Socio-Cultural Perceptions of Technology in Regional Vocational Contexts: A Quantitative Analysis in Surigao Del Sur, Philippines

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DOI: https://doi.org/10.47772/IJRISS.2026.100700134

Received: 08 July 2026; Accepted: 13 July 2026; Published: 27 July 2026

ABSTRACT

The integration of digital tools in regional vocational sectors necessitates an empirical understanding of the intersection between technological efficiency and cultural values. This study examined the perceptions of students in Surigao del Sur (N=100) toward technology as a human and cultural practice across four dimensions: vocational utility, cultural synergy, inherent risks, and identity impact. Utilizing a quantitative cross-sectional design and a 5-point Likert scale instrument, the study assessed the level of technological acceptance within a culturally dense, rural-urban transitional zone. Results indicated a high level of receptivity toward technology in vocational practices (AWM = 4.234) and a strong perceived synergy between traditional knowledge and modern automation (AWM = 4.228). However, respondents documented measured concerns regarding technology-induced deskilling and the erosion of cultural identity (AWM = 3.676). Inferential analysis revealed that occupation significantly influenced perceptions of vocational utility (p=0.007) and cultural synergy (p=0.003), while educational attainment significantly affected the perception of risks (p=0.023). The study concludes that while technology is viewed as an essential instrument for economic advancement, its acceptance in regional contexts is contingent upon its alignment with community values. These findings suggest a requirement for culturally responsive vocational training that balances digital proficiency with the preservation of tactile, ancestral knowledge.

Keywords: Socio-technical integration, Vocational digital transformation, Indigenous knowledge systems, Caraga region, Digital-cultural synergy, Technological ambivalence.

INTRODUCTION

The global landscape of vocational labor is currently undergoing a shift characterized by the integration of digital tools into traditionally manual sectors. This transition is particularly observable in developing economies within Southeast Asia, where technological adoption is often viewed as a primary driver of economic resilience and market participation (World Bank, 2024). As industrial processes become increasingly automated, the intersection between modern technology and localized cultural practices has become a critical subject of academic inquiry (OECD, 2023). Recent literature suggests that in labor-intensive regions, digital proficiency is no longer an auxiliary asset but a fundamental requirement for systemic growth (Thang & Wong, 2022). In rural and peri-urban contexts, the introduction of new technologies is not merely a technical update but a social intervention that influences how communities engage with their heritage and professional identities (Castells, 2021). Furthermore, UNESCO (2023) emphasizes that the sustainability of technological progress in regional areas depends on the synergy between innovation and local socio-technical frameworks (Lee et al., 2021).

In the Philippine context, national digital transformation strategies have prioritized infrastructure and technical proficiency in major urban centers (DICT, 2023). However, a significant research gap exists regarding the socio-cultural reception of technology in regional provinces, specifically within the Caraga region and Surigao del Sur. While existing local literature often addresses digital literacy or the availability of equipment (DOST, 2024),

there is a scarcity of empirical data regarding the "technological ambivalence" felt by students who must balance modern vocational requirements with indigenous or traditional values (Madianou, 2022). Previous investigations in regional Philippine settings have frequently overlooked the specific tension between technological efficiency and the preservation of tactile, ancestral knowledge (Smith, 2021), leaving a void in the understanding of how rural students negotiate their cultural identity in a digitalized workforce (Pertubal, 2022). Recent assessments by Abad and Dela Cruz (2025) indicate that centralized digital policies often fail to account for the unique cultural densities found in provinces like Surigao del Sur.

The novelty of this study lies in its shift away from a purely technocentric evaluation toward a multidimensional analysis of the synergy between indigenous wisdom and modern automation (Selwyn, 2022). Unlike previous research that treats tradition and technology as binary opposites, this study investigates the perceived compatibility and "negotiated identity" of students in a culturally dense, rural-urban transitional zone (Appadurai, 2023). By examining the dimensions of vocational utility, cultural synergy, inherent risks, and identity impact, this research provides a unique data-driven perspective on how the next generation of professionals in Surigao del Sur frames technology as a cultural practice. Following the demographic frameworks utilized by Reyes et al. (2024), the objective is to determine if variables such as occupation and education significantly influence these perceptions. Through this analysis, the study aims to provide evidence-based insights for culturally responsive educational policies, addressing the critical socio-technical complexities identified in recent digital influence studies (Zuboff, 2021).

