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Integrating Bhutanese values into ICT education: Perspectives of ICT teachers in Bhutan

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Abstract
The Bhutanese education system is founded on a philosophy of core cultural values. Integrating these values into Information and Communication Technology (ICT) education presents both a critical opportunity and a significant challenge in an increasingly digital world. This study explores how teachers in Bumthang District perceive and implement key Bhutanese values, Tha Damtsi (sacred commitments), Ley Jum Drey (karmic responsibility), and Driglam Namzha (discipline and etiquette) within ICT education. Using a convergent parallel mixed-methods design, survey data was collected from 30 teachers and conducted in-depth interviews with five. Thematic analysis of qualitative data and descriptive statistics of quantitative data revealed strong teacher support for value integration, which they believed enhanced learning and protected culture. However, actual implementation was weak, hindered by limited resources, time constraints, and difficulties in aligning values with technical content. A significant gap in professional development was identified, with teachers requesting structured training and localised resources. This study proposes an adapted TPACK model as a culturally sensitive framework for digital pedagogy. It emphasises the need for curriculum alignment and teacher capacity building. It also highlights the importance of promoting value-based digital citizenship in Bhutan.

Keywords: Bhutanese values; Digital citizenship; ICT education; Teacher perception; TPACK

1. Introduction

A decline in Bhutanese values among students is a pressing educational concern, evident in their attitudes, behaviors, and community interactions. This decline is frequently attributed to the insufficient integration of these values into the formal curriculum. These values, rooted in Buddhist principles, emphasise ethical conduct, compassion, and harmony between material and spiritual well-being (Wangyal, 2001). While Bhutan's National Education Policy aims to preserve this cultural heritage, it also seeks to equip students with 21st-century skills (Kaka et al., 2022). The rapid proliferation of technology makes this balance difficult. Therefore, integrating core philosophies like Gross National Happiness [GNH] into Information and Communication Technology [ICT] education is now an urgent priority. This study investigates Bhutanese teachers' perspectives on aligning technological innovation with the integration of these traditional values. International evidence reveals the possibility of integrating cultural values in ICT education. Finland focuses on child wellbeing and equity with a decentralised, trusting approach; Singapore focuses on meritocracy and innovation with a centrally planned curriculum; and Australia focuses on responsibility and work ethic with human capital model-aligned policies (Wangdi & Boossabong, 2024). Similarly, New Zealand adapts Māori values in ICT education with storytelling (Hutchings & Lee-Morgan, 2016). In Indonesia, some studies suggest that digital citizenship education incorporates elements of digital ethics and civility, aiming to foster responsible digital behavior among learners (Purwantiningsih & Prasetyo, 2022). Overall, finding reports that, with support from policies and adequate teacher professional development, infusing values in education is significantly effective.

In the Bhutanese context, the Educating for Gross National Happiness [EGNH] initiative was launched in 2009. This initiative guided the country's schooling system through a value-based curriculum that incorporated GNH values (Kaka et al., 2022; Sadagopan & Krishnan, 2025). Based on Buddhist philosophy, GNH is the moral basis of the free schooling system of Bhutan,

cultivating character and making students "locally rooted and globally competent" (Sadagopan & Krishnan, 2025). Policy proposals, for example, the iSherig Education ICT Master Plan, identify alignment of ICT incorporation with GNH values as crucial (Ministry of Education [MoE], 2019). While there have been studies on EGNH in the curriculum, pedagogy, administration, and school climate, value incorporation in the ICT curriculum remains under-researched, with few value incorporation models or localised training frames for guidance (Chewang, 2017; Kaka et al., 2022; Schuelka & Sherab, 2022; Wangdi & Boossabong, 2024). Policy lags, shifting agendas, and overall schooling reforms have also limited its effective implementation (Tobden & Ham, 2022).

