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Information And Communication Technology (Ict): Usage Frequency And Attitude Towards Usage – Nexus And Mediating Role Of Technology Acceptance Model (Tam)

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Abstract:

The National Education Policy (NEP) 2020 emphasizes the transformative role of information and Communication Technology (ICT) in enhancing the quality, accessibility, and inclusivity of higher education in India. In alignment with this vision, the present study aims to validate the Technology Acceptance Model (TAM) by examining the impact of ICT usage frequency and students' attitudes towards ICT Usage among post graduate management students in the twin cities of Telangana State. The research addresses an important gap by exploring how frequently students engage with ICT tools and how their perceptions regarding the usefulness and ease of use of these tools influence their attitudes. This focus is particularly relevant in the context of Indian higher education's rapid digitalization under NEP 2020, where understanding the behavioral aspects of ICT adoption becomes critical for the success of e-learning initiatives. To achieve its objectives, the study employed a quantitative research design. A structured questionnaire was distributed to 450 students selected through simple random sampling based on Institutional criteria, yielding 431 valid responses. The model was tested using partial least squares Structural Equation Modeling (PLS-SEM) and hypothesis testing along with model evaluation was carried out using goodness-of-fit measures. The use of PLS-SEM enabled the researchers to analyze complex relationships between constructs and validate the TAM in the specific educational context under study. The findings of the research revealed significant relationships among key variables. Specifically, ICT usage frequency was found that significantly influence both perceived usefulness and perceived ease of use. Moreover, perceived usefulness was identified as a significant mediator between ICT usage frequency and attitude toward ICT usage. Overall, the Technology Acceptance Model (TAM) was validated in this context, which is explaining 42% of the variance in students' attitudes toward ICT Usage. These results highlight the crucial role of both user perceptions and engagement frequency in shaping positive attitudes toward educational technologies. This research supports e-learning practice by demonstrating that encouraging frequent ICT use can positively impact students' perceptions, thus promoting greater acceptance and adoption of digital learning tools. By validating TAM within the post-NEP 2020 context, the study advances the compass of e-learning knowledge by providing empirical insights specific to post graduate management education in India. It offers valuable guidance for educators, administrators and policymakers aiming to foster more effective digital learning environments. Such a way, the research contributes significantly to the growing body of literature on technology adoption in higher education and supports the development of inclusive and accessible e-learning strategies aligned with national educational reforms.

Keywords: *National Education Policy (NEP) 2020, Technology Acceptance Model (TAM), Information and Communication Technology.*

1. INTRODUCTION:

The Ministry of Education (MoE) and National Education Policy (NEP) mainly focusing on the Information and Communication Technology (ICT), which is being an important Teaching-Learning Platform. The focus on ICT can help student learning in a better way and it supports the learning even during difficult and unexpected situations like Pandemic 2020. They have incorporated computer technology into students' learning experiences to help equip them with the skills and knowledge needed to succeed. (Sandu Nitirajsingh, 2019). They focused the importance of ensuring that all students, irrespective of their social economic background, have equal access to computer-based technology to

support their academic success in higher education. The drive to incorporate and integrate technology into classroom teaching across all levels gained significant momentum in Indian education system. (Gupta, 2008). The Ministry of Education (MoE) introduced the National Education Policy-2020 to make education in the country more practical, focused on bridging gaps in quality and equity. To achieve this goal, the Indian Government allocated funds to train teachers in essential computer skills and knowledge while fostering a positive attitude towards technology adoption to ensure its effective integration into education.

Over the decades, the adoption of technology in teaching and learning has been widely studied. More recently, there has been growing interest in students' attitude toward technology use. Many researchers have emphasized that students play a crucial role in the successful implementation of computers in the classroom (Magen-Nagar and Maskit, 2016), (Raman and Yamat, 2014). Several survey studies conducted in developed countries have indicated that integrating technology into education does not necessarily simplify teaching and learning. Instead, the adoption of computers in teaching is a complex innovation that faces numerous challenges, including high resistance to change among teachers and the need for new technological and pedagogical practices (Arshad et al., 2024). Technology enhances pedagogy only when teachers perceive it as pedagogical practices. Technology enhances pedagogy only when teachers perceive it as a pedagogical tool to achieve learning objectives. Another significant barrier to full adoption is the attitude of students toward technology, which can impact its effective use in classrooms.

