



Teachers' Beliefs and Attitudes as Mediators between the UNESCO ICT-CFT Framework and Classroom ICT Use: Evidence from Nepal

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Abstract

Background and Aim: UNESCO introduced the ICT Competency Framework for Teachers (ICT-CFT) in 2008 with support from Microsoft, Cisco, ISTE, and Intel. The framework guides the integration of information and communication technology (ICT) into education. However, as a framework without direct classroom monitoring, its implementation depends on teachers' beliefs and attitudes. The study investigated whether UNESCO's ICT-CFT is translated into classroom practice through these psychological factors.

Materials and Methods: A quantitative survey design was employed, guided by the Technology Acceptance Model (TAM). Google Forms questionnaires were distributed to 150 teachers, yielding responses from 125 participants across 12 districts in Nepal's Koshi and Bagmati Provinces. Data were collected in two waves and analyzed using Hayes' PROCESS macro (Model 4) in SPSS version 27. Parallel mediation analysis examined whether teachers' beliefs and attitudes mediated the relationship between the ICT-CFT and classroom ICT use.

Results: Teachers' positive beliefs and attitudes toward ICT mediated 47.5% of the total effect of the ICT-CFT on technology use. The direct effect accounted for 52.5%, indicating that the framework influenced practice directly and indirectly through teachers' psychological dispositions.

Conclusion: The findings demonstrate that translating UNESCO's ICT-CFT into classroom practice requires support from teachers' willingness to adopt technology. Positive beliefs and attitudes are mechanisms through which policy guidance becomes ICT use. Although the framework exerts a direct influence, policy directives alone may be insufficient without educators' acceptance and commitment. Effective implementation should combine institutional policies with initiatives that strengthen teachers' confidence, motivation, and favorable attitudes toward educational technology.

Keywords: UNESCO ICT-CFT, Teachers' Beliefs, Teachers' Attitudes, ICT Integration, Parallel Mediation, Nepal

Introduction

The education system entered into a new paradigm due to the digital revolution. ICT became the de facto tool for teachers in the classroom (Petko, 2012). It has been utilized either partially or in full by subject teachers. Adopting ICT depends on several factors such as sufficiency of infrastructure, beliefs and attitudes, teachers' competencies, and policies in place. Resourceful countries have adequate ICT infrastructure and monitoring systems in pedagogy. As a result, their productivity is higher in comparison to under-resourced countries (Sakil, 2018). Therefore, teachers are expected to use ICT in education by school administrations. Under-resourced countries like Nepal struggle to implement ICT in many ways. The Digital Nepal Framework (2019) was introduced to bridge this gap. To supplement this framework, the School Education Sector Plan (SESP, 2022–2032) was developed in both formal and non-formal education. Despite many ICT plans being developed, the implementation was weak in either teachers' competencies and infrastructures (Tripathi, 2024; Pal et al., 2021). The realities of digitally divided Nepal were further exposed by the COVID-19 pandemic. Many of the educational institutions were at their wits' end about how to use technology in this period (Magar & Rana, 2022).

Though the government's effort was believed to bridge the gap of the existing digital divide, to the contrary, various research revealed that mere provision of infrastructural richness does not promise the productivity of digital transformation, but rather it needs psychological readiness on teachers' part (Lomos et al., 2023; Sanhueza et al., 2025; Fathima et al., 2025). Humans tend to be critical agents in transformation, especially as their beliefs and attitudes play a vital role; therefore, it matters for ICT (Teo, 2008).





UNESCO's ICT Competency Framework for Teachers (ICT-CFT), launched in 2008, is adopted worldwide (UNESCO, 2008). This framework provides a comprehensive roadmap to develop teachers' digital competence; yet the localized implementation relies on teachers' psychological strength. Beliefs and attitudes are two psychological constructs that play an important role in innately motivating teachers to use ICT in education (Bas et al., 2016).

Past studies have discussed barriers and challenges of ICT in the classroom, perception of teachers towards ICT, and the Nepali policy implementation gap (Dawadi, 2022; Shahi & Khadka, 2025). The majority of research covered ICT in education broadly. Despite the previous research, studies regarding UNESCO's ICT CFT framework for teachers and psychological readiness have been understudied in Nepal. We have taken our main domain of study to be teachers' beliefs and attitudes towards ICT.

