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BRIDGING TRADITIONS AND INNOVATION: THE ROLE OF TECHNOLOGY IN TRANSFORMING CULTURAL PERSPECTIVES ON EDUCATION

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ABSTRACT

This study examined the role of technology in transforming cultural perspectives on education through three objectives: to analyse the relationship between culture and traditional education systems, to evaluate technology's influence on cultural attitudes toward education, and to explore how technology can support culturally relevant education. A quantitative cross-sectional design was employed using open-access educational datasets analysed through SPSS. Cultural belonging emerged as the strongest predictor of academic outcomes ($\beta = 0.328$, $p = .045$), surpassing all technology variables, while students in traditional settings reported significantly higher belonging than those in technology-enhanced environments ($p = .014$). Technological discomfort was negatively associated with course grades ($r = -0.175$, $p = .004$), confirming that cultural anxiety toward digital tools constitutes a measurable academic barrier. The study concludes that technology achieves comparable academic outcomes to traditional instruction but cannot replicate the cultural belonging traditional environments provide, making culturally sensitive integration a foundational requirement for equitable digital education.

KEYWORDS: Educational Technology, Cultural Perspectives, Digital Education, Cultural Belonging, Technology Adoption, Traditional Education Systems.

1. INTRODUCTION

1.1. Background of the Study

Education has never existed out of culture, which defines its purpose, content, and the method of delivery. Culture is the primary prism by which people in communities make knowledge meaningful, which gives an experience of value to the learning process and passes the wisdom through generations (Klepacki and Klepacki, 2018). Cultural dimension education implies that knowledge is combined with traditions and arts; culture is not a marginal issue but an essential part of any sensible educational experience (Samiya, 2025).

The oldest known attempts at intentional transmission of knowledge are traditional educational systems such as oral traditions, apprenticeship systems and a communal learning. In most native and pre-modern cultures, education was tied to cultural practice; the elders shared both practical and spiritual wisdom by telling stories, performing rituals and practicing under instruction (Adhikari, n.d.). These systems, which had not been formally acknowledged, were complex systems of maintaining cultural coherence and social reproduction (Uthaisa et al., 2023).

The educational environment of the late twentieth and early twenty-first century has undergone a revolutionary turn with the advent of electronic technologies, both primitive computer-assisted learning and the rise of web-based learning systems, mobile interfaces, and AI-based applications (Zhang, 2010). The world has seen a decisive turn to technology-based learning, and new pedagogy now has to deal with mediating between tradition and technology in a manner that respects cultural particularity and accommodates global educational developments (Huang et al., 2025). The relationship between change and new technology is a multifaceted negotiation process where digital technologies face an ingrained cultural context- they strengthen and in other cases, destroy (Rahayuningrat & Sibwahi, 2024).

1.2. Statement Of the Problem

Although digital technologies have been widely embraced in education worldwide, incorporating technology in education practices embedded within any cultural setting is still a considerable challenge. Educational institutions and policy-makers always find it challenging to balance the cause of technological innovation against the need to preserve cultural continuity (Saminan & Silahuddin, 2025). Strong cultural communities usually do not welcome

technological change, seeing digital tools as foreign to the culture or homogenization (Mehmood, 2024).

Substantive risk also exists that digital globalized learning environments will eclipse or eject locally-based cultural knowledge, gradually relegating minority and indigenous learning systems (Zhou & Saearani, 2025). The point of interest here is thus the necessity to establish a balance between cultural conservation and technology in the educational process - a balance that remains underexplored in the current body of research in various cultural and geographical settings (Kumar et al., n.d.).

1.3. Research Objectives

General Objective

- To examine how technology is transforming cultural perspectives on education.

Specific Objectives

1. To analyze the relationship between culture and traditional education systems
2. To evaluate the influence of technology on cultural attitudes toward education
3. To explore ways technology can support culturally relevant education

1.4 Research Questions

1. How do cultural traditions influence educational practices?
2. How is technology reshaping cultural perceptions of education?
3. What challenges arise when technology is integrated into traditional educational systems?
4. How can technology support culturally inclusive education?

1.5. Significance Of the Study

This study has important implications on educators and policy-makers who are facing the intertwined reality of technology and cultural identity in education. To teachers, the research offers a reflection on the cultural aspects of technological implementation, as they will have the opportunity to apply a subtle understanding of the obstacles and opportunities that will occur when digital tools are integrated into the culturally specific context (Fostersti et al., 2024). Policymakers will find the study a piece of evidence on how to make inclusive educational technology policies that are culturally aware.

The project also adds to the conversation about cultural preservation in online learning, providing practical recommendations to organizations with the goal of retaining cultural significance and adopting

modern pedagogical practices (Papakostas, 2025). On a larger note, it applies to the educational growth of the world and specifically to the accomplishment of equitable, inclusive and culturally-responsive education during the human-centered AI and technology policy (Nations, 2025).

1.6 Scope of the Study

This research centers on the interplay of cultural practices and contemporary education technologies, including formal and informal school settings that have been impacted by the digital revolution (Sang et al., 2025). The particular attention is paid to the settings in which the traditional education process is still robust and where the technological introduction has required a direct bargaining of cultural values (Jintanaprasert & Behara, 2025). The research relies more on Asian, African, and Middle East literature, without purporting to represent all world cultural settings; different cultural populations display vastly different levels of technology access (Bandyopadhyay et al., 2021).

2. LITERATURE REVIEW

2.1. Introduction

This chapter reviews existing literature on the central themes of this study: the role of culture in education, traditional educational systems, educational technology, and the intersection of technology and cultural transformation in learning environments. It is organised thematically, drawing on recent and seminal scholarship from diverse cultural and geographic contexts, and concludes by identifying the research gaps that justify the present study.