Research has demonstrated that the attitude of students plays a crucial role in the effective integration of technology into teaching and learning practices. Their outlook and approach significantly influence how successfully technology is incorporated into their educational methods. To understand students' intention to use technology in teaching and learning, it is essential to establish a framework that identifies their behavioral intentions. Several technology acceptance models have been developed to explore and comprehend an individual's attitude toward and intention to adopt a specific technology. Prominent among these are the Technology Acceptance Model (TAM) (Davis, 1989), the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and the Theory of Planned Behaviour (TPB) (Ajzen, 1985). These models aim to provide insights into the factors that influence technology adoption. Moreover, numerous validations of the TAM have been conducted in non-educational contexts, which restrict its applicability in educational environments.

Considering the significant influence of students' attitudes towards technology useage and their role in either supporting or hindering the integration of computer technology in the classroom, it becomes essential to investigate the factors that affect its acceptance. Therefore, the TAM is applied to a sample of students in the study. The findings are expected to primarily enhance the understanding of the validation and adaptability of the TAM within the student context, while also offering valuable insights into the factors that influence technology acceptance among students. Communication Technology (ICT), Higher Education, E-Learning, Educational Technology Integration

2. THEORETICAL FRAMEWORK AND HYPOTHESIS

The implementation of the National Educational Policy (NEP) 2020 underscores the critical role of Information and Communication Technology (ICT) in transforming higher education in India by enhancing its quality, accessibility and inclusivity. However, despite significant investments and policy support, the effective adoption and usage of ICT tools among students, particularly at the postgraduate level, remains inconsistent. There is a limited understanding of how frequently students engage with ICT and how their perceptions of its usefulness and ease of use shape their attitudes towards its adoption. Existing research of ten overlooks the behavior and attitudinal factors influencing ICT usage among management students in the Indian Context, especially in the rapidly developing educational hubs like the twin cities of Telangana State. Without empirical validation of establishing models like the Technology Acceptance Model (TAM) in this specific context, efforts to integrate ICT into learning

processes may fall short of achieving the intended educational outcomes. Therefore, there is a pressing need to examine and validate the determinants influencing post graduate students' attitudes toward ICT usage to support the successful implementation of e-learning initiatives and to fulfill the transformative goals envisioned by NEP 2020

2.1 Elements of TAM model:

Several theoretical models have been developed to explore and explain the factors that influence individuals' decisions to accept, reject, or continue using new technology. Building on Ajzen and Fishbein's Theory of Reasoned Action (TRA), Davis et.al. (1989) introduced the Technology Acceptance Model (TAM), which provides a theoretical framework to understand the relationship between attitudes, intentions and behavior. The TAM has received empirical support for its effectiveness and simplicity in predicting technology acceptance and adoption. According to the TAM, an individual's behavior in using technology is influenced by their attitude toward its use in performing specific tasks. The model identifies two keys variables – perceived usefulness and perceived ease of use – as the primary factors driving a user's acceptance of technology

a. Perceived Ease of Use

Perceived ease of use refers to how much a person believes that using a system will require minimal effort (Davis, 1989), Research has shown that this perception significantly impacts both attitudes toward technology use and the intention to adopt it (Sumak et. al., 2011; Teo, 2011; Wong & Teo, 2009). Wong and Tel (2009) found that perceived ease of use is a key factor influencing students attitudes and intentions to use technology. Additionally, perceived usefulness directly affects the intention to use technology, while perceived ease of use influences it indirectly through attitude. Sumak et. al, (2011) confirmed that perceived ease of use has a direct impact on students' attitudes, aligning with findings from Davis et. al. (1989). Their research also indicated that perceived ease of use influences perceived usefulness, a relationship further supported by more recent studies (Antonio et al., 2008; Sumak et al., 2011; Teo, 2011). Moreover, the studies in technology acceptance have shown that perceived ease of use affects behavioural intention both directly and indirectly (Davis, 1989; Teo, 2009; Wong & Teo, 2009).