Researchers have conceived diversified theoretical lenses through which technology and values can be integrated within curricula for instruction. The Theory of Practice Architectures, as propounded by Kaka et al. (2022) and initially conceived by Kemmis and Grootenboer (2008), offers a lens through which to analyse structural and cultural conditions that determine the practice of instruction. In a similar vein, Schuelka and Sherab (2022) presented the Educational Values Evaluation and Design Framework and systematically identified, examined, and aligned interrelated elements within intricate systems for instruction towards value-based reform. Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge [TPACK] model offers a complementary approach where it conceptualises the intermingle of technology, pedagogy, and content knowledge for effective instruction. In the context of Bhutan, TPACK can be modified, and value-based ethical and cultural principles can be incorporated and constituting the Bhutanese Value-Based TPACK model. The modification expands the function of the teacher beyond that of a digital facilitator and enables as a guide of moral and cultural value where learners are both technologically literate and ethically balanced. These central Bhutanese values drawn from Buddhist philosophy and cultural norms, constitute the basis of this approach. Tha Dam-Tsi (*loyalty, integrity, and responsibility that engenders trust and accountability*), whereas Ley Jumdrey (*implication of actions and promotes ethical behaviour*) (Wangyal, 2001) are the foundation of the Bhutanese values. Driglam Namzha, the code of etiquette, governs behaviour, dressing, speech, enforces cultural identification and social cohesion. These Bhutanese values in unison incorporate the proficiency for technology with morals and cultural identification with Bhutanese education.

EGNH was launched in 2010 with the intention of presenting balanced education that merges both utilitarian and humanistic values (Wangdi & Boossabong, 2024). In this scenario, teacher perceptions can have a central role in integrating values empathetically, as they have a bearing on the instilling of ethical action, empathy, and shared responsibility towards the community, in learners (Chewang, 2017; Thinley, 2024). In this regard, curriculum efforts, such as EGNH and the iSherig Education ICT Master Plan, have a goal of incorporating values in ICT education (Kaka et al., 2022; Ministry of Education [MoE], 2019). However, their practical manifestations have limitations due to exam-oriented instruction, minimal professional development, and scarcities in culturally appropriate digital media for learning (Dorji et al., 2016; Schuelka & Sherab, 2022; Tshering et al., 2024). In effective use, such efforts have advantages such as whole-person development of learners, culturally based digital citizenship, and ethically conscious use of technology. To support such curricular efforts, Buddhism cultivates compassion, respect. It carries learning beyond academic subjects towards cultivating virtuous human traits. Furthermore, core Bhutanese values such as Tha-Dam-Tse and Lay-Ju-Dey support cultural heritage development, ethical behaviour, and nation development (Wangyal, 2001). These philosophical and curricular regimes together highlight the interplays between teacher perceptions, curricular implementation and the derived advantages and disadvantages. This lays the ground for whole and ethically conscious ICT education in Bhutan.

International studies provide evidence for the possibility and effectiveness of value incorporation within ICT instruction. According to Wangdi and Boossabong (2024), states that the equity and child well-being are stressed in Finland innovation and meritocracy in Singapore; human capital development for Australian ICT instruction; Māori value entwinement through storytelling and communities in New Zealand; and religious and moral values in response to ethical digital citizens in Indonesia (Hutchings & Lee-Morgan, 2016; Purwantiningsih & Prasetyo,

2022). Findings from the various studies suggest that effective value incorporation relies on harmonious consistency between curriculum design, teacher professional development, and policy structures.

In Bhutan, classroom practices acknowledge minimal empirical work on value incorporation in ICT education. These earlier studies mostly cover the overall inclusion of EGNH values across the curricula. Though GNH-based learning offers a robust ethical and cultural ground (Ministry of Education [MoE], 2011; Sadagopan & Krishnan, 2025), its practice in ICT classes is uneven, especially for subjects with Western-biased content (Chewang, 2017; Dorji et al., 2016). To add on this, Wangdi and Boossabong (2024) mentioned that political changes, the Draft National Education Policy, consistency with international policies, as well as exposure towards international digital media, have further impeded GNH incorporation into the curriculum.

Researchers concluded that incorporating Bhutanese values in ICT education demands alignment of curriculum, teacher attitude, and support from policies. Bhutanese Value-Based TPACK models present a model for integrating technology, pedagogy, and Bhutanese values which propounds that teachers' role as facilitator leads learners' ethical, cultural, and digital competency development. Though international and national studies prove the value of integration possibilities and provide insights on value promotion, limitations such as few professional development opportunities, examination-centric pedagogy, and few culturally responsive sources continue to exist.

This research is thus required as a means of exploring the experiences, pitfalls, and opportunities for teachers in value-based digital instruction. This will provide country-based insights that can inform policymakers, teacher educators, and curriculum developers. The goal is to add in designing a culture-based, technology-savvy ICT curriculum that sustains Bhutan's distinct personality.