This study examined how teachers' beliefs and attitudes towards ICT play a vital role in digital pedagogy, mediating UNESCO's ICT framework for teachers' competency with actual usage in the classroom. This research focused on the mediating role of beliefs and attitudes towards ICT between teachers' usage of ICT and the UNESCO framework.

Objectives of the study

The objective of this study is: (i) to test the direct effect between UNESCO's ICT CFT framework for teachers and actual ICT use in the classroom; (ii) to examine the mediation path of beliefs and attitudes towards ICT use in the classroom; (iii) to measure the total mediation effect between UNESCO's ICT framework for teachers and actual ICT use in the classroom.

Hypothesis Development

This study hypothesized that teachers' beliefs and attitudes towards ICT mediate the relationship between UNESCO ICT CFT and usage in the classroom. By reviewing the literature, the following hypotheses were developed.

UNESCO ICT Framework for Teachers

ICT competencies for teachers refer to the skills, knowledge, attitudes, and practices employed in education (Gay Querol Leiva, 2025). ICT-CFT is a policy-driven theoretical framework to guide teachers on digital technologies ranging from pre-school to grade 12 (Muyambi & Ramorola, 2025). This guideline facilitates capacity building for teachers in the ICT domain. According to UNESCO (2018), these competencies include technical abilities to integrate ICT in the classroom. The framework assumes digital competency as key instrumentation in 21st-century education systems and is propounded by the UN's Sustainable Development Goal (SDG) program. ICT competence involves the ability to effectively integrate digital tools into pedagogy, strengthening interactive, engaging, and student-centered learning environments. Key areas of this framework include digital literacy for teachers to use in their classroom, such as downloading and managing online learning materials, knowledge acquisition, knowledge deepening, and knowledge creation (Dzidzornu & Xu, 2025). This implies that the digital tools and their guidelines largely influence the actual use. As a result, students get opportunities to be more engaged via teachers' psychological readiness to use ICT in the classroom (Siyam et al., 2025). This is why we proposed the first hypothesis as follows:

H1: UNESCO ICT CFT framework for teachers (ICT CFT) influences ICT usage in the classroom (US).

Teachers' Belief and Attitude towards ICT

Belief and attitude are psychological constructs (Lee & Albarracin, 2026). But they are different in their intrinsic nature, the former being more conviction-based and the latter evaluative (Fischer & Karl, 2025). ICT use in education as a planned action is central to teachers' beliefs and attitudes (Ajzen, 1991). The majority of teachers employ ICT in the classroom because they are steered by their attitudes and beliefs (Tondeur et al., 2017). The advent of ICT mechanized teaching methods with higher student engagement (Ertmer & Ottenbreit, 2010). A good teacher has been suggested to brainstorm their visionary process for their classroom using ICT. Teachers' mission of ICT is reflected in the lesson





plan, which is paradigmatically value-laden with attitude and belief (Almerich et al., 2024).

Past studies conducted in the South African setting reported that the national ICT policy of the country encouraged adaptation of ICT in education (Abedi, 2024; Brown & Brown, 2008; Blignaut et al., 2010). One of the criticisms in these studies comes from Mashinini (2008) that policy in place does not only guarantee the use of ICT in education, but it also relies on the leadership style and compliance with the policy by the teachers, along with the cultural context (Fischer & Karl, 2025).

A literature review highlighted that teacher beliefs and attitudes towards ICT are usually influenced by various factors such as individual level of confidence and exposure to technology in teachers (Li, 2025). However, we argue that the conviction of technology use in education is still mediated by the teacher's beliefs and attitudes because these two constructs drive human behavior. Various studies related to the psychological dimension state that beliefs and attitudes drive rationally actionable behavior (Turner et al., 2022; Kammeyer-Muller et al., 2024; Cabrera & Estacio, 2022). The idea of mediating by belief and attitude has been criticized by Bariu and Chun (2022). They argued that belief and attitude pose dynamically complex phenomena to measure. Nevertheless, these challenges can be simplified by adapting the teacher's positive belief and attitude towards ICT (Ertmer et al., 2012). The teacher used technology as a tool for task accomplishment (Wang et al., 2020). Tools simplify the process of functions and assist in engaging students. When ICT is implemented in the classroom, students need to be busy working with their hands, which demands creativity. In this way, we proposed the second and third hypotheses as follows:

H2: UNESCO ICT CFT framework for teachers (ICT CFT) influences teachers' beliefs (BEL) toward ICT.