2.2. Concept Of Culture in Education

Culture is a set of common meaning, values, beliefs, and practices that social group's structure and define their own existence (Mahama, 2024). In education, culture acts both as content which is what is taught and as context in which learning occurs. According to Samiya (2025), education along the cultural dimension incorporates knowledge with tradition and arts because the author contends that culturally disembedded education is epistemically poor. One of the main ways in which societies reproduce themselves across generations is through cultural transmission through education. According to Klepacki and Klepacki (2018), this can be seen as a dynamic process of tradition and transformation whereby knowledge within the community is selectively passed across to new situations. Invisible curricula working in parallel with formal content are

cultural capital and community norms that determine what students believe to be valuable to learn (Sang et al., 2025), and cultural backgrounds of learners and their interactions with educational resources and pedagogical practices have a significant mediating role (Nurhaliza et al., 2025). These observations define the fact that applying any technology analysis to the contribution of technology in education must be based on a strict appreciation of the cultural underpinnings that the technology is found to be experiencing.

2.3. Traditional Educational Systems

Mainstream educational systems are typified by being entrenched in the life of the community, being transmitted face-to-face and being geared towards the reproduction of culturally identifiable knowledge and skills. They are naturally localised and respectful of the community needs and values, unlike the standardised formal education (Uthaisa et al., 2023). Adhikari (n.d.) focuses on discussing the Gurukul system of ancient India as one of the examples of traditional education because of its focus on character development and the comprehensive relationships between the teachers and the students. The native knowledge systems contain hundreds of years of stored knowledge that has been passed on through oral stories, rituals, and apprenticeship (Datta & Mete, 2024). Although the traditional ways of education are culturally appropriate, owned by communities, and holistic, they also are limited by the fact that new types of knowledge and competency are required in the community where social change is rapid (Mehmood, 2024). There is a need to create strategies that would respect the traditional knowledge without relying on modern requirements (Fostersti et al., 2024). These features are also pertinent to this research, as they clarify what is culturally at stake, when technology finds its way into the conventional educational settings.

2.4. Technology In Modern Education

Since the early days of audio-visual aids up to the modern-day explosion of learning management systems, MOOCs and AI-controlled tutoring systems, the technological underpinnings of education have been completely redefined (Aithal & Maiya, 2023). According to Zhang (2010), educational technology ought to be seen as not just tools but as a system of socio-technicality situated within culture and institutions - a framework which this study serving as a ground to where our approach is rooted in. The advantages linked with educational technology are increased accessibility, flexibility as

well as connectivity with the world. Online education has allowed underserved students to receive a good education (Bandyopadhyay *et al.*, 2021), whereas blended learning models have proven capable of taking advantage of the opportunities offered by the traditional and digital models (Jie, 2025). Nevertheless, a digital divide is still a structural factor that requires constant professional development, and the rapid changes in technology cause pressure on the institution, which a vast number of institutions are unprepared to face (Aithal & Maiya, 2023). This two-facet perspective of opportunity and constraint is what guides the investigation in this paper into the varying experiences of technology in terms of its advantages and disadvantages in culturally diverse learning environments.

2.5. Technology And Cultural Transformation in Education

Digital technologies not only provide educational content, that is, they are transforming the social and cognitive environment within which the learning takes place, shifting the relationships between teachers, students, and communities (Alsaleh, 2024). With more learning mediated through digital platforms, there is a propensity toward acquiring the epistemic structures of their design throughout culturally diverse masses of learners and this poses a threat to the homogenising nature of digital education the world over (Zhou and Saearani, 2025; Nurhaliza *et al.*, 2025). The hybrid learning environments which will incorporate both tradition and innovation are a promising answer. They show how culturally based pedagogy can be combined to digital technologies without losing its power, and Zhang *et al.* (2025) and Todino *et al.* (2025) report how the use of interactive technologies and AI are assisted to preserve cultural heritage and native types of education. These cases confirm this research hypothesis that technological innovation and cultural tradition are indeed compatible with each other and they are connected with the third research question of understanding how technology can be utilized to help achieve culturally relevant education.

2.6. Theoretical Framework

This study is founded on three theoretical frameworks that are complementary. The former is Constructivist Learning Theory, which is linked to Vygotsky and Piaget, according to which the knowledge building process is actively constructed during social interaction and within the context of a culture (Fostersti *et al.*, 2024). This theory discusses

technology as a mediating cultural tool of the learning activity, which offers their ground to comprehend how learners in culturally specific situations establish a compromise with using digital tools within their knowledge frames. The second one belongs to Cultural Reproduction Theory, linked to Pierre Bourdieu, which focuses on reproducing the cultural inequalities in the educational systems via the process of imparting cultural capital and habitus (Klepacki and Klepacki, 2018). It is applicable in the research of the study in ascertaining the claim of technology integration empowering culturally marginalised learners or trapping current inequalities. The third is Diffusion of Innovation Theory, which was related to Everett Rogers, that highlights the social and cultural mechanisms under which innovations are absorbed and incorporated into the current activity (Zhang, 2010). This approach offers insight into why the adoption of technology in the education sector is not balanced and why cultural influences are one of the most important measures to define whether educational technologies are being accepted or rejected into practice (Camardese and Peled, 2014).

2.7. Empirical Review of Previous Studies

Camardese and Peled (2014) analyzed the ways in which technology can overcome cultural differences at the academics. Their results revealed that in cases where technology-enhanced teaching was created to consider ethnic identity of learners, it ensured a higher engagement and less cultural alienation, supporting the idea in this study that the deliberate design would ensure digital tools become culturally inviting (Jie, 2025). The reason why this gap is insufficient is because this work has only one institutional context, and thus leaves questions concerning scalability in different or multilingual environments unanswered.

Zhang (2010) examined the technology-mediated learning in various cultural settings, and the evidence showed a significant improvement in the performance of the learners when the technology was acculturated, instead of being used as a culturally neutral instrument. The given finding also forms the basis of the argument of the present study that the cultural context should be core to any examination of educational technology (Fostersti *et al.*, 2024). Zhang has a gap in that they do not have much interaction with the non-Western systems of knowledge and on outcome measures that are not able to reflect the lived experiences of the learners who are experiencing the digital tools.