2. Theoretical Framework

The conceptual framework of this study introduces a Bhutanese Value-Based TPACK model, an expanded and culturally responsive adaptation of the original TPACK framework. While the traditional TPACK model emphasises the intersection of Technological Knowledge [TK], Pedagogical Knowledge [PK], and Content Knowledge [CK]. This adapted model re-centres Bhutanese values as the foundational core that informs all dimensions of teacher knowledge and instructional decision-making. However, the scope of the study is limited to examining how Bhutanese values are integrated specifically within Technological Knowledge [TK].

At the heart of the model is "Bhutanese Value", representing the nation's moral, cultural, and spiritual principles particularly *Tha Damtshi* (commitment), *Ley Jumdrey* (cause and effect or moral responsibility), and *Driglam Namzha* (discipline, etiquette, and harmonious conduct). These principles serve as the guiding lens through which educational practices, including ICT integration, must be interpreted. By placing these values at the centre rather than at the periphery, the model emphasises their importance. It highlights that technology use in Bhutanese classrooms should not be value neutral. Instead, it must actively support the cultivation of responsible, ethical, and culturally grounded learners.

Surrounding the core values are the traditional TPACK components TK, PK, and CK along with their intersections: Technological Pedagogical Knowledge [TPK], Technological Content Knowledge [TCK], and Content Pedagogical Knowledge [CPK]. In this adapted framework, each overlap is reconceptualised as a value-infused domain. This means that every technological or pedagogical decision is evaluated based on its alignment with Bhutanese cultural principles. The area where all components intersect normally the central TPACK zone is transformed into the Primary Value PTK area. In this space, Bhutanese values directly shape the design, selection, and implementation of digital tools in classrooms.

The entire model is enclosed by a green outer boundary, symbolising the philosophical influence of GNH on the education system. This boundary reflects the expectation that ICT education should promote more than technical proficiency or subject knowledge. It should also

foster holistic well-being, national identity, and social harmony. Thus, the Bhutanese Value-Based TPACK model extends the original TPACK. It embeds a culturally specific dimension that guides technological integration in ways consistent with Bhutan's national vision. This framework provides the basis for examining how Bhutanese ICT teachers understand and enact their technological knowledge in relation to value integration. It also supports the study's broader aim of exploring how ICT practices either enable or hinder the incorporation of Bhutanese values within school curricula. Ultimately, it contributes to the development of ethically grounded and culturally rooted digital citizens.

Figure 1
Repositioned TPACK Framework Illustrating the Integration of Bhutanese Values at the Core of ICT Education

The study seeks to answer the following research questions:

RQ 1) How do ICT teachers in Bumthang District perceive the integration of Bhutanese values into ICT education?

RQ 2) To what extent do ICT teachers in Bumthang District incorporate Bhutanese values into their ICT teaching practices?

3. Method

The study employed a convergent parallel mixed methods design to examine the perspectives of ICT teachers in Bumthang District on integration of Bhutanese values into ICT education. Quantitative data were collected through surveys, and qualitative data were gathered through semi-structured interviews. Both data strands were collected concurrently to obtain generalisable patterns from the quantitative component and rich, contextual insights from the qualitative component. Data interpretation occurred during the final phase, where both data sets were systematically compared to identify points of convergence, divergences, and complementarity.

3.1. Participants

Bumthang District was selected as the research site because of its strong cultural heritage and its active engagement in ICT-related professional development programmes. The District Education Office has consistently supported initiatives that promote ICT integration in teaching and learning. This made the district an appropriate context for examining how Bhutanese values is embedded within ICT education. ICT teachers across the district regularly incorporate technology into their instructional practices.

A total of 43 ICT teachers served as the population for this study. The sample size of 30 survey participants was determined using Yamane's formula. This formula provided a statistically acceptable number for achieving reliable quantitative results. In addition, five ICT teachers were selected for qualitative interviews. These teachers had a minimum of one year of ICT teaching experience and demonstrated familiarity with integrating Bhutanese values in classroom practices.