H3: UNESCO ICT CFT framework for teachers (ICT CFT) influences teachers' attitude (ATT) toward ICT.

Actual Use of ICT in Classroom

A study revealed that ICT competency among teachers triggered readiness to use it in the classroom (Dasal, 2025). Despite having a higher level of competencies, this research concluded that actual use in the classroom is moderate. This implied that actual use of ICT still needed positive beliefs and attitudes toward ICT. Similarly, a study conducted to examine the level of pre-service teachers regarding the usage of ICT (Gulbahar, 2008) supported the idea that pre-service teachers may have ICT competency; yet still struggle to use it effectively in teaching practice. A study stated that pre-service teachers who held digital skills to apply in teaching contexts remained relatively strong (Lu et al., 2025). Teacher educators supported the use of ICT in education (Abedi, 2024). Actual pedagogy with deeper subject matter dissemination becomes possible through the use of technology and pedagogical knowledge (Koehler & Mishra, 2009). Engaging students with some ICT tools yields positive learning outcomes across the subjects. In addition to this, students can realize that knowledge and skills are co-constructed when they devise the available tools because using ICT in many ways makes the function easier (Tondeur et al., 2017). Teachers find it easier to collaborate with students, and students get opportunities to work in a group as well with the help of network technology (Hu et al., 2021). Overall, the use of ICT in the classroom confirms enhanced interaction, student motivation, and instructional efficiency. Thus, we developed two hypotheses as follows:

H4: Teachers' belief (BEL) has a significant effect on ICT usage (US) in the classroom.

H5: Teachers' attitude (ATT) has a significant effect on ICT usage (US) in the classroom.

Technological Acceptance Model (TAM) as a Perspective

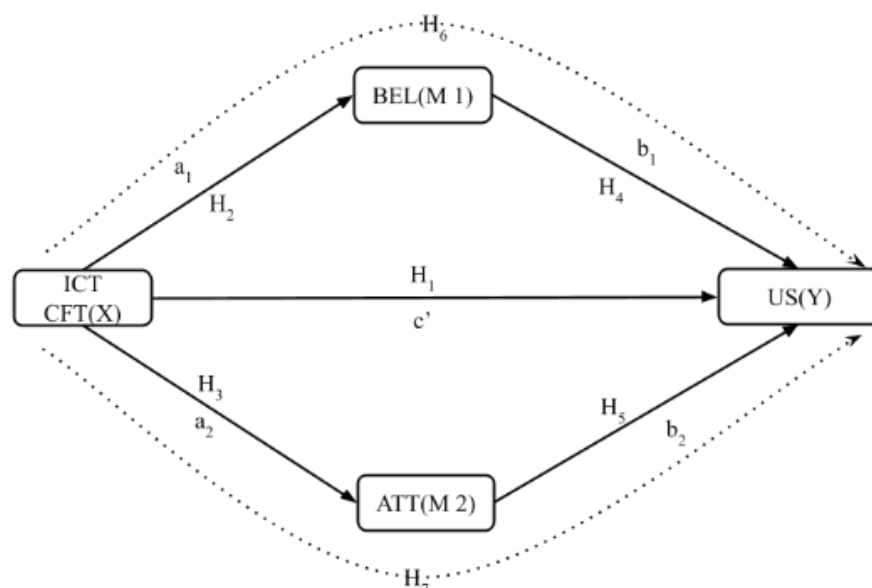
The Technology Acceptance Model (TAM) envisions the perceived ease of use and usefulness of technology (Davis, 1989), which is derived from the Theory of Reasoned Action by Ajzen (1991). This theory was later developed into the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh and Bala (2008). Applying the TAM framework to this study would be appropriate to construct belief and attitude with the help of perceived ease of use and perceived usefulness, respectively. Our argument that UNESCO ICT-CFT has been mediated by belief and attitude underpins perceived usefulness and ease of use. As a result, the teacher's intention to use ICT in the classroom is eventually put into action. The TAM model posits that teachers' decision to adopt



technology in the classroom comes from a sequential chain of psychological constructs: external factors influencing internal cognitive beliefs and attitudes, which in turn shape the behavioral intention to use ICT in the classroom. The internal mechanism of human interest in using a new technology comes from its perceived usefulness and perceived ease of use for both teachers and students. Had one of the party's perceived ease of use been at a different level, the TAM model would not have been theorized as it is. Thus, the TAM model clarifies technology-driven classrooms by demonstrating teachers' cognitive evaluation shaping their adoption behavior directly. Therefore, we proposed the sixth and seventh hypotheses as follows:

H6: Teachers' positive belief (BEL) toward ICT mediates the relationship between UNESCO ICT CFT for teachers and usage (US) in the classroom.