METHODOLOGY

Research Design

This study employed a quantitative, descriptive-comparative research design. This approach was selected to systematically describe the perceptions of technology as a human and cultural practice among students and to determine if these perceptions varied significantly when categorized by demographic variables. The use of a cross-sectional survey allowed for the simultaneous collection of data regarding vocational utility, cultural synergy, and perceived risks within the target population.

Participants and Sampling

The study involved a sample of 100 students residing in Surigao del Sur, Philippines. Participants were selected through a purposive sampling technique to ensure that the cohort consisted of individuals currently engaged in academic or vocational training. The demographic composition of the sample was predominantly young, with 90.00% of respondents aged 25 or below. Female participants constituted 60.00% of the sample, while 40.00% were male. A significant portion of the participants (53.00%) represented rural community settings, providing a localized perspective on technological integration in non-urbanized areas.

Instruments

Data were collected using a structured survey instrument comprising 20 items, divided into four thematic dimensions: (1) Technology in Vocational Practices, (2) Challenges and Risks of Technology, (3) Synergy between Cultural Knowledge and Technology, and (4) Impact on Cultural Identity. Each item was measured on a 5-point Likert scale, ranging from 1.00 (Strongly Disagree) to 5.00 (Strongly Agree). The instrument underwent content validation to ensure that the items accurately reflected the research objectives. To maintain reliability, the survey utilized standardized descriptors for each weighted mean range, ensuring consistency in the interpretation of the respondents' levels of agreement.

Data Gathering Procedure

The data collection process was conducted systematically following institutional protocols. Initial permission was sought from relevant local authorities and educational heads within the Surigao del Sur region. Upon receiving approval, the survey was administered to the respondents. Participants were provided with a clear explanation of the study's objectives and the nature of their involvement. Data collection was performed over a

specified period to ensure a consistent response rate. Completed surveys were then audited for completeness before being encoded for statistical processing.

Data Analysis

The collected data were analyzed using both descriptive and inferential statistical methods. Descriptive statistics, specifically weighted means and standard deviations, were employed to determine the respondents' average level of agreement for each survey dimension. For the inferential analysis, independent samples t-tests were used to compare perceptions based on gender, while One-Way Analysis of Variance (ANOVA) was utilized to identify significant differences across age groups, occupational fields, educational attainment, and community settings. All statistical tests were conducted at a 0.05 level of significance.

Ethical Considerations

The study adhered to established ethical guidelines for research involving human participants. Informed consent was obtained from all respondents prior to data collection, and participants were informed of their right to withdraw from the study at any time without penalty. To ensure confidentiality and anonymity, no personally identifiable information was recorded. Data were stored securely and were accessed only by the research team for the sole purpose of academic analysis. The study complied with the principles of the Declaration of Helsinki regarding the ethical treatment of research subjects..

RESULTS

Demographic Profile of Respondents

The demographic profile of the 100 student respondents from Surigao del Sur, Philippines, indicates a predominantly young cohort, with 90.00% of participants aged 25 or below. Female respondents accounted for 60.00% of the sample, while males represented 40.00%. In terms of vocational or occupational distribution, the largest groups were concentrated in Education/Training (41.00%) and Student categories (21.00%), followed by Agriculture/Farming (20.00%). A majority of the respondents (53.00%) reported residing in rural community settings. Furthermore, 75.00% of the participants indicated high or very high daily access to technology, while 56.00% identified with local cultural groups and 5.00% with indigenous communities. Educational attainment was distributed primarily between secondary/high school (49.00%) and undergraduate degrees (30.00%).

Table1. Demographic Profile

Variable	Category	Frequency (f)	Percentage (%)
Age Group	18–25	46	46.00%
	17 and below	44	44.00%
	26–35	10	10.00%
Gender	Female	60	60.00%
	Male	40	40.00%
Occupation / Vocational Field	Education / Training	41	41.00%
	Student	21	21.00%
	Agriculture / Farming	20	20.00%
	STEM	5	5.00%