The purposive sampling strategy ensured that participants possessed relevant expertise,

thereby improving the depth and contextual relevance of the data. The sample is reasonably representative of the ICT teacher population in Bumthang; however, it remains limited by its size and geographical focus. Consequently, the findings may not fully generalize to ICT teachers in other districts or national contexts. Despite these limitations, the selected sample provided rich, meaningful, and context-specific insights that aligned with the study's objectives.

3.2. Data Collection Tools

3.2.1. Survey instrument

The quantitative data were collected using a structured survey questionnaire developed for this study. This instrument was designed to measure ICT teachers' perceptions, practices, and challenges regarding the integration of Bhutanese values. Its construction followed a multi-step process. Item generation was first informed by a comprehensive literature review on value-based education and ICT integration. This review also included an analysis of key Bhutanese policy documents, such as the Educating for Gross National Happiness framework and the iSherig ICT Master Plan.

The survey was organized into four thematic subscales. The first subscale, Perceptions and Beliefs (8 items), assessed attitudes towards the importance of value integration. A sample item is: "Integrating Bhutanese values into ICT education enhances students' learning experiences." The second subscale, Implementation Practices and Familiarity (8 items), evaluated teachers' self-reported familiarity and integration frequency. This included items such as, "I incorporate Bhutanese values into my ICT teaching practices." The third subscale, Challenges and Gaps (6 items), identified barriers like limited resources and time. The fourth subscale, Training and Professional Development Needs (3 items), gauged the adequacy of prior training and demand for future support.

All items used a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The draft questionnaire was pilot tested with a group of five ICT teachers to refine its clarity and relevance. Subsequently, content validity was established through review by two experts in educational research and Bhutanese studies. Finally, the instrument demonstrated high internal consistency, with a Cronbach's alpha coefficient of 0.878 for the overall scale.

3.2.2. Semi-structured interview

The semi-structured interview protocol was designed to align directly with the study's research questions and theoretical framework. This ensured the collected qualitative data would provide deep, contextual insights into teachers' perceptions and practices. To establish validity, the initial questions were shared with experts in the field, who confirmed their face and content validity. Furthermore, the trustworthiness of the qualitative data was secured through rigorous validation procedures. These procedures included member checking with participants to verify accuracy, peer debriefing to minimize researcher bias, and the maintenance of a detailed audit trail throughout the coding and analysis process.

3.3. Data Analysis

The quantitative data collected through surveys were analysed using descriptive statistics using the mean and standard deviation. Similarly, to analyses the qualitative data, Braun and Clarke's (2021) framework was employed to interpret semi-structured interviews data. A purposive sampling strategy was used for the qualitative component, which involved five in-depth interviews. Data saturation was a principle criterion for determining the final sample size. Saturation was evaluated through an iterative process. This process involved concurrent data collection and thematic analysis.

Interview transcripts were analysed sequentially. Data collection was concluded when subsequent interviews no longer yielded new substantive themes. Instead, they served to reinforce and elaborate upon the patterns already established within the data set. Informational redundancy was achieved by the fifth interview. The final accounts consistently reiterated core themes without

introducing new conceptual categories. These themes included the perceived importance of value integration, the practical challenges of implementation, and the critical need for professional development. This confirmed that a comprehensive account of participant experiences and perceptions had been attained within the study's parameters. This leveraged a systematic interpretation of emerging themes. Furthermore, collected data from both were merged through a comparison approach, enabling a comprehensive interpretation of the results. This integration of data sets provided a holistic and nuanced understanding of the research questions.

3.4. Ethical Considerations

Prior to data collection, ethical approval was secured from the Bumthang District Education Office, followed by subsequent authorization from the respective school Principals. Written informed consent was obtained from all participants. They were assured of the confidentiality of their responses and the voluntary nature of their involvement.

4. Result

4.1. Perceptions and Beliefs about Integrating Bhutanese Values into ICT Education

Table 1 shows respondents' perceptions of integrating Bhutanese cultural values in ICT education, measured using eight items on a five-point Likert scale. Results are presented with mean, standard deviation [SD], interpreted levels, and overall averages.