H7: Teachers' positive attitude (ATT) toward ICT mediates the relationship between UNESCO ICT CFT for teachers and usage (US) in the classroom.



Picture 1: Parallel Mediation Model

Methodology

Research Design

This study adopted a quantitative research design. The researchers investigated whether teachers' beliefs and attitudes towards ICT parallelly mediates between the UNESCO ICT-CFT framework and the actual use of ICT in the classroom. This research identified the following constructs following already validated scale development: attitude (ATT), usage (US), and belief (BEL), developed by scholars in Türkiye (Bas et al., 2016).

Population and Sample

The population consists of teachers working at the basic and secondary level from twelve districts in Koshi and Bagmati provinces in Nepal. The teacher had at least five years of teaching experience with ICT use in their classroom. The sample includes both male and female teachers ranging from 25 to 55 years of age. The rationale for selecting the eastern provinces comes from the researchers' networking area. The first author comes from Kochi province and had a good network with school teachers. Likewise, the second researcher comes from the Bagmati province, where the researcher had



a good network with teachers.

Data collection

Data were collected using a 33-item structured questionnaire with a Likert scale of 1 to 5 using Google Forms in two waves, before the main festival (Bijaya Dashami) and after. In the second wave, the number of female participants increased by an additional 23.8%. There was no intention of the author to collect data in two waves. When the second author sent a questionnaire, it was before the festival. We kept receiving responses from participants even after the festival. The second author emailed questionnaires with an informed consent mechanism to 150 teachers using Google Forms. The choice was given to respondents that they were not mandatorily required to participate in this study. We received 125 responses from teachers, out of which 69 % were male and the rest female. The sample size we collected suffices based on a study conducted by Fritz & MacKinnon (2007). Additionally, a sample sufficiency test was conducted using KMO ($MSA = 0.86$). Out of the total respondents, 76.2 % of the teachers taught at the secondary level, and 23.8% of the teachers taught at the basic level. In Nepal, the basic level of education constitutes grades 1 to 8, and the secondary level makes up grades 9 to 12 according to the new education system (MoEST, 2019).

Instruments and Measures

The instruments, except ICT-CFT, were developed in Türkiye in English (Bas et al., 2016). We did not translate the instrument into the Nepali language because participating teachers were competent in English and used English as a medium of instruction. A five-point Likert scale was used to measure all responses, where “strongly disagree” represented 1 and “strongly agree” stood for 5.

Belief (BEL) was measured by 5 items. The scale demonstrated good consistency ($\alpha = .80$), which exceeds the original alpha value ($\alpha = .72$). The sample item is “*I believe ICTs as powerful tools helping students' understanding of abstract content*”.

Attitude (ATT) was measured by 10 items. This scale demonstrated reliable consistency ($\alpha = .85$), nearly similar to the original scale ($\alpha = .88$). The sample item is “*I consider the use of ICTs a suitable tool for the teaching-learning process*”.

Usage (US) was measured using 10 items. The scale indicated strong consistency ($\alpha = .89$), which is higher than the original alpha value ($\alpha = .85$). The sample item is “*I give priority to using ICTs more than textbooks in the teaching-learning process*”.