2.3 Perceived Usefulness:

Perceived usefulness refers to how much a person believes that using a particular technology will improve their job performance (Davis et al., 1989). People are more likely to use a technology if they believe it will enhance their efficiency. Perceived ease of use, is the belief that using a system will require little effort (Davis, 1989). However, even if a person finds a technology useful they may still avoid it if they think it is too difficult to use and that the effort required outweighs the benefits (Davis, 1989). Some researches suggests that students' attitudes, whether positive of negative, are shaped by how useful they perceive technology to be in learning. Besides, perceived usefulness directly and indirectly influences behavioral intention. Some studies outcomes were more likely to use technology if they perceived it as beneficial and effective. This indicates the students' are more inclined to adopt technology when they see it as a valuable tool for improving their learning.

2.4 Attitude towards the ICT Usage:

Research increasingly suggests a strong connection between students' attitude towards computer use and their learning intentions. Many students have limited or no experience using computers in real learning environments. Therefore, it is considered more precise to access their intention to use computers rather than their usage (Wong & Teo,2009). In essence, students' attitudes toward computer use influence how they engage with technology. The following is the hypothesis framed based on the above literature framework.

2.5 Objectives of the study

The following are the objectives framed from the above literature

1. to examine the impact of ICT usage frequency on Perceived usefulness, perceived ease of use and attitude towards ICT usage
2. To investigate the relationship between perceived ease of use and perceived usefulness in the context of ICT adoption
3. To analyze how perceived usefulness and perceived ease of use influence ICT usage frequency and attitudes towards ICT usage among postgraduate management students.

2.6 Hypothesis:

Based on these insights the following hypothesis are proposed

H1: Frequency of ICT usage significantly impact perceived usefulness

H2: Frequency of ICT usage significantly influence perceived ease of use

H3: Frequency of ICT usage directly affecting the attitude towards ICT use

H4: Perceived ease of use positively associated with perceived usefulness

H5: Perceived usefulness positively influencing frequency of ICT usage and Attitude towards ICT use

H6: Perceived ease of use positively influencing frequency of ICT usage and Attitude towards ICT use

3. METHODS AND MATERIALS:

Data were collected using a survey questionnaire that included sections on demographics and scales assessing key variables in the research model: Frequency of ICT usage perceived usefulness, perceived ease of use, and attitude towards ICT use. To ensure factorial and structural validity, confirmatory factor analysis (CFA) was conducted. Additionally, structural equation modeling (SEM) was employed for model comparison and hypothesis testing.

The study utilized a self-report questionnaire in which participants provided demographic information and responded to a scale which is interpreted as a single consolidated item on the frequency of ICT usage used to measure. The seventeen ICT tools availability at the institution considered for the study and these are measured on scale Never (1) to Always (5) on five point Likert scale. To consolidate this scale into a single item, created a composite measure that represents the overall availability of ICT tools at the institution. The average of the responses across all ICT tools to create a single index of ICT availability. Additionally, they answered 15 items assessing key constructs: perceived usefulness (6 items), perceived ease of use (6 items) and attitude towards ICT usage (3 items). Responses were recorded on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5) with intermediate options of slightly disagree (2), neither agree nor disagree (3) and slightly agree (4).

The study included 431 postgraduate management students from the Twin Cities of Telangana State. Among the participants 58.4% were male, while 41.6% were female, with an average age of 22.8 years. Nearly all participants (96%) had access to a laptop at home, and their average duration of computer use was 9.12 years. Participation in the study was entirely voluntary, with no course credits awarded. Before taking part, students were informed about the study's objectives and were assured that they could withdraw at any stage, even after completing the questionnaire. On average, respondents took approximately 20 minutes to complete the survey.