	Craftsmanship / Artisanal Work	3	3.00%
	Assistant store Manager	3	3.00%
	Engineering	2	2.00%
	Industrial / Manufacturing	1	1.00%
	Laborer	1	1.00%
	Not Specified	3	3.00%
Cultural Affiliation	Local cultural group	56	56.00%
	Prefer not to say	36	36.00%
	Indigenous community	5	5.00%
	Multicultural / Mixed heritage	3	3.00%
Highest Education	Secondary / High School	49	49.00%
	Undergraduate Degree	30	30.00%
	Postgraduate Degree	13	13.00%
	Vocational Training / Certificate	6	6.00%
	Primary / Elementary	2	2.00%
Access to Technology	Very High (Daily use)	45	45.00%
	High (Regular use)	30	30.00%
	Moderate (Occasional)	24	24.00%
	None	1	1.00%
Community Setting	Rural	53	53.00%
	Urban	27	27.00%
	Semi-urban / Peri-urban	20	20.00%

Perceptions of Technology as a Human and Cultural Practice

The assessment of technology as a human and cultural practice revealed a general trend toward agreement across all studied dimensions. The dimension of Technology in Vocational Practices yielded the highest Average Weighted Mean (AWM) of 4.234, corresponding to a "Strongly Agree" interpretation. Specifically, the use of digital platforms for new learning opportunities (M = 4.41, SD = 0.74) and the role of modern tools in increasing efficiency (M = 4.38, SD = 0.722) were the highest-rated items. Similarly, the Synergy between Cultural Knowledge and Technology received an AWM of 4.228. Within this dimension, the necessity of respecting community values for technology acceptance was noted as a prominent factor (M = 4.39, SD = 0.777).

Perceptions regarding the Challenges and Risks of Technology (AWM = 3.676) and the Impact on Cultural Identity (AWM = 3.616) both fell within the "Agree" range. Concerns were documented regarding technology-induced dependence weakening hands-on skills (M = 3.87, SD = 0.884) and the potential erosion of cultural identity (M = 3.79, SD = 0.977).

Table 2. The Level of Perceptions of Technology as a Human and Cultural Practice

Survey Statement	**Weighted Mean**	**SD**	**Interpretation**
Technology in Vocational Practices			
1. Technology has improved overall vocational quality.	3.89	0.973	Agree
2. Modern tools make tasks faster and more efficient.	4.38	0.722	Strongly Agree
3. Digital platforms create new learning opportunities.	4.41	0.74	Strongly Agree
4. Technology connects local practices to global markets.	4.34	0.945	Strongly Agree
5. Technology increases innovation in traditional sectors.	4.15	0.936	Agree
AVERAGE WEIGHTED MEAN (AWM)	**4.234**	**0.863**	**Strongly Agree**
Challenges and Risks of Technology			
6. Dependence has weakened hands-on skills.	3.87	0.884	Agree
7. Modern tech creates inequality by excluding access.	3.65	1.149	Agree
8. Excessive use threatens social interactions.	3.65	1.114	Agree
9. Rapid changes make it hard for workers to keep up.	3.76	1.016	Agree
10. Risk of losing knowledge via tech-driven practices.	3.45	1.077	Agree
AVERAGE WEIGHTED MEAN (AWM)	**3.676**	**1.048**	**Agree**
Synergy: Cultural Knowledge & Tech			
11. Traditional practices provide a foundation for tech.	4.22	0.836	Strongly Agree
12. Indigenous knowledge + tech = sustainable solutions.	4.23	0.827	Strongly Agree
13. Cultural traditions guide ethical use of	4.13	0.812	Agree

technology.			
14. Tech helps preserve culture through documentation.	4.17	0.853	Agree
15. Respecting values strengthens community acceptance.	4.39	0.777	Strongly Agree
AVERAGE WEIGHTED MEAN (AWM)	**4.228**	**0.821**	**Strongly Agree**
Impact on Cultural Identity			
16. Tech often conflicts with cultural traditions.	3.63	0.971	Agree
17. Tech dependence risks eroding cultural identity.	3.79	0.977	Agree
18. Industrial approaches ignore indigenous wisdom.	3.49	1.096	Agree
19. Younger generations are abandoning traditions.	3.69	1.187	Agree
20. Cultural heritage is undervalued for high-tech.	3.48	1.096	Agree
AVERAGE WEIGHTED MEAN (AWM)	**3.616**	**1.065**	**Agree**
4.21–5.00 = Strongly Agree | 3.41–4.20 = Agree | 2.61–3.40 = Neutral | 1.81–2.60 = Disagree | 1.00–1.80 = Strongly Disagree			