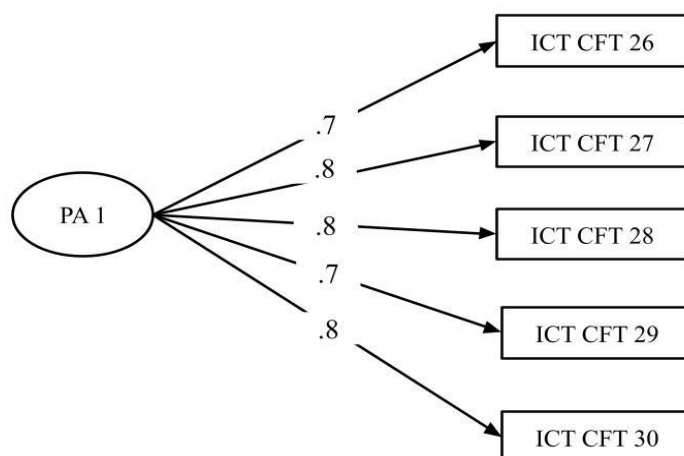
ICT Competency Framework for Teachers (ICT-CFT) was measured by developing 5 items to align with other instrumental items. These items were finalized by consulting experts who were working in the field of the UN's SDG 4. A sample item is “*I create digital content and materials to support my classroom instruction*”. The scale was reliable and consistent ($\alpha = .86$).

Results

Exploratory Factor Analysis of ICT CFT Construct

An EFA was conducted separately on the new ICT CFT. For sampling adequacy, the KMO was assessed, which confirmed $MSA = 0.86$. For data suitability for factor analysis, Bartlett's Test of Sphericity was conducted, which proved significant ($\chi^2(10) = 276.27, p < .001$). A single-factor PAF extraction was conducted on all 5 items. The factor accounted for 75.0 % of the total variance (eigenvalue = 2.85). All five items demonstrated strong factor loadings to construct (ICT CFT26 = .71, ICT CFT27 = .80, ICT CFT28 = .83, ICT CFT29 = .67, ICT CFT30 = .76). Item communalities(h^2) ranged between .45 and .69. All item complexities were exactly 1.0 that confirms a unidimensional factor structure for the ICT CFT construct.





Data Analysis and Results

This section presents the data analysis employing PROCESS Macro Model 4 with 5000 bootstrap samples in SPSS v.27 software (Hayes, 2018). This investigation examined the relationship between UNESCO's ICT competency framework for teachers (ICT-CFT) and ICT usage (US) in education. The model indicated a significant relationship of parallel mediation between ICT-CFT and actual use of ICT in education.

Descriptive Statistics and Variable Intercorrelation (Pearson r)

All variables carried high mean scores ranging from 3.96 to 4.36 with a moderate level of standard deviation (0.44 to 0.61). This indicates that all participants had a positive psychological understanding of ICT. The intercorrelation analysis revealed a positive relationship among variables. The correlation between BEL and ATT ($r = .749, p < .001$) showed a stronger relationship than the original scale ($r = .595$). ICT usage (US) indicated a strong correlation with ICT CFT ($r = .745, p < .001$), BEL ($r = .769, p < .001$), and ATT ($r = .749, p < .001$). Table 1 illustrates the descriptive statistics and correlation matrix for all variables used in the study. It also displays the original correlation coefficient in a side for reference.

Table 1: Descriptive Statistics and Variable Intercorrelation Matrix for this study and the original scale

Variable	Mean	SD	Min	Max	1	2	3	4
1.US	4.12	0.53	2.00	5.00	1			
2. ICT CFT	3.94	0.61	1.20	5.00	.745**	1		
3. BEL	4.16	0.52	2.80	5.00	.769**	.602**	1	
4. ATT	4.36	0.44	2.70	5.00	.739**	.581**	.749**	1

Note: ** < .001



Direct, Indirect and Total Path Analysis

The analysis indicated that the overall regression model for all three variables was statistically significant. Approximately 74 % of the variation in the dependent variable (US) has been explained by the independent variables, $F(3,121) = 116, p < .001$. Table 2 illustrates the path coefficients and mediation model.

Table 2: Path Coefficients for Mediation Model

Path	Coef	SE	T	P
ICT CFT → BEL - a ₁	.510	.061	8.36	< .001
ICT CFT → ATT - a ₁	.414	.052	7.92	< .001
Bel → US - b ₁	.349	.075	4.68	< .001
ATT → US - b ₂	.309	.087	3.56	< .001
ICT CFT → US - c'	.338	.051	6.57	< .001

Model Diagnostics

All variables were measured on a 5-point measurement scale. Participants had generally higher levels of understanding towards ICT, as the mean value indicated above was > 4. A modest level of variation in the dataset was seen, as the *SD* was < 1, which indicates that not all participants responded identically. Pearson correlation was tested to check the strength of the relationship between the variables. Multicollinearity among the variables did not exist, being BEL ($VIF = 1.57$), ICT-CFT ($VIF = 1.57$), and ATT ($VIF = 2.42$). Cronbach's alpha value was greater than .800 in acceptable range.

