Converting tradition with modernity can help tribal communities successfully cope in a global world whilst preserving their cultural differences from it. It is time to act before the rich heritage of these communities inspires generations to come.

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