Table 1
Perceptions and Beliefs about Inclusion of Bhutanese Values

Sl.No	*Items*	*Mean*	*SD*	*Level of perception*
1	Integrating Bhutanese values into ICT education is important.	4.86	0.35	Highest
2	ICT education can contribute to preserving Bhutanese cultural identity.	4.33	0.73	High
3	Integrating Bhutanese values into ICT education enhances students' learning experiences.	4.57	0.59	Highest
4	ICT education plays a key role in preserving Bhutanese traditions and culture.	3.81	0.81	High
5	Integrating Bhutanese values into ICT education enhances students' engagement.	4.19	0.68	High
6	ICT teachers have a responsibility to uphold and preserve Bhutanese values in the digital age.	4.19	0.75	High
7	ICT tools and platforms can effectively promote Bhutanese values.	4	0.83	High
8	There are significant opportunities to integrate Bhutanese values into ICT education.	4.14	0.72	High
Overall Perception		4.26	0.69	High

The findings indicate that respondents hold consistently positive views toward integrating Bhutanese values into ICT education, with mean scores ranging from (M = 3.81) to (M = 4.86), and these perceptions are reinforced by teachers' qualitative accounts of classroom practices. The highest rating was given to the importance of value integration (M = 4.86, SD = 0.35), which aligns with Tr05's observation that values such as Tha Dam-Tsi and Ley Jum Drey are "essential in shaping well-rounded, responsible, and culturally grounded individuals." Similarly, the strong belief that value integration enhances learning experiences (M = 4.57, SD = 0.59) is reflected in Tr01's emphasis that ICT must "coexist harmoniously with the nation's Bhutanese values." Even the relatively lower score on ICT's role in preserving traditions (M = 3.81, SD = 0.81) is supported by teachers' reflections on the challenges of embedding cultural elements effectively, suggesting a need for contextualisation through policy, teacher training, and resource development. Teachers also shared practical strategies demonstrating integration in action, such as linking cyberbullying

lessons to Ley Jum Drey (Tr03) and promoting moral integrity through plagiarism awareness and respectful online behavior (Tr05), providing concrete examples that strengthen the quantitative evidence of broad support for embedding Bhutanese values into ICT education.

4.2. Implementation Practices and Familiarity with Bhutanese Values in ICT

Table 2 presents the perceptions of ICT teachers regarding their familiarity with and implementation of Bhutanese values in ICT education. The items measured aspects such as conceptual awareness, pedagogical integration, observation of student behavior, and confidence in value-based instruction.

Table 2
Teachers' Implementation Practices and Familiarity with Integrating Bhutanese Values into ICT Education

Sl.No	*Items*	*Mean*	*SD*	*Level of perception*
1	I am familiar with the concept of integrating Bhutanese values into ICT education.	3.57	0.98	High
2	I incorporate Bhutanese values into my ICT teaching practices.	3.62	0.86	High
3	I frequently integrate values like Driglam Namzha (etiquette and discipline) into my ICT lessons.	3.52	0.81	High
4	I observe whether students demonstrate Bhutanese values in their ICT-related activities.	3.43	0.75	Moderate
5	I use teaching methods like storytelling or case studies to integrate Bhutanese values into ICT education.	3.29	0.90	Moderate
6	Bhutanese values such as Tha-Damtshig and Ley-Jumdrey are relevant to ICT education.	3.9	0.94	High
7	I feel prepared to integrate Bhutanese values into my ICT teaching.	3.24	0.89	Moderate
8	I am confident in my ability to teach Bhutanese values through ICT.	3.57	0.98	High
Overall Perception		3.52	0.88	High

ICT teachers show high familiarity and confidence with value integration (M = 3.24–3.90), particularly in conceptual understanding (M = 3.57, SD = 0.98), teaching confidence (M = 3.57, SD = 0.98), and recognising values like Tha Dam-Tsi and Ley Jum Drey (M = 3.90, SD = 0.94). Moderate scores in preparedness (M = 3.24, SD = 0.89) and pedagogical strategies such as storytelling (M = 3.29, SD = 0.90), along with lower observation of students' value demonstration (M = 3.43, SD = 0.75), indicate areas needing support. Qualitative data reveal challenges in operationalising values: Tr04 noted the curriculum "does not explicitly support or prioritise value integration," Tr05 highlighted linking values to coding lessons, and Tr03 observed reduced student interest with digital responsibility lessons. Conversely, Tr02 used Google Workspace to foster ethical collaboration. These findings suggest that while teachers align conceptually with value integration, clearer curricula, targeted professional development, and contextualised resources are essential for consistent classroom practice.