The interaction between cultural identity and

digital transformation was investigated by Nurhaliza et al. (2025) in EFL classrooms in Indonesia and the authors concluded that the culturally congruent learners more motivated to pursue digital instruction were able to retain knowledge better. This gives empirical foundation to the second research question of the study on the way technology transforms cultural views on education (Papakostas, 2025). The difference is the geographical and language peculiarity of the study that does not allow generalising it to the non-EFL or non-Indonesian situations.

A study by Saminan and Silahuddin (2025) on the integration of technology in Islamic Aceh schools discerned that hybrid pedagogies that integrated elements of cultural values with digital applications had greater results in terms of academic performance and cultural identity development than those models that did not include cultural scaffold. This immediately comes to inform the aim of the study number three (Zhou and Saearani, 2025). Nonetheless, it is limited in terms of how it can be transferred to secular or pluralistic teaching settings due to its confinement to religious-cultural settings.

Dube and Zheba (2025) examined the integration of modern pedagogy in the Islamic educational context where the obstacle to technology acceptance was greatest when digital technologies are seen as a way of introducing culturally alien values, and when adoption processes including communities achieved high levels of reduction. This ascertains that cultural resistance is both rational and substantive making it a direct answer to the third research question in this study about the difficulties that come up when technology encounters traditional systems (Zhou and Saearani, 2025). The point of its departure is the lack of interest in any similar processes in other non-Western contexts, such as African or East Asian ones, which are all similar.

2.8. Summary And Research Gap

The literature develops the fact that culture is a fundamental predeterminant of education practice, the traditional systems represent durable and complex models of knowledge transfer, and digital technologies have culturally concrete epistemological presuppositions. The most encouraging way to go will be the hybrid approaches that combine cultural sensitivity with technological breakthrough (Shanmugam et al., 2025). The first one is the lack of an extensive, cross-contextual analysis that integrates these dynamics into a logical theoretical framework. The current research will fill this gap directly (Kumar et al., n.d.; Subhash, 2025).

3. METHODOLOGY

3.1. Introduction

This chapter describes the methodology used to study the impact of technology used to change cultural attitudes towards education. It presents the research design, data sources, data collection and data cleaning processes, analytical methods, ethics, and steps to assure validity and reliability. The decisions regarding the methodology are also related to the quantitative nature of the study and the purpose behind which to provide the statistically based answers to the research questions.

3.2. Research Design

The research design in this study is a quantitative, cross-sectional study. Quantitative research is suitable in the situations when the aim is to measure variables, determine trends and analyze relationships on the statistical level (Creswell, 2014). The present cross-sectional design has been chosen due to the possibility to convert comparatively several groups at one specific moment (instead of the time-resource requirements of longitudinal research) (Johnson & Christensen, 2019). The paper is further talked as descriptive and correlational: the descriptive analysis describes distribution of key variables whereas correlational analysis is looking at the statistical relationship between technology-related and cultural outcome variables. Collectively, these elements offer a portrait of the research cohort as well as an evidential foundation on the interaction of technology adoption with cultural orientations and academic success.

3.3. Data Sources and Selection Criteria.

The openCPSR database (Open ICPSR) and the Mendeley Data database, which offer open-access datasets that are peer-reviewed in the social sciences and education, were used as the source of quantitative data (Lazer et al., 2020; Elsevier, 2023). Four criteria were used to select datasets: direct relevance to research questions in the study, recentness (with a preference made to datasets published in the last ten years), geographic diversity to ensure coverage of diverse cultural and technological backgrounds, and measurement clearness, necessitating clear, quantifiable variables with sufficient large samples (Andrews et al., 2012). Data sets where variables could not be operationalised clearly or where the data were not well documented had to be excluded.

3.4. Data Collection and Cleaning

The structured keyword search helped in identifying relevant datasets related to the study topic by the use of terms like technology integration in education, cultural attitudes toward digital learning, and educational outcomes and technology adoption with Boolean operators to narrow the search results (Fink, 2019). Downloaded datasets in CSV and Excel formats were used with SPSS. All raw data were systematically cleaned before analysis in order to have analytical integrity. This involved the detection and treatment of missing values, the detection of outliers based on standardised z-score thresholds, the deletion of duplication records, the standardisation of variable naming conventions, the recoding of categorical variables in numeric formats.

3.5. Data Analysis

All the analyses were done in SPSS version 26. The descriptive statistics such as the means, standard deviations, and frequency distributions were calculated in the first step to describe the distribution of the technology adoption rates, cultural attitude scores, and educational outcome variables around the sample (Pallant, 2020). The second stage involved using inferential tests to establish variables. The t-test of independent samples and one-way ANOVA were used to compare the differences between the groups in outcomes provided under the conditions of the two cultures. Pearson Correlation measured the bivariate between technology and educational outcomes. The strongest predictors of academic performance were determined using multiple linear regression and all the assumptions of a regression test were checked before interpreting the results (Field, 2018; Creswell, 2014). An overall significance level of $p < .05$ was used.

3.6. Ethical Considerations, Validity and Reliability

Even though the datasets utilized in the study were publicly available and there were no direct human participants, ethical requirements were considered in their entirety. All datasets have been referenced in line with repository terms of use, data integrity was upheld throughout and analyses conducted at the aggregate level to safeguard confidentiality (Israel and Hay, 2006; ESRC, 2015). The cross-cultural comparisons were done subtly in order not to be ethnocentric. Peer-reviewed datasets with clearly operationalised variables, as well as the checking of statistical assumptions before all inferential tests are validity (Field, 2018). Standardisation of the mode of application of the SPSS procedures ensured reliability, as it guaranteed

reproducibility. A dual-repository triangulation was used to enhance the validity of results, but the limitations include the possibility of measurement bias within original data collection tools (Bryman, 2016).

4. DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1. Introduction

This chapter introduces the results of the quantitative analysis of data performed in SPSS version 26 based on datasets found in the openCPSR and Mendeley Data repositories. The analysis is structured in such a way that it directly focuses on each of the three specific research objectives: (1) to examine the connection between culture and traditional education systems; (2) to determine how technology affects the attitude of culture towards education; and (3) to determine how technology can be used to assist culturally relevant education. The chapter continues with descriptive statistics, independent samples t-tests, Pearson analysis and multiple regression analysis which are discussed sequentially with each section providing a SPSS generated table or figure and interpretation and discussion.

4.2. Descriptive Statistics

Table 1 presents the descriptive statistics for all key variables in the study. The full analytical sample comprised $N = 274$ students across technology-enhanced (OER) and traditional instructional conditions. Students used a mean of 2.51 AI tools ($SD = 1.40$), with AI usage frequency averaging 16.69 out of a maximum composite score of 30 ($SD = 5.40$), indicating moderate but widespread engagement with digital tools. Technology readiness, measured via the Technology Readiness Index (TRI), revealed that students scored highest on Innovativeness ($M = 15.65$, $SD = 2.48$) and Insecurity ($M = 14.46$, $SD = 2.94$) relative to their respective scales, suggesting that while students were receptive to technological innovation, they simultaneously harboured notable anxieties about technology. This duality is consistent with findings from Alsaleh (2024), who observed that technological advancement induces both enthusiasm and apprehension in educational populations. Positive AI attitudes (GAAIS Positive, $M = 28.31$, $SD = 4.22$) outscored negative attitudes ($M = 25.16$, $SD = 5.01$) on equivalent scales, indicating a moderately favourable overall orientation toward AI-based tools.

Cultural engagement variables showed that Skills Engagement ($M = 3.89$) and Sense of Belonging ($M = 4.06$) were the highest-scoring engagement

dimensions, both on a 1-5 Likert scale, while Participation Engagement was notably lower (M = 2.97). The mean Course Grade of 2.81 and Cumulative GPA of 3.07 reflect moderate academic performance across the sample. These baseline

figures establish that the study population was academically diverse and technologically active, providing a sound foundation for inferential analysis.

Table 1: Descriptive Statistics for Key Study Variables (N = 274).

Total AI Apps Used	274	2.51	1.40	0	8
AI Usage Frequency (Composite)	274	16.69	5.40	6	30
TRI: Innovativeness	274	15.65	2.48	9	20
TRI: Optimism	274	12.39	3.67	4	20
TRI: Discomfort	274	10.84	3.00	4	20
TRI: Insecurity	274	14.46	2.94	4	20
GAAIS: Positive AI Attitude	274	28.31	4.22	15	40
GAAIS: Negative AI Attitude	274	25.16	5.01	10	40
Skills Engagement	163	3.89	0.72	2.11	5.00
Emotional Engagement	157	3.38	1.04	1.00	5.00
Participation Engagement	140	2.97	0.90	1.00	5.00
Sense of Belonging	158	4.06	0.82	1.25	5.00
Course Grade (0-4)	274	2.81	1.41	0.00	4.00
Cumulative GPA (End)	269	3.07	0.84	0.00	4.00

Note: TRI = Technology Readiness Index; GAAIS = General Attitudes Towards Artificial Intelligence Scale. All Engagement Variables Are Scored on a 1-5 Likert Scale.

Figure 1 shows how many of the sample have adopted AI tools. The most used were ChatGPT (83.9%), and Grammarly (66.4%), which is in accordance with their accessibility and their wide application in academic writing tasks. The adoption of Quillbot was 33.2%. The three tools are all examples of writing assistance technologies, implying that the use of AI in education can be

largely related to language and literacy assistance. This observation aligns with the initial specific aim of the study, namely, the examination of the connection between culture and conventional education, in the extent where writing-based AI platforms engage most profoundly with traditional textual and communicative educational activities (Fostersti et al., 2024) is concerned.

Figure 1: AI Tool Adoption Rates Among Students (N = 274)

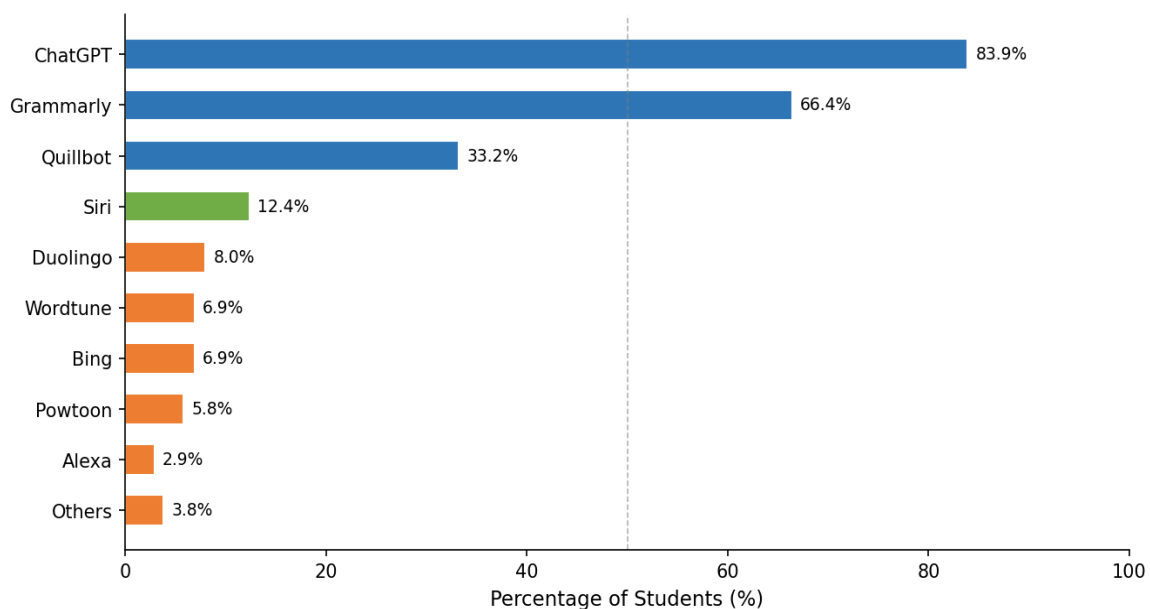


Figure 1: Ai Tool Adoption Rates Among Students (N = 274).