3.1 PLS-SEM analysis: Measurement model Validation:

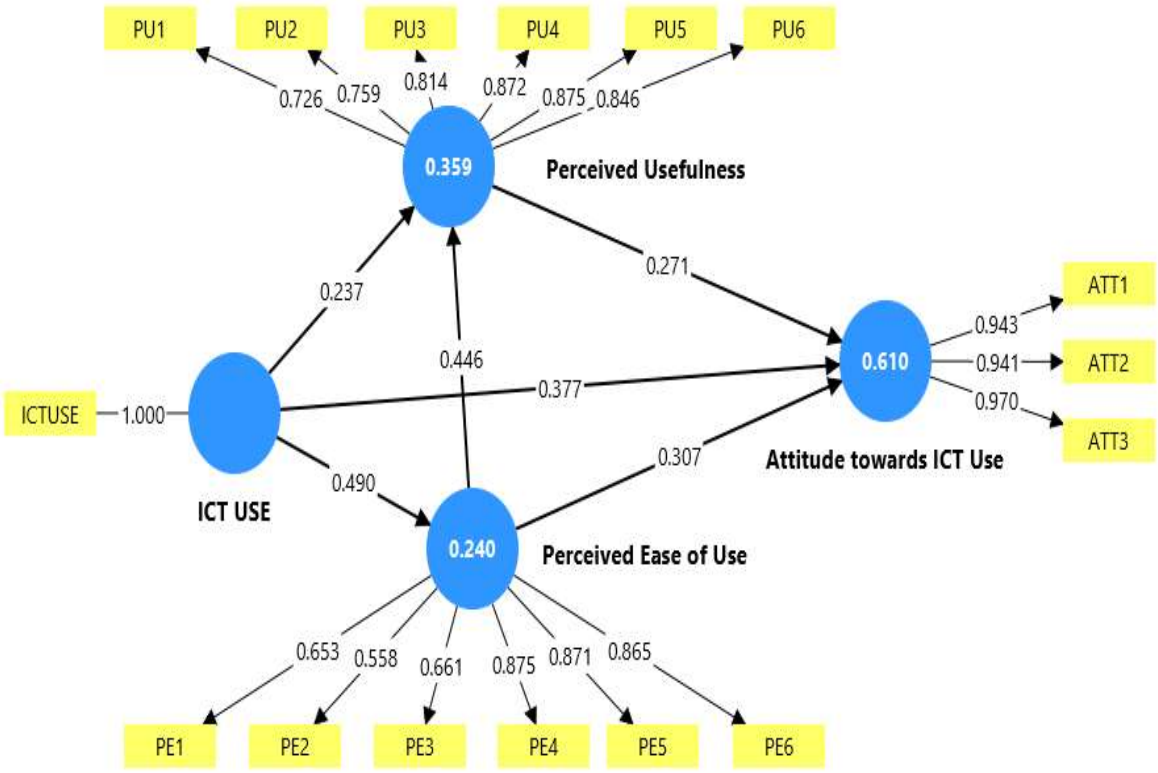

Fig : PLS SEM Model with path coefficients, Outer weights/ Loadings and R-Square values

The above SEM model is describing the path coefficients and R-Square values.

3.2 Model Fit:

To determine whether this is a good model in Partial Least Squares Structural Equation Modeling (PLS-SEM), which evaluates with the fitness indices?

1. **Standardized Root Mean Square Residual (SRMR) :** The SRMR Value is 0.72 for the SEM model. A Good model fit typically has SRMR < 0.08. Since SRMR is below the threshold, the fit is excellent.
2. **d_ULS and d_G:** Lower values, which is close to 0 indicates good model fit. Hence the analyzed values here are 0.014
3. **Normed Fit Index (NFI) :** The values above 0.90 indicate a good fit, and above 0.80 indicate an acceptable fit. The NFI value here 0.87, which indicates good model fit.

3.3. Reliability and Validity:

Constructs	Cronbach's Alpha	Composite reliability	Average Variance
Attitude towards ICT Use	0.948	0.966	0.905
Perceived Usefulness	0.901	0.887	0.768
Perceived Ease of Use	0.853	0.923	0.862

Cronbach's Alpha: Cronbach's Alpha values indicate strong internal consistency for all constructs: Attitude towards ICT Use: 0.948 (Very High Reliability), Perceived Usefulness: 0.901 (High Reliability), Perceived Ease of Use: 0.853 (High Reliability)

Since all values exceed 0.80, the constructs demonstrate high to very high reliability, meaning that the measurement items consistently assess their respective constructs. Attitude towards ICT Use (0.948) has the highest reliability, indicating that the items measuring this construct are highly consistent. Perceived Usefulness (0.901) and Perceived Ease of Use (0.853) also exhibit strong reliability, confirming their suitability for further analysis in PLS-SEM. These results align with the recommended threshold (≥ 0.70), confirming that the scales used in the study are internally consistent and reliable for measuring the intended constructs.