4.3. Challenges and Gaps in Curriculum and Teaching Practices

Table 3 presents ICT teachers' perceptions of the challenges and gaps in integrating Bhutanese values into ICT education. Six items assessed perceived barriers, including resource availability, curricular support, time allocation, and teacher preparation.

Table 3
Perceived Challenges and Gaps in Integrating Bhutanese Values into ICT Education

Sl.No	*Items*	*Mean*	*SD*	*Level of perception*
1	I face challenges in integrating Bhutanese values into ICT education.	3.71	0.72	High
2	There is a lack of resources or materials to support integrating Bhutanese values into ICT education.	3.62	0.97	High
3	Balancing ICT skills with Bhutanese values in teaching is challenging.	3.29	1.10	Moderate
4	Time constraints prevent me from integrating Bhutanese values into my ICT lessons.	3.62	1.16	High
5	The current ICT curriculum adequately supports the integration of Bhutanese values.	3.52	0.93	High
6	Pre-service teacher training programs adequately prepare ICT teachers to integrate Bhutanese values.	2.95	0.97	Moderate
Overall Perception		3.45	0.98	Moderate

The findings indicate that respondents perceive considerable challenges in integrating Bhutanese values within ICT instruction. The most prominent difficulty was the general challenge of value integration (M = 3.71, SD = 0.72), followed by limited resources (M = 3.62, SD = 0.97) and time constraints (M = 3.62, SD = 1.16), reflecting systemic barriers that hinder effective value-based pedagogy. Qualitative accounts corroborate these results, with teachers noting that ICT curricula are heavily weighted towards technical competencies, leaving minimal scope for embedding cultural and moral values. Tr02 observed that "ICT syllabi are packed with technical content," restricting opportunities for cultural discussions, while Tr05 highlighted that upper-grade content often lacks moral alignment. Tr04 emphasised the absence of embedded guidance within curricular frameworks, and Tr03 reported that students frequently perceive ICT as purely technical, which complicates the promotion of value-oriented perspectives. Moderate ratings for curriculum support (M = 3.52, SD = 0.93) and for balancing technical content with values (M = 3.29, SD = 1.10) were mirrored in teachers' reflections on the need for contextualised lesson planning and stage-wise pedagogical strategies. The relatively low rating for pre-service teacher preparation (M = 2.95, SD = 0.97) further highlights gaps in professional readiness and capacity-building.

4.4. Training and Professional Development Needs

Table 4 presents ICT teachers' perceptions regarding their training and professional development needs for integrating Bhutanese values into ICT education. Three items assessed the adequacy of prior training, participation in workshops, and perceived need for further support.

The results reveal a striking imbalance between teachers' experiences and their expressed needs. Low ratings for both the training adequacy (M = 2.48, SD = 1.12) and attendance at workshops (M = 1.95, SD = 0.92) demonstrate a lack of systematic professional development opportunities. In contrast, the very high mean score for the need for more training (M = 4.38, SD = 0.87) underscores teachers' strong demand for structured capacity-building initiatives. The overall moderate perception (M = 2.94, SD = 0.97) reflects this tension between insufficient current provision and an urgent call for professional support. The qualitative data reinforce these findings. Teachers consistently reported an absence of formal training specific to value integration. Tr05 noted, "I have not received any training on how to integrate Bhutanese values into the ICT curriculum," a view echoed by Tr04 and Tr01. Participants highlighted the need for practical handbooks, context-specific lesson plans, and digital resources grounded in Bhutanese ethics. Tr02

Table 4
Training and Professional Development Needs for Integrating Bhutanese Values into ICT Education

Item	*Training and Professional Development Needs*	*Mean*	*SD*	*Level of perception*
1	I have received adequate training or guidance on integrating Bhutanese values into ICT education.	2.48	1.12	Low
2	I have attended sufficient workshops or seminars on integrating Bhutanese values into ICT education.	1.95	0.92	Low
3	I need more training or support to integrate Bhutanese values into ICT education.	4.38	0.87	High
Overall Perception		2.94	0.97	Moderate

proposed workshops on digital citizenship contextualised to Bhutanese realities, while Tr01 emphasised the importance of instructional guides that link age-appropriate values with ICT topics. These insights collectively affirm the quantitative evidence, highlighting the critical necessity of developing targeted professional development programs and resources to equip teachers for meaningful value integration in ICT education.