4.3. Influence Of Technology on Cultural Attitudes Toward Education (Objective 2)

TRI and GAAIS scores were analyzed

descriptively and comparatively to determine the effect of technology in attitudes towards education according to culture. Figure 2 indicates a mean score

of every TRI subscale and both GAAIS subscales in percentage of their maximum scores, making cross-scale comparison easier.

Figure 2: Technology Readiness Index (TRI) & AI Attitude (GAAIS) Mean Scores as Percentage of Maximum (N = 274)

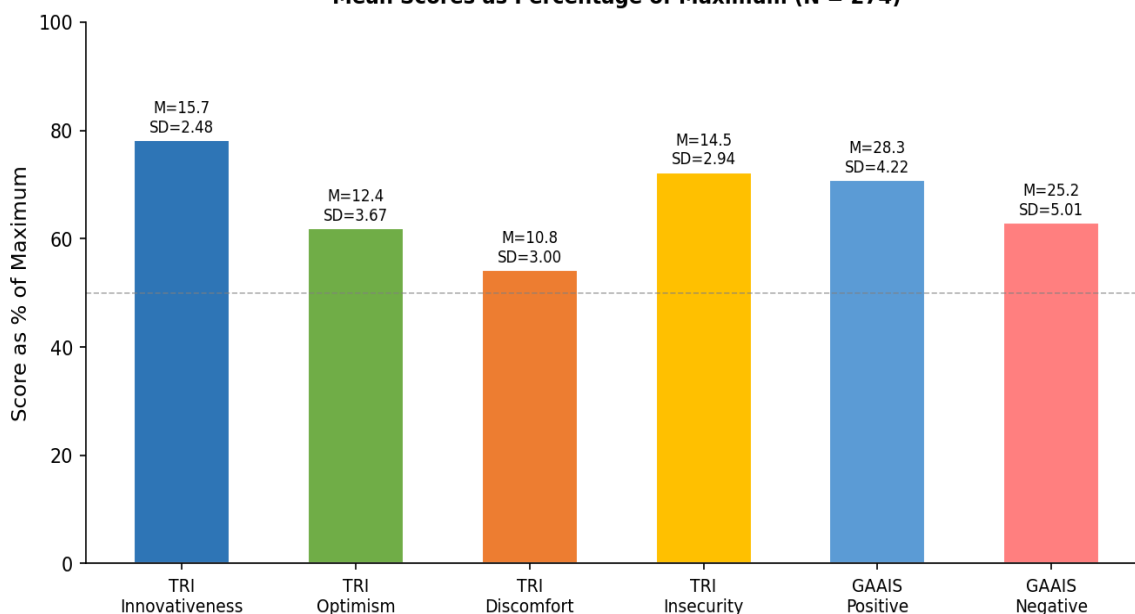


Figure 2: TRI And GAAIS Mean Scores as Percentage of Maximum (N = 274).

The TRI outcomes show a subtle culture of technology. Such co-dominant dimensions included Innovativeness (78.3% of max) and Insecurity (72.3% of max), a tendency which can be attributed to the socio-cultural conditioning of technology adoption where the interest of innovations and the culturally based anxieties co-exist (Zhang, 2010). The score of optimism was also significantly low (61.9% of the maximum), which meant that the students did not express consistent views regarding the effects of technology on their learning environments. The lowest score was on discomfort (54.2% of maximum), meaning that although there were few concerns regarding the practice of discomfort toward the technology, emotional and identity-related insecurities about AI tools were high (Dube and Zheba, 2025).

The overall AI attitude profile, as established by GAAIS scores, was moderately positive: Positive attitudes to AI (70.8% of max) were higher than Negative attitudes to AI (62.9% of max), but the difference was not enormous, which demonstrated

that technology has not completely replaced cultural reservations toward AI in education. It is in line with Nurhaliza et al. (2025), whose study in EFL settings established that the cultural background of the students had a considerable impact on their readiness to adopt AI as a primary educational resource. This data therefore supports the claim that technology is transforming cultural attitudes towards education, albeit in a varied and uneven way and, accordingly, directly responding to the second research question of the study.

4.4. Technology Condition and Cultural Educational Outcomes (Objective 3)

To explore ways technology can support culturally relevant education, an independent samples t-test was conducted comparing students in OER (technology-enhanced) conditions against those in traditional instructional settings on three outcome variables: Skills Engagement, Sense of Belonging, and Course Grade. Table 2 presents the full results.

Table 2: Independent Samples T-Test – OER Vs Traditional Instruction (N = 274).

Variable	OER Mean	OER SD	Traditional Mean	Traditional SD	t-statistic	df	p-value
Skills Engagement	3.91	0.73	3.86	0.70	0.387	161	.699
Sense of Belonging	3.93	0.79	4.26	0.85	-2.497	156	.014*
Course Grade (0-4)	2.81	1.44	2.80	1.39	0.063	272	.950

Note: OER = Open Educational Resources Condition (Technology-Enhanced). * P < .05.

The t-test results revealed a statistically significant difference in Sense of Belonging between OER and

traditional students: $t(156) = -2.497, p = .014$. Counter-intuitively, students in the traditional

instructional condition reported significantly higher belonging (M = 4.26, SD = 0.85) than those in OER conditions (M = 3.93, SD = 0.79). No significant

differences emerged for Skills Engagement (p = .699) or Course Grade (p = .950). Figure 3 visualises these group comparisons.