Inferential Analysis of Demographic Differences

Inferential statistical analysis identified specific demographic variables as factors of variation in respondent perceptions. The ANOVA results indicated that Occupation significantly influenced perceptions of Technology in Vocational Practices ($p=0.007$) and Synergy between Tradition and Technology ($p=0.003$). Age Group was found to have a significant effect only on the perception of Synergy between Tradition and Technology ($p=0.029$). Additionally, the level of Education yielded a significant difference in the perception of Challenges and Risks ($p=0.023$). No significant differences were observed based on Gender or Community Setting across any of the four dimensions ($p>0.05$), indicating a relative consistency in perceptions regardless of these variables.

Table 3: Test of Significant Differences

Demographic Profile	Dimension	Test	Test Value	p-value	Decision	Interpretation
Age Group	Tech in Vocational	ANOVA	2.638	0.077	Fail to Reject	Not Significant
	Challenges & Risks	ANOVA	0.903	0.409	Fail to Reject	Not Significant
	Synergy	ANOVA	**3.691**	**0.029**	**Reject**	**Significant**

	Tradition/Tech					
	Impact on Identity	ANOVA	2.135	0.124	Fail to Reject	Not Significant
Gender	Tech in Vocational	t-test	-0.676	0.501	Fail to Reject	Not Significant
	Challenges & Risks	t-test	-1.381	0.171	Fail to Reject	Not Significant
	Synergy Tradition/Tech	t-test	0.918	0.361	Fail to Reject	Not Significant
	Impact on Identity	t-test	-1.432	0.155	Fail to Reject	Not Significant
Occupation	Tech in Vocational	ANOVA	**2.982**	**0.007**	**Reject**	**Significant**
	Challenges & Risks	ANOVA	1.077	0.385	Fail to Reject	Not Significant
	Synergy Tradition/Tech	ANOVA	**3.319**	**0.003**	**Reject**	**Significant**
	Impact on Identity	ANOVA	1.104	0.368	Fail to Reject	Not Significant
Education	Tech in Vocational	ANOVA	1.577	0.187	Fail to Reject	Not Significant
	Challenges & Risks	ANOVA	**2.987**	**0.023**	**Reject**	**Significant**
	Synergy Tradition/Tech	ANOVA	0.819	0.516	Fail to Reject	Not Significant
	Impact on Identity	ANOVA	1.581	0.186	Fail to Reject	Not Significant
Community	Tech in Vocational	ANOVA	0.078	0.925	Fail to Reject	Not Significant
	Challenges & Risks	ANOVA	0.331	0.719	Fail to Reject	Not Significant
	Synergy Tradition/Tech	ANOVA	0.034	0.967	Fail to Reject	Not Significant
	Impact on Identity	ANOVA	1.83	0.166	Fail to Reject H_0	Not Significant

DISCUSSION

The findings indicate that students in Surigao del Sur perceive technology not as a replacement for tradition, but as a complementary tool for vocational advancement. The high Average Weighted Mean (AWM) for "Technology in Vocational Practices" (4.234) aligns with recent research regarding the digital transformation of rural education in Southeast Asia. For instance, Gomez and Alieto (2023) observed that students in provincial Philippine contexts increasingly view digital proficiency as a prerequisite for economic mobility. This perspective is further supported by Ng et al. (2023), who argue that in developing economies, digital literacy is no longer an auxiliary skill but a fundamental requirement for participation in globalized labor markets.

The Paradox of Integration and Preservation

A notable outcome of this study is the high level of agreement regarding the synergy between indigenous knowledge and technology (AWM = 4.228). The data suggest that for technology to be successfully adopted in culturally sensitive regions, it must be framed within local value systems. This supports the "Cultural Synthesis" model, where modern tools are utilized to document and preserve, rather than erase, local heritage (M = 4.17). This finding resonates with the work of Tindowen (2021), who highlighted that indigenous communities in the Philippines often leverage technology to safeguard intangible cultural assets. Similarly, Kim and Park (2024) posit that digital documentation serves as a defensive mechanism against cultural homogenization in the face of rapid globalization.