Multivariate outliers were tested using Mahalanobis distance. Case number 10 exceeded the critical chi-square value ($\chi^2(2) = 13.82, p < .01$) with the maximum distance of 21.02. The case was retained as it did not impact the overall result of the model. The Breusch-Pagan (BP) test indicated heteroskedasticity. Therefore, overall interpretation relied on bootstrap confidence intervals. The confidence interval remains robust in such conditions and can be relied on as the confidence interval (Breusch & Pagan, 1979).

Parallel Mediation Effects

The analysis investigated the direct and indirect pathways. The result revealed that significant parallel mediation effects existed in the model. By including both mediators in the model, the indirect total effect (path a x b) is .3059, with a bootstrap 95% CI [.221, .3978]. The indirect mediation through BEL is .1179, 95% CI [.0874, .2921] and via ATT is .1280, 95% CI [.0523, .2093]. Since the CI does not contain zero, the total indirect effects are statistically significant. This supports the conclusion that both mediators collectively transferred the impact of ICT-CFT on the classroom use of ICT.

The direct (path c') effect between ICT-CFT and US remained significant ($\beta = .338, p < .001$, 95% CI [.236, .440], indicating a strong direct relationship with US in the classroom. This implies that ICT CFT fairly impacts the US without any mediators. The total effect of ICT CFT on the US is larger than the direct effect ($\beta = .6437, p < .001$, 95% CI [.5409 to .464]). This confirms that the mediators BEL and ATT remained as intervening variables in the model.

The total effect size ($c = .6437$) is larger than the direct effect size ($c' = .3378$). This pattern revealed that about 47.5% of the total effect is via mediators ($.3059 / .6437 = .475$). This confirmed that about half of the relationship was influenced by the mediators. Table 3 illustrates indirect effects with bootstrap confidence intervals.

Table 3: Indirect Effects with Bootstrap Confidence Interval

	Effect	SE	LLCI	ULCI
Total	.3059	.0457	.2212	.3978
BEL	.1779	.0525	.0874	.2921
ATT	.1280	.0402	.0523	.2093

Note. Bootstrap sample = 5000; CI = Confidence Interval (Bias-corrected percentile method). A confidence interval that does not include zero means the indirect effect is significant.





Testing of Hypothesis

This section presents hypothesis testing. Seven hypotheses were tested using Hayes PROCESS Macro Model 4 in SPSS v.27 software. An effect is considered statistically significant when the CI does not contain zero in the range.

Testing H1 indicated the result that the UNESCO ICT competency framework for teachers (ICT CFT) has a positive influence on ICT usage (US) in education. H1 is supported, marking a significant positive relationship between ICT CFT and US ($\beta = .3378$, $SE = .0514$, $t = 6.5693$, $p < .001$, 95% CI [.2360, .4396]). A change of one unit in ICT CFT would be a 0.34-unit increase in the US.

Tests on H2 suggested that the ICT CFT framework predicted teachers' positive belief (BEL) towards ICT. The coefficient (.5098) indicated a strong relationship between ICT CFT and teachers' belief ($\beta = .5098$, $SE = .0610$, $t = 8.3579$, $p < .001$, 95% CI [.3890, .6305]). Thus, H2 is supported. If a change in ICT CFT occurred by one unit, the belief (BEL) would increase by .5095 units.

Tests on H3 resulted in ICT CFT significantly influencing teachers' positive attitudes towards ICT. Teachers' attitude towards ICT was associated with the UNESCO teachers' competency framework ($\beta = .4139$, $SE = .0523$, $t = 7.9189$, $p < .001$, 95% CI [.3105, .5174]). H3 was supported. A one-unit change in ICT CFT would change attitude (ATT) by .4139 units. Approximately 34% variance has been explained by ICT CFT on ATT.