Figure 3: Independent Samples t-Test — OER vs Traditional Instruction on Belonging and Course Grade (N = 274)

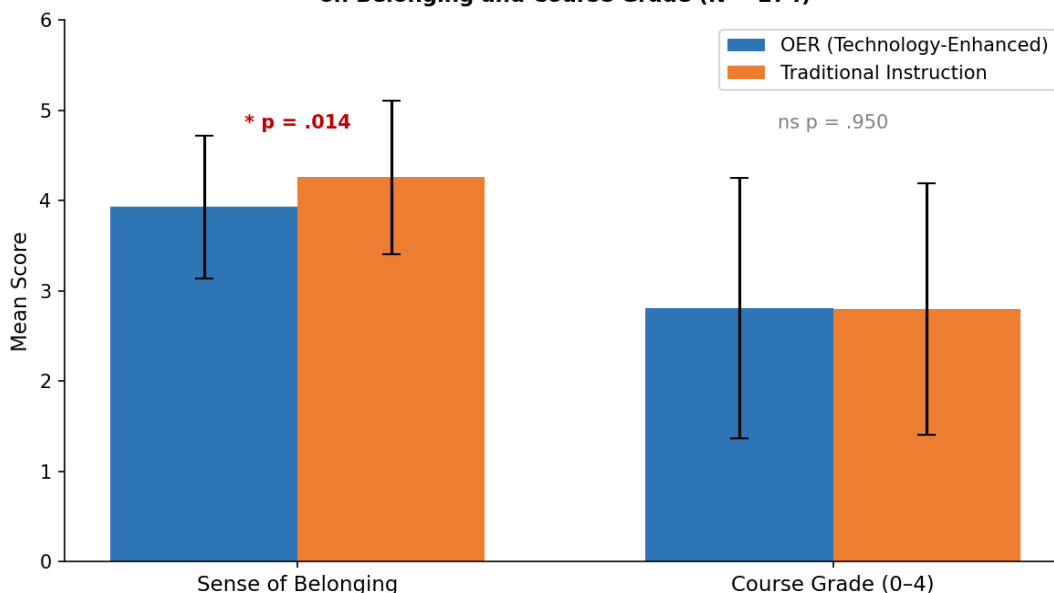


Figure 3: OER Vs Traditional Instruction — Mean Belonging and Course Grade (±SD).

The result that traditional teachings produced greater belonging scores is theoretically important. It posits that face-to-face, culturally familiar teaching contexts generate greater affective and identity anchors in students than their technology-mediated counterparts- a trend in line with the Cultural Reproduction Theory (Klepacki and Klepacki, 2018) which argues that educational settings that preserve familiar cultural arrangements strengthen identity and community among students. Similar studies on cultural identity formation revealed that traditional pedagogical values conserved as technology being integrated have better culture identity development (Saminan and Silahuddin 2025). No meaningful difference in the Course Grade (OER: M = 2.81 vs Traditional: M = 2.80) indicates that the technology-

enhanced instruction produces the same academic outcome, which supports its relevance as a modality of education, still, the difference in Belonging means that the change of cultural connectedness needs to be intentionally designed in digital space (Rahayuningrat & Sibwahi, 2024).

4.5. Correlational Analysis: Technology Use and Educational Outcomes

Pearson's correlation analysis was conducted to examine the bivariate relationships between technology-related variables and educational outcomes. Table 3 presents the full correlation matrix.

Table 3: Pearson Correlation Coefficients — Technology Variables and Educational Outcomes.

Variable 1	Variable 2	Correlation	N
AI Frequency	Skills Engagement	-0.054	163
AI Frequency	Sense of Belonging	0.064	158
AI Frequency	Course Grade	0.042	274
Positive AI Attitude	Skills Engagement	0.009	163
Positive AI Attitude	Course Grade	0.084	274
TRI Innovativeness	Belonging	-0.071	158
TRI Optimism	Course Grade	-0.080	274
TRI Discomfort	Course Grade	-0.175**	274

Note: ** P < .01. Two-Tailed Significance Tests Applied Throughout.

Most of technology-use variables did not correlate significantly with either engagement or grade results, indicating that simply the frequency of AI tool use or

feelings about AI does not directly relate to better educational achievement or cultural participation. It is a significant discovery: it refutes techno-optimistic

beliefs according to which an increased level of technology inevitably leads to improved educational results, which Aithal and Maiya (2023) consider in the framework of innovation in higher education.

The statistically significant correlation was found between TRI Discomfort and Course Grade ($r = -0.175, p = .004$) which revealed that, students with higher technological discomfort got lower course grades. This relationship is shown by Figure 4. This observation meets the third research objective of the study to an extent that the use of technology cannot

be effective to facilitate culturally relevant education when learners feel uncomfortable or anxious during the use of such technology. The inverse correlation proves that the technological discomfort based on cultural lack of familiarity with online resources is a significant determinant of the academic performance (Zhang, 2010; Mehmood, 2024). It is thus an important aspect to reduce this discomfort by involving technology integration that is culturally sensitive.