However, the "Agree" rating for risks (AWM = 3.676) indicates a measured caution among respondents. The concern that technology may weaken hands-on skills (M = 3.87) reflects an awareness of "deskilling," a phenomenon documented by Li and Smith (2022) in their study of agricultural mechanization. The respondents appear to recognize that while technology increases operational efficiency, it may simultaneously create a dependency that threatens the tactile knowledge inherent in traditional craftsmanship. This risk of "technological displacement" of traditional wisdom is a recurring theme in recent industrialization studies in the Asia-Pacific region (Zhang, 2023).

Demographic Drivers of Perception

The statistical significance of "Occupation" in determining views on vocational technology and synergy suggests that specialized training—particularly in Education and Agriculture—provides a clearer framework for evaluating technological utility. Respondents in these fields may more readily identify specific applications where technology enhances local workflows without disrupting cultural foundations. This is consistent with Rahman's (2025) findings, which suggest that vocational identity significantly dictates the level of openness toward automated tools.

The significant p-value for Education regarding "Challenges and Risks" ($p=0.023p=0.023$) suggests that higher levels of academic exposure may correlate with a more critical view of technological dominance. This aligns with the "Critical Digital Literacy" framework proposed by Pangrazio and Selwyn (2021), which posits that increased education leads to a greater awareness of the socio-cultural costs of automation. Furthermore, the awareness of digital exclusion among more educated respondents echoes the findings of Van Deursen (2023) regarding the "second-level digital divide," where the focus shifts from mere access to the social consequences of technology use. Finally, the observed concerns regarding identity erosion are mirrored in recent socio-technical research by Brown et al. (2026), who emphasize that rapid technological adoption in rural settings often necessitates a "negotiated identity" to prevent the loss of communal heritage.

LIMITATIONS

This study is characterized by certain limitations, including a localized sample size (N=100) and a focus exclusively on a student population. While the data provide a robust snapshot of the perceptions within Surigao del Sur, the results may not be generalizable to older, non-student demographics or regions with differing cultural densities. Additionally, as a cross-sectional study, these findings reflect perceptions at a single point in time and do not account for longitudinal shifts in attitude as technology becomes further embedded in the community.

CONCLUSIONs

The study concludes that students in Surigao del Sur perceive technology as a constructive instrument for vocational and economic advancement, rather than a threat to local traditions. The high levels of agreement regarding technology's role in vocational practices indicate that respondents prioritize efficiency and market connectivity as essential outcomes of digital integration. Furthermore, the findings suggest a perceived synergy between cultural knowledge and technology, provided that modern tools are implemented with respect for community values. This indicates that technological acceptance in this region is not absolute but is instead contingent upon its alignment with cultural ethics.

However, the data also reflect a measured awareness of the potential negative consequences of technological dominance. The acknowledgment of risks such as "deskilling" and the erosion of cultural identity suggests that while students are receptive to innovation, they remain cautious about becoming overly dependent on digital platforms. The statistical significance of occupation and education levels in shaping these perceptions implies that critical engagement with technology is influenced by specialized training and academic exposure. In summary, the respondents advocate for a balanced approach to development—one that leverages technological benefits for vocational growth while maintaining a strategic safeguard for traditional and indigenous knowledge.

Recommendations

Practical and Policy Recommendations

Based on the evidence, it is recommended that educational institutions in Surigao del Sur integrate culturally responsive modules into their vocational and technical curricula. These programs should focus on "Cultural Synthesis," demonstrating how digital tools can be utilized to enhance, rather than replace, traditional practices in sectors such as agriculture and craftsmanship. Furthermore, local government units and cultural agencies may consider establishing digital heritage programs that empower students to use technology for the documentation and preservation of indigenous knowledge, thereby mitigating the risk of identity erosion. To address concerns regarding technological dependence, policy-makers should promote a hybrid curriculum that maintains a balance between digital proficiency and the preservation of hands-on, tactile skills.

Future Research Suggestions

Regarding the direction of future scholarship, longitudinal studies are suggested to monitor how perceptions of the tradition-technology synergy evolve as automation becomes more embedded in the region. The scope of subsequent research could also be expanded to include non-student populations, particularly older community members and active practitioners in traditional trades, to provide a more representative cross-section of regional attitudes. Additionally, future investigations could employ qualitative methodologies, such as phenomenological interviews or focus group discussions, to gain a deeper understanding of the specific cultural values that respondents perceive as being most vulnerable to rapid technological shifts.

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