5. Discussion and Implication

This study employed a convergent parallel mixed methods design to provide a nuanced analysis of the integration of Bhutanese values into ICT education within the Bumthang District. The discussion that follows moves beyond a mere summary of results to critically examine the points of convergence, divergence, and complementarity between the quantitative and qualitative data strands. This examination is organized around four emergent themes.

5.1. Strong Philosophical Alignment versus Practical Implementation: A Defining Divergence

A profound convergence between the datasets is the overwhelmingly positive perception among ICT teachers regarding the philosophical importance of integrating Bhutanese values. The quantitative survey recorded a very high mean score (M=4.86) for its importance. This a sentiment was qualitatively elaborated by participants, who viewed values like *Tha Dam-Tsi* and *Ley Jum Drey* as foundational for shaping "well-rounded, responsible, and culturally grounded individuals" (Tr05). This strong belief aligns with the national vision of GNH and EGNH, positioning teachers as willing agents of this policy mandate (Kaka et al., 2022; Ministry of Education [MoE], 2019). It is also consistent with the national vision of harmonising cultural preservation with holistic educational progress (Wangyal, 2001).

However, a critical divergence emerges between this robust philosophical support and the level of practical implementation. While teachers reported moderate familiarity and conceptual confidence, their self-reported enactment was lower, with modest scores for feeling prepared and using specific pedagogical strategies. Qualitative data is indispensable in diagnosing this belief-practice gap, revealing that teachers' conceptual confidence is thwarted by structural constraints. The finding that the curriculum "does not explicitly support or prioritise value integration" (Tr04) and the challenge of linking abstract values to technical content (Tr05) provide a lived-experience context for the statistical gap. This corroborates prior critiques of Bhutan's predominantly content-oriented and examination-focused system, which inadvertently marginalizes value-based pedagogy (Dorji et al., 2016; Kaka et al., 2022; Lhendup, 2022).

5.2. Systemic Barriers: Triangulating the Challenges of Curriculum and Resources

The quantitative and qualitative findings converge strongly in identifying key systemic impediments, including inadequate instructional resources, limited teaching time, and insufficient curricular guidance. The quantitative pattern of a moderately rated curriculum is sharply clarified by qualitative accounts. Teachers reported that "ICT syllabi are packed with technical content" (Tr02) and noted an "absence of embedded guidance" (Tr04), indicating the curriculum is not just passively inadequate but actively obstructive by design. This triangulation suggests the challenge

is a fundamental misalignment between a technocentric curriculum. The goals of value-based education, a systemic shortcoming noted in earlier studies (Chewang, 2017; Schuelka & Sherab, 2022; Zangmo, 2014).

5.3. The Imperative for Contextualized Professional Development: A Complementary Finding

Perhaps the most striking convergence in the data is the identified vacuum in professional development. The survey revealed a dramatic imbalance between the very low ratings for training received and the extremely high demand for more support. This quantitative evidence was unanimously validated in the interviews, with declarations such as, "I have not received any training" (Tr05). The two data strands complement each other to specify both the magnitude and the character of the need. While the survey established the scale of the deficit, the interviews detailed its nature, with requests for "instructional guides that link age-appropriate values with ICT topics" (Tr01) and workshops on "digital citizenship contextualised to Bhutanese realities" (Tr02). This aligns with recommendations for sustained professional learning through workshops, peer mentoring, and communities of practice to effect pedagogical change (Kaka et al., 2022; Lhendup, 2020; Zangmo, 2014).

5.4. Theoretical and Practical Implications: Towards a Systemic Transformation

The collective findings of this study substantiate the proposed Bhutanese Value-Based TPACK model. Within this model robust teacher, belief legitimises the central positioning of "Bhutanese Values." Conversely, the identified gap in classroom implementation underscores the critical need to enhance teacher capacity within the value-infused technological, pedagogical, and content knowledge domains. This research firmly establishes that sustainable integration cannot be contingent upon teacher initiative alone but demands a comprehensive systemic transformation (Thinley, 2024; Wangdi, 2022). The practical implications emanating from this conclusion are multifold.