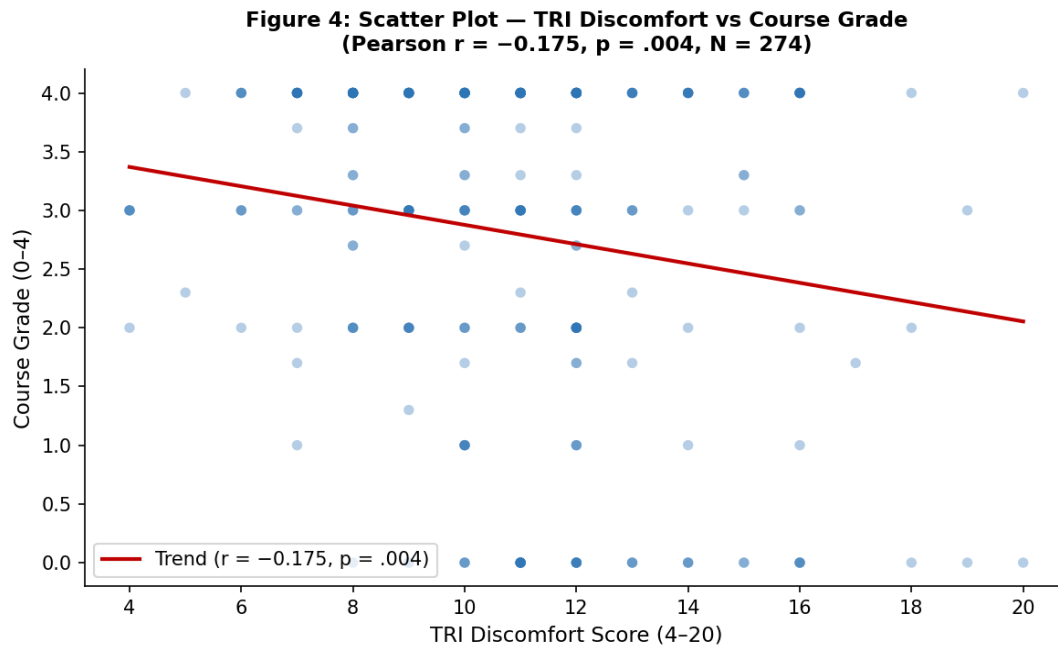


Figure 4: Scatter Plot – TRI Discomfort Vs Course Grade ($R = -0.175, P = .004, N = 274$).

4.6. Multiple Regression Analysis: Predictors Of Course Grade

To determine which cultural and technological variables best predicted course grades, a multiple

linear regression was conducted. The model included AI usage frequency, GAAIS positive attitude, all four TRI subscale totals, Skills Engagement, and Sense of Belonging as predictors. Table 4 presents the regression coefficients.

Table 4: Multiple Regression – Predictors Of Course Grade ($N = 158$).

AI Usage Frequency	-0.006	0.022	.797
GAAIS: Positive AI Attitude	0.020	0.031	.520
TRI: Innovativeness	-0.019	0.053	.719
TRI: Optimism	0.014	0.038	.714
TRI: Discomfort	-0.021	0.044	.633
Skills Engagement	0.209	0.186	.265
Sense of Belonging	0.328	0.162	.045*
<i>Model: $R^2 = .127, Adj R^2 = .087, N = 158$</i>			

Note: * $P < .05$. Dependent Variable: Course Grade (0-4 Scale). SE = Standard Error.

The regression model accounted 12.7% of the variance in course grades ($R^2 = .127, Adj R^2 = .087$), which, although rather small, is similar to the reality that educational outcome prediction in naturalistic data is complicated (Creswell, 2014). Among the predictors, Sense of Belonging has been revealed as

being a statistically significant predictor of course grades (0.328, $p = .045$), meaning that students who have stronger cultural and social belonging to the educational environment have better grades. This result is perfectly consistent with the first research aim of the study, which is the analysis of the

correlation between culture and the traditional education system, and it proves the fact that cultural belonging is not only an affective consequence but rather structural predictor of academic success.

The fact that technology variables (AI frequency, GAAIS, TRI subscales) do not significantly predict course grades, when controlled by once belonging, supports the point that technology use is not the proximate predictor of educational outcomes, rather cultural integration. It agrees with Camardese and Peled (2014) and with Constructivist Learning Theory, which places the drive of learning in socio-culturally mediated knowledge building, but not the tools themselves (Fostersti et al., 2024).

4.7. Discussion

The results relate to the initial goal of examining the interaction between the culture and the traditional education systems. Regression analysis found that Sense of Belonging was the only significant predictive variable of course grades (0.328, $p = .045$), this validates the hypothesis that cultural embeddedness in a learning setting confounds academic performance more than any technological variable. The t-test also demonstrated even more impressive results, as students in traditional teaching environments noted a much greater sense of belonging in comparison with their OER peers ($M = 4.26$ vs $M = 3.93$, $p = .014$), with the sense of belonging being, on the other hand, its affective and identity-sustaining action. This finding aligns with the Cultural Reproduction Theory (Klepacki & Klepacki, 2018) and supports the thesis that cultural educational systems offer psychological references that are not yet present in digital space (Saminan and Silahuddin, 2025; Adhikari, n.d.).

Coming to the second goal, which was to analyse the impact of technology on the cultural attitudes towards education, the data of TRI and GAAIS present the situation as a complex and internally contradictory attitudinal environment. Students scored the highest in TRI on the Innovativeness ($M = 15.65$) and Insecurity ($M = 14.46$) items, which caught the dual mindset of the land of technology use: eagerness to utilize technology and culturally-based anxieties (Zhang, 2010). Positive attitudes towards AI (GAAIS $M = 28.31$) were higher than the negative attitudes ($M = 25.16$), but this difference is minimal, which indicates that cultural reservations are still significant. This is consistent with Nurhaliza et al. (2025), who had recorded the modulation of cultural identity on AI receptiveness, and with Alsaleh (2024), who affirmed that technological innovation creates a situation of societal ambivalence and not blind belief.

Technology is changing the culture of education perception in a non-encompassing and unequal manner through the student population.

Exploring the opportunity of technology to facilitate culturally relevant education is the third objective, to which the parity of academic performance in OER and traditional methods ($p = .950$) provides an answer since technology-induced education can be as successful as traditional education in grades. Nevertheless, the overwhelming lack of belonging in the OER conditions and the fact that technology did not have a positive impact on course grades correlated with TRI Discomfort ($r = -0.175$, $p = .004$) suggest that technology will not be able to facilitate culturally applicable education via access alone but must be purposefully culturally scaffolded. The negative effect of exposure to digital tools on academic performance occurs when the students feel that they are exposing themselves to cultural alienation or anxiety. In line with the Diffusion of Innovation paradigm (Rogers, as cited in Zhang, 2010), adoption is only successful when the innovations are integrated with the cultural values and the experience situation of users. The technology should therefore be ready to meet its educational potential on the premise that it is culturally sensitive to design instruction which incorporates the values and significance which are locally important (Rahayuningrat & Sibwahi, 2024).