The constructs in the study—Attitude towards ICT Use, Perceived Usefulness, and Perceived Ease of Use—were assessed for internal consistency, composite reliability (CR), and average variance extracted (AVE). The results confirm that the measurement model meets the recommended reliability and validity criteria.

Composite Reliability (CR): CR values range from 0.887 to 0.966, all exceeding the recommended threshold of 0.70 (Hair et al., 2010). This indicates that the constructs have strong internal consistency and reliability, confirming that the observed items adequately explain their respective latent variables.

Average Variance Extracted (AVE): The AVE values (0.768 to 0.905) surpass the recommended minimum of 0.50, indicating that more than 50% of the variance in the observed variables is explained by their respective constructs (Hair et al., 2010). Attitude towards ICT Use (0.905) and Perceived Ease of Use (0.862) have particularly high AVE values, signifying a strong degree of construct validity.

The high Cronbach's Alpha values confirm internal consistency. The high Composite Reliability (CR) values indicate strong construct reliability. The high AVE values support convergent validity, confirming that the constructs effectively capture their intended concepts. Thus, the measurement model meets the necessary criteria for PLS-SEM analysis, ensuring reliable and valid construct measurement.

3.4 Discriminant Validity

	Attitude towards ICT Use	ICT Use	Perceived Ease of Use	Perceived Usefulness
Attitude towards ICT Use	1.000	0.668	0.666	0.648
ICT Use	0.668	1.000	0.502	0.471
Perceived Ease of Use	0.666	0.502	1.000	0.595
Perceived Usefulness	0.648	0.471	0.595	1.000

Attitude towards ICT Use shows strong positive correlations with ICT Use (0.668), Perceived Ease of Use (0.666), and Perceived Usefulness (0.648). This suggests that a positive attitude towards ICT is associated with higher usage, greater ease of use, and increased perceived usefulness. ICT Use has a moderate positive correlation with Perceived Ease of Use (0.502) and a weaker correlation with Perceived Usefulness (0.471). This indicates that increased ICT use is moderately associated with perceptions of ease and usefulness. Perceived Ease of Use is moderately correlated with Perceived Usefulness (0.595). This implies that as users find ICT easier to use, they also perceive it as more useful. The correlations highlight that positive perceptions of ICT's ease of use and usefulness are linked to favorable attitudes and increased usage. These insights can inform strategies to enhance ICT adoption and integration.

To ensure the validity of the constructs – Frequency of ICT usage, perceived usefulness, perceived ease of use, attitude towards ICT use - several key measures were assessed, including composite reliability (CR), average variance extracted (AVE) and discriminant validity. The Composite reliability (CR) of each construct was evaluated using Cronbach's alpha, with values ranging from 0.887 to 0.966, surpassing the recommended threshold (sekharan, 2003). According to Sekaran (2003), a Cronbach's alpha value below 0.60 indicates low reliability, values between 0.60 and 0.80 suggest moderate to acceptable reliability, and

values above 0.80 are highly reliable. Furthermore, as per Hair (2010), the AVE values should be at least 0.50 to be considered sufficient for structural equation modeling. In the study, all constructs met this requirement, indicating that more than half of the variance in the observed items was explained by their respective constructs. Overall, the factor loadings, composite reliability coefficients, and AVE values adhered to the recommended criteria, confirming that the outer loadings of the constructs in the measurement model were suitable for structural modeling.

3.5 R-square:

Constructs	R-Square	
Attitude towards ICT Use	0.610	Moderate
Perceived Usefulness	0.240	Weak
Perceived Ease of Use	0.359	Moderate

Attitude towards ICT Use ($R^2 = 0.610$): Approximately 61% of the variance in this construct is explained by its predictors, indicating a moderate level of explanatory power. Perceived Usefulness ($R^2 = 0.240$): About 24% of the variance is accounted for by its predictors, suggesting a weak explanatory power. Perceived Ease of Use ($R^2 = 0.359$): Roughly 36% of the variance is explained by its predictors, reflecting a moderate level of explanatory power. These interpretations are based on guidelines by Chin (1998), which categorize R^2 values as follows: Substantial: $R^2 \geq 0.67$, Moderate: $0.33 \leq R^2 < 0.67$, Weak: $0.19 \leq R^2 < 0.33$, Very Weak: $R^2 < 0.19$. The model demonstrates moderate explanatory power for Attitude towards ICT Use and Perceived Ease of Use, while Perceived Usefulness exhibits weak explanatory power. This suggests that the predictors in the model are more effective in explaining variations in Attitude towards ICT Use and Perceived Ease of Use than in Perceived Usefulness. To enhance the model's explanatory power for Perceived Usefulness, consider incorporating additional relevant predictors.