The test on H4 revealed that belief (BEL) influenced usage (US), signifying positivity of teachers for ICT integration in the classroom ($\beta = .3490$, $SE = .0745$, $t = 4.6808$, $p < .001$, 95% CI [.2014, .4965]). As a result, H4 is supported. A one-unit change in belief (BEL) would change usage (US) by .3490 units.

Tests on H5 confirmed that the teacher's attitude predicted ICT usage (US) in the classroom ($\beta = .3093$, $SE = .0870$, $t = 3.5553$, $p < .001$, 95% CI [.1371, .4815]). H5 is supported, with positive coefficients indicating a positive attitude that creates a favorable situation for students.

Testing H6 demonstrated that teacher belief (BEL) significantly mediated the relationship between ICT-CFT and usage (US), unstandardized Indirect Effect = .1779, BootSE = .0525, 95% Bootstrap CI [.0874, .2921]). The bootstrapped CI shows that the mediation is strong, as it does not contain zero. This path accounts for approximately 27.6% of the total effect (.1778/.6437). The model demonstrates that UNESCO's framework for teachers' competencies partly shapes teachers' beliefs about the fundamental role of ICT in education.

Tests on H7 resulted in teachers' attitudes towards ICT mediating between ICT CFT and usage (US), unstandardized Indirect Effect = .1280, BootSE = .0402, 95% Bootstrap CI [.0523, .2093]. This indirect effect confirmed that the UNESCO ICT framework for teachers' competencies functions partly via a positive attitude, which, in turn, encourages the usage (US) in education. Approximately 19.9% of the total effect is carried by this construct (.1280/.6437).

All seven hypotheses were significantly supported by the data. The combined total indirect effects using belief (BEL) and attitude (ATT) account for 47.5% of the total effect (.3059/.6437). This shows that UNESCO's ICT CFT framework works on the basis of psychological mechanisms such as belief and attitude. The direct effect between the ICT CFT framework and usage (US) is 52.5 %. On the whole, the full model explains 74.3% of the variance in usage ($r^2 = 74.30$). Table 4 illustrates the status of all hypothesis tests.

Table 4: Summary of the hypothesis testing results

H1-7	Path	Coeff	SE	t	p	95% LLCI	95% ULCI	Result
H1	ICT-CFT → Usage (Direct Effect, c')	0.338	0.051	6.57	< .001	0.236	0.44	Supported
H2	ICT-CFT → Belief (a1)	0.51	0.061	8.36	< .001	0.389	0.631	Supported
H3	ICT-CFT → Attitude (a2)	0.414	0.052	7.92	< .001	0.311	0.517	Supported





H1-7	Path	Coeff	SE	t	p	95% LLCI	95% ULCI	Result
H4	Belief → Usage (b1)	0.349	0.075	4.68	< .001	0.201	0.497	Supported
H5	Attitude → Usage (b2)	0.309	0.087	3.56	< .001	0.137	0.482	Supported
H6	ICT-CFT → Belief → Usage (a1 b1)	0.178	0.053	—	—	0.087	0.292	Supported
H7	ICT-CFT → Attitude → Usage (a2b2)	0.128	0.04	—	—	0.052	0.209	Supported

Discussion

This section discusses the results of the analysis. This research intended to examine whether UNESCO ICT CFT influences ICT use in the classroom. To examine the relationship, the researchers tested parallel mediation using Hayes PROCESS Macro model 4 in SPSS software v.27. The researcher argued that the UNESCO ICT framework influences classroom activities in terms of ICT use. The results showed that the evidence that teachers' beliefs and attitudes towards ICT play an important role in mediation. Out of the total effect of the model, the mediating variables' beliefs and attitudes accounted for 47.5%. The analytical result aligned with the Technology Acceptance Model (TAM). The research question was: *Do teachers' positive beliefs and attitudes towards ICT parallelly mediate the relationship between ICT-CFT and usage?* The findings provided evidence that both teachers' belief and attitude served as mediating variables. Both mediating variables accounted for 47.5% of the total impact of ICT-CFT on usage. The model's explanatory power was strong ($r^2 = .743$). Mediation examination illustrated that belief (indirect effect = .1779, 27.6% of total effect) and attitude (indirect effect = .1280, 19.9% of total effect) operate as complementary pathways for ICT-CFT and classroom use. These distinctive pathways suggested that belief was a stronger factor than attitudes.