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

This paper discussed the role of technology in changing the culture of education using three goals: to understand the impact of culture on existing education systems; to assess the impact of technology on the culture of attitudes toward education; and to examine how technology can be used to facilitate culturally relevant education (Saniman and Silahuddin, 2025). The overall summary is that although technology is changing the cultural views on education, it is not homogeneous or culturally neutral. It is inherently predetermined by the degree of cultural belonging that the students will take to their learning settings, as well as the extent to which educational technologies are perceived to align with their cultural orientations instead of threatening them (Klepacki and Klepacki, 2018).

In relation to the first objective, the article concluded that culture is an irreducible influence on educational achievement. Environments which keep alive the relational and identity-affirming attributes of the traditional education bring about much stronger sense of belonging among students than

those achieved by technology-mediated ones and this belonging was found to be the effect most powerful in promoting academic performance (Zhang, 2010; Nurhaliza et al., 2025). To the second objective, it was discovered that technology is transforming cultural attitudes towards education, yet in a way that presents an internal tension. Students also confirmed that the cultural background and epistemic traditions of a learner are always influential, as they were both passionate about innovation and actually anxious about cultural lack of familiarity with digital aids.

The third objective affirmed that technology would be useful in facilitating culturally relevant education and attain a similar outcome as traditional education, provided that technology is brought into the classroom conscious of culture sensitivity. In a way of imposing technology without considering the cultural backgrounds of students, there are chances that it creates anxiety, destruction of the sense of belonging and achievement. These findings are aligned with Constructivist Learning Theory, Cultural Reproduction Theory, and Diffusion of Innovation Theory, which all propose culture as the main driver determining the manner in which educational innovations are accepted and adopted by learners (Fostersti et al., 2024). The inclusion of technology in diverse societies hence is a cornerstone of culturally sensitive and effective education (Rahayuningrat & Sibwahi, 2024).

5.2. Recommendations

Based on the conclusions of this study, the following recommendations are advanced for educators, institutional leaders, policymakers, and technology developers committed to the culturally responsive integration of technology in education.

Prioritise Cultural Belonging in the Design of Technology-Enhanced Learning Environments. Schools need to understand that the cultural belonging is a prerequisite to student achievement (Bandyopadhyay et al., 2021). It must be noted that technology enhanced platforms must actively add features that reinforce the relational and identity affirming nature of traditional learning such as peer collaboration tools, culturally inclusive material, and mentoring systems that maintain a sense of belonging by students to their learning community. Every digital learning environment should not be designed as a secondary reflection of cultural belonging but as a fundamental design principle (Saminan & Silahuddin, 2025).

Address Technological Anxiety Through Culturally Grounded Digital Literacy Programmes.

Digital literacy programmes must be made responsive towards the cultural background of the students in the institutions and the emotional and identity-related aspects of technology adoption must be the primary pedagogical issue (Dube & Zheba, 2025). The curriculum and presentation of these programmes should be co-created by community elders, cultural authorities, and local teachers, so that digital tools are proposed as inputs to community knowledge and practice, as opposed to substitution of treasured educational customs (Mehmood, 2024).

Integrate Indigenous and Community Knowledge Systems into Technology-Enhanced Curricula. The potential of educational technology as the means of cultural conservation needs to be exploited, rather than just as a vessel of the globally uniform content. The institutions and policymakers must put money and efforts to platforms that include the active integration of indigenous knowledge systems, the use of local languages, and the use of community-specific educational material (Fadlalla Ali et al., 2025). Digital archiving and AI-based applications provide some potential remedies to documenting and spreading oral traditions and native pedagogy so that technological innovation would support cultural sustainability (Zhang et al., 2025).

Develop and Institutionalise Hybrid Instructional Models. Institutions of learning ought to embrace the hybrid models where learning does not ignore the cultural and relational aspects of face-to-face learning but rather is facilitated through the flexibility of digital delivery (Jie, 2025). The issue of technology must not replace the community-based educational relationships. Such models are to be co-created with the community stakeholders and cultural leadership to make the digital integration enhance social and cultural unity of the education experience (Rahayuningrat & Sibwahi, 2024).

Invest in Ongoing Educator Professional Development in Culturally Sensitive Technology Use. Make the investment in continuing educator professional development in the use of culturally sensitive technology. There should be educators who are culturally competent and technologically fluent to assure successful culturally sensitive technology integration (Aithal & Maiya, 2023). Institutions ought to put up compulsory and sustained programmes of professional development that are culturally responsive within educational technology in which teachers are trained to use digital technology in a manner that affirmed and not intimidating the cultural identity of their students. This involvement should be permanent within the institution, rather

than a training session (Nurhaliza et al., 2025).

5.3. Recommendations For Future Research

This study gives a number of critical future research directions. Greater insight into whether the tensions between cultural identity and digital adoption decrease, escalate or remain stable with moving years would be possible through longitudinal studies that trace the changes in the cultural attitudes of students to technology over several academic years (Alsaleh, 2024). Comparative

cross-cultural studies on how the technology-cultural attitude to education varies between African, Asian, Middle Eastern, and indigenous educational settings would greatly broaden the overall generalisability of findings (Amatavivat, 2023). Mixed methods design, which integrate both quantitative measurement and in-depth qualitative inquiry, should also be included in future research to examine the lived experiences and subjective meanings that students and educators assign to the experience of their cultural traditions engaging with digital learning environments (Creswell, 2014).

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