First, the ICT curriculum itself requires explicit revision to embed value-based objectives and pedagogical guidance, thereby moving beyond its current technocentric focus. This includes integrating concrete lesson ideas where values are core, such as teaching digital citizenship through *Ley Jumdrey* (karmic consequences of online actions) or collaborative projects framed as an exercise in *Tha Damtshi* (commitment and accountability). Second, targeted professional development is essential to equip teachers with the skills to implement this revised curriculum; such training must progress from conceptual advocacy to offering practical, actionable strategies for value integration, such as using scenario-based learning for ethical dilemmas in technology or guiding culturally resonant project work. Third, this curricular shift must be supported by the urgent development of culturally contextualised resources, such as lesson plans, instructional handbooks, and digital templates that demonstrate the practical connections between technology and Bhutanese ethics (Schuelka & Sherab, 2022). Finally, a paradigm shift in assessment is warranted, where frameworks are redesigned to evaluate ethical digital comportment and value-based competencies with the same rigor as technical skills, thereby signaling the equal importance of both domains within the education system (Chewang, 2017).

5.5. Limitation of the Study

While this research provides valuable insights, several limitations should be acknowledged. First, the study's generalisability is constrained by its sample characteristics. The findings are based on a modest cohort of teachers from a single district, Bumthang. Although this district offers a rich cultural context, the results may not fully represent the diverse infrastructural, developmental, and regional cultural realities across Bhutan.

Second, the methodological reliance on self-reported data from surveys and interviews presents a potential for social desirability bias. Participants may have provided responses aligned with national educational policies rather than reflecting their actual classroom practices. The absence of observational data to triangulate these self-reports means that the described implementation levels remain uncorroborated by direct evidence.

Finally, the scope of the study was limited to teacher perspectives. The absence of student data means the reception and effectiveness of value integration from the learner's viewpoint are unknown. Understanding student perceptions is critical for assessing the true impact of these pedagogical strategies on fostering ethical digital citizenship.

5.6. Conclusion and Recommendation

ICT teachers in Bhutan acknowledge the importance of integrating Bhutanese values into curriculum. They strongly belief nurturing students to become technologically adept, ethically grounded, and culturally responsive. On the other hand, its practical implementation in classroom remains inconsistent due to limitations in the curriculum, exam-driven practices, scarcity of resources, time constraints, and inadequate professional training. To address these gaps, the study recommends reenvisioning the TPACK model with a Bhutanese Value at its core. This enhanced framework provides a solid theoretical foundation that positions teachers as both facilitators of digital knowledge and custodians of cultural values. Integrating values ensures that ICT education supports the development of moral character and personal accountability, reinforcing the broader goals of GNH.

For effective and sustainable integration of Bhutanese values, the Ministry of Education and Skills Development is encouraged to provide explicit curricular guidance, culturally relevant teaching resources, appropriate digital tools, and assessment mechanisms that reflect both technical and ethical competencies. Enhancing ongoing professional development will further empower teachers to apply value-based ICT practices with confidence and consistency. Future research should examine classroom level enactment, incorporate student perspectives, and undertake cross-district comparisons. Such studies will help strengthen, refine and validate the Bhutanese Value-Based TPACK framework, supporting its wider application in Bhutanese education system.

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Appendix: Sample Semi-structure Interview Questions

1. How would you describe the importance of integrating Bhutanese values into ICT education? Do you believe it is necessary, and why?
2. Can you provide examples of how you currently incorporate Bhutanese values into your ICT teaching practices? What are the specific values you focus on?
3. What challenges, if any, have you faced in trying to integrate Bhutanese values into ICT education? Are there any specific barriers that make this difficult?
4. In your opinion, what opportunities exist for effectively embedding Bhutanese values into ICT education? Are there specific teaching methods or tools that could facilitate this?
5. Do you feel that the current ICT curriculum supports the integration of Bhutanese values? If not, what changes or additions would you recommend?
6. How do you ensure that the ICT content you teach remains culturally relevant to Bhutanese students while also preparing them for global technological advancements?
7. Have you received any training or support to help you integrate Bhutanese values into your ICT teaching? If not, what kind of training or resources would you find helpful?
8. How do students respond to the integration of Bhutanese values in ICT lessons? Do you notice any differences in their engagement or understanding when values are included?

9. How do you balance the need to preserve Bhutanese cultural values with the demands of a rapidly evolving technological landscape? Do you see any conflicts between the two?
10. Based on your experience, what recommendations would you make to policymakers or curriculum developers to better support the integration of Bhutanese values into ICT education?