The most important part of this research was the substantial effect of ICT-CFT on usage ($\beta = .3378$), accounting for 52.5% of the total effect when controlling for belief and attitude. The mediating effect was considered nearly half of the total effect. This implied that these two constructs partially mediate the relationship with ICT use in the classroom. This notion came true because the ICT-CFT framework anticipates ICT integration regardless of teacher belief and attitude toward ICT. This brings an important insight that a teacher with a positive attitude towards ICT may not have enough skill to implement it, and a teacher with strong ICT skill may have a neutral mindset about ICT use in education. Therefore, UNESCO's ICT-CFT framework directs teachers to use it, and subsequently, the continuous use of ICT can help develop positive attitudes toward ICT (UNESCO, 2018; UNESCO, 2023). Another assumption is that every institution has a unique working setting and thus demands that teachers comply with the existing structure, ignoring the human element.

The third but most critical perspective comes from the direct effect that indicated incomplete mediation due to other unmeasured constructs such as self-efficacy, outcome appraisal, apprehension about technology, or peer pressure at work. Any of these unmeasured features may account for the direct effect.

Critically observing the connection between TAM and the result of this analysis, the model discovers that perceived usefulness and perceived ease of use seem to be directly associated with the beliefs and attitudes of the teachers, serving a mediating role between policy and actual use (Davis, 1989; Venkatesh & Davis, 2000). Extended TAM theory supports the central idea that external factors influence the primary use of technology in education. These external variables align with the mediating variables: belief and attitude, as suggested by the scale developer (Bas et al., 2016).

Teachers may use ICT in education due to their belief in its usefulness, or they may have a positive attitude towards ICT according to TAM theory. However, TAM theory struggles to accommodate other factors, as the TAM model was developed based on voluntary technology acceptance in the given contexts.





The TAM model, though it has been extended by UTAUT (Venkatesh & Davis, 2000), needs to capture the underlying rationale of ICT use in education in a fast-changing world. Therefore, incorporation of mediating variables such as belief and attitude justifies their use in our model.

Conclusion

This study demonstrated teachers' positive beliefs and attitudes towards ICT. Both constructs come under the psychological domain. They mediate ICT use within the UNESCO ICT CFT framework. The mediating variables accounted for only nearly half of the effect, leaving the other half of the effect between ICT CFT and usage. In this way, using ICT in the classroom became a complex human phenomenon directed by the theory, and this cannot be simply a subject of decision of teachers and students. The study introduced strong evidence that human belief and attitude play a vital role in the implementation of any guidelines given to them.

New Knowledge and Study Contributions

This study presents three distinct contributions to the education field: (i) Under-resourced schools can still upgrade in the classroom through their positive belief and attitude towards ICT. (ii) The TAM model's pragmatic aspect and its instrumentality still endure despite being introduced decades ago. (iii) When a policy cannot be empirically and practically implemented, the functional system must rely on the underlying human psychology. This suggests that when direct executive management remains out of reach, addressing the core human conviction ensures implementation and execution to a greater extent.

Limitation

We realized that the sample size of $n = 125$ could be increased from various provinces of Nepal. This finding may not represent the ontology across the country, as the sample has been taken from Koshi and Bagmati provinces of Nepal. Increasing samples from all over the country may further compare and contrast TAM models with extended nuances. Doing so may change the effect size of independent variables. Different institutions may regard the UNESCO ICT CFT framework differently in their local setting. While this study is limited to the TAM model, other theories such as Self-Determination Theory can be taken as a reference to compare and contrast. Likewise, the community of Practice framework (Wegner & Nuckles, 2015) suggests that technology use in education is the primary social cause rather than individual, which is accommodated in this research.

Future Research Direction

This research contributes to the knowledge base. It highlights some areas where this research could be extended. Instead of using belief and attitude as a mediating variable, other variables such as social influence can be added to the model. As we followed the validated scale developed in Türkiye, we were limited to these variables. School policy on ICT use and facilitating factors from local authorities are included in other studies.

Authors' Declaration

The first author conducted data wrangling, data analysis, and wrote the results and discussion section. The second author collected data, wrote an introduction, and developed a hypothesis. Both authors were engaged in the whole interactive process in need. We declare that this piece of work has no interest or conflict with anyone.

Data Availability Statement

Data are available upon request through this email: narayan.niroula@kusom.edu.np.





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