3.6 Mediation Analysis in the Structural Model :

The diagram represents a Partial Least Squares-Structural Equation Modeling (PLS-SEM) model assessing the relationships among ICT Use, Perceived Usefulness, Perceived Ease of Use, and Attitude towards ICT Use.

Direct Effects:

ICT Use → Perceived Usefulness (0.237)
ICT Use → Perceived Ease of Use (0.490)
Perceived Ease of Use → Perceived Usefulness (0.446)
Perceived Usefulness → Attitude towards ICT Use (0.271)
Perceived Ease of Use → Attitude towards ICT Use (0.307)
ICT Use → Attitude towards ICT Use (0.377)

Mediation Effects:

Mediation occurs when an independent variable (ICT Use) influences a dependent variable (Attitude towards ICT Use) through a mediator (Perceived Usefulness or Perceived Ease of Use).

a) ICT Use → Perceived Usefulness → Attitude towards ICT Use

ICT Use positively influences Perceived Usefulness (0.237).

Perceived Usefulness positively influences Attitude towards ICT Use (0.271).

Since the direct path (ICT Use → Attitude towards ICT Use) is 0.377, and there is an indirect effect through Perceived Usefulness, this suggests partial mediation.

b) ICT Use → Perceived Ease of Use → Attitude towards ICT Use

ICT Use significantly influences Perceived Ease of Use (0.490).
Perceived Ease of Use positively affects Attitude towards ICT Use (0.307).

Since ICT Use still has a direct effect on Attitude towards ICT Use (0.377), this again suggests partial mediation.

c) ICT Use → Perceived Ease of Use → Perceived Usefulness → Attitude towards ICT Use

ICT Use affects Perceived Ease of Use (0.490).
Perceived Ease of Use affects Perceived Usefulness (0.446).
Perceived Usefulness influences Attitude towards ICT Use (0.271).

This suggests indirect chain mediation, where ICT Use influences Attitude towards ICT Use through both Perceived Ease of Use and Perceived Usefulness.

Partial mediation exists, as ICT Use influences Attitude towards ICT Use both directly and indirectly through Perceived Ease of Use and Perceived Usefulness. Sequential mediation (ICT Use → Perceived Ease of Use → Perceived Usefulness → Attitude) is also evident, demonstrating a layered effect.

4. DISCUSSIONS:

The study examines the role of ICT Use in shaping Attitude towards ICT Use. The findings indicate that ICT Use has both direct and Indirect influences on Attitude towards ICT Use. The significant direct relationship suggests that greater ICT exposure enhances students' willingness to integrate technology into their academic activities, aligning with previous research on technology adoption (Venkatesh & Davis, 2000; Teo, 2011). However, the presence of Perceived Ease of Use and Perceived Usefulness as mediators indicates that students' cognitive perceptions about ICT play a crucial role in shaping their attitude, reinforcing the Technology Acceptance Model (TAM) (Davis, 1989).

The mediating role of Perceived Ease of Use discussed in the study. It highlights that Perceived Ease of Use significantly mediates the relationship between ICT Use and Attitude Towards ICT Use, suggesting that students are more likely to develop positive Attitudes Toward ICT if they find it easy to use. This finding supports previous studies emphasizing that usability is a key determinant of technology adoption in educational contexts (Teo et. al., 2008; Sanchez Prieto et. al., 2019). Furthermore the strong direct relationship between ICT Use and Perceived Ease of Use suggests that frequent exposure to ICT contributes to students' perceived confidence and familiarity with digital tools, which has been found to be a critical factor in technology adoption (Park, 2009). Additionally, the link between Perceived Ease of Use and Perceived Usefulness aligns with previous studies (Davis et. al., 1989; King & He, 2006), supporting the notion that when students find ICT easy to use, they are more likely to perceive it as beneficial for learning.

The Mediating role of Perceived Usefulness showing the results and also confirm that Perceived Usefulness mediates the relationship between ICT Use and Attitude towards ICT Use. The direct effect of ICT Use on Perceived Usefulness, though weker that its effect on Perceived Ease of Use, suggests that

students need to see clear academic benefit of ICT before fully adopting it. This is consistent with previous studies highlighting that perceived benefits of ICT significantly influence students' attitudes toward its adoption (MAzman & Usluel, 2010; Ifinedo, 2017). Moreover, Perceived Usefulness has a strong effect on Attitude Towards ICT Use, reinforcing the findings of Davis (1989) and Venkatesh & BAla (2008), which argue that perceived benefits of technology play a crucial role in user acceptance and adoption behaviours.

Sequential Mediation: A Multi-stage Influence – A key contribution of this study is the sequential mediation observed in the relationship between ICT Use, Perceived Ease of Use, Perceived Usefulness and Attitude Towards ICT Use. The model suggests that – ICT use enhances Perceived Ease of Use. Perceived Ease of Use improves Perceived Usefulness. Both Perceived Ease of Use and Perceived Usefulness collectively shape Attitude Towards ICT Use. This cascading effect aligns with studies by Venkatesh et. al., (2003) and Teo (2011), which emphasize that technology adoption is a multi-layered process, where usability perceptions influence usefulness perceptions, ultimately shaping users' attitudes and intentions.

These findings provide several practical recommendations for higher education institutions aiming to enhance ICT adoption among students: Enhancing Usability Training: Given that Perceived Ease of Use strongly affects students' attitudes universities should invest in ICT training programs that focus on usability and user experience (Teo. 2009). Emphasizing Academic Benefits: Since Perceived Usefulness mediates the relationship between ICT Use and Attitude Towards ICT Use, educators should highlight how technology improves academic performance (Venkatesh & Davis, 2000). Encouraging Hands-on Experience: As ICT Use directly influences both Perceived Ease of Use and Attitude Towards ICT Use, institutions should create more technology-rich learning environments to increase students' exposure to ICT (Ifinedo, 2017).

This study extends the Technology Acceptance Model (TAM) by empirically demonstrating the dual-mediation role of Perceived Ease of Use and Perceived Usefulness in ICT adoption. While prior studies have explored these constructs separately, the findings confirm that Perceived Ease of Use has a stronger mediating effect than Perceived Usefulness, which is consistent with earlier research (Sanchez Prieto et. al., 2019; King & He, 2006). Furthermore, the results highlight that ICT Use alone is not sufficient to improve attitudes; rather, usability and Perceived benefits must be emphasized, which aligns with Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et. al., (2003).

5. LIMITATIONS AND FUTURE RESEARCH

While this study provides valuable insights, certain limitations should be acknowledged, such as cross-sectional nature, since this study is cross- sectional, it cannot establish causality. Further research should employ longitudinal studies to track changes in students' attitudes over time (Teo et. al., 2008). Furthermore extends the study to the sample specific findings. The research focuses on postgraduate students in a specific region. Expanding the study to undergraduate students or other disciplines would enhance generalizability (Mazman & Usluel, 2010). Additional Variables can be added according to the study area. Future research should explore other mediators, such as self- efficacy, institutional support and peer influence, to gain a deeper understanding of ICT adoption behavior (Ifinedo, 2017).

This study confirms that ICT Use positively influences Attitude Towards ICT Use, both directly and indirectly, through Perceived Ease of Use and Perceived Usefulness. The findings suggest that educators and policymakers should not only promote ICT usage but also enhance its usability and highlight its academic benefits to ensure successful adoption. By demonstrating the sequential mediation effect, this study contributes to the Technology Acceptance model (TAM) and supports the Unified Theory of Acceptance and Use of Technology (UTAUT), emphasizing that technology adoption is a multi-step process driven by both ease of use and perceived benefits. Future research should expand on these

findings by incorporating longitudinal designs, diverse student's populations and additional influencing factors, ensuring a more comprehensive understanding of ICT adoption in education.

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