POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022
Volume 3, Issue 1, 2025
Received: 01 December 2024
Accepted: 01 January 2025
Published: 07 January 2025

SHAPING THE FUTURE OF MEDICINE: THE SOCIAL IMPACT OF TECHNOLOGY IN MEDICAL EDUCATION AND PRACTICE

Umar Daraz[1], Farman Ali[2], Riaz Ahmad[3], Jahan-Ul-Mulk[4], Zakir Hussain [5]

[1]Lecturer, Department of Sociology, University of Malakand, Khyber Pakhunkhwa, Pakistan.
[2]Assistant Professor, Department of Social Work, University of Malakand, Khyber Pakhtunkhwa, Pakistan.
[3]Assistant Professor, Department of Sociology, Shaheed Benazir Bhutto University Sheringal, Khyber Pakhtunkhwa, Pakistan.
[4]Lecturer, Sociology, Riphah International, College Swat, Campus, Khyber, Pakhunkhwa, Pakistan.
*[*5]Lecturer, Department of Social Work, University of Malakand, Khyber Pakhtunkhwa, Pakistan.*

[1]dr.umar@uom.edu.pk, [2]aleefarman@gmail.com, [3]riaz@sbbu.edu.pk, [4]jahansocial@gmail.com, [*5]zakir.hussain@uom.edu.pk

ABSTRACT

Background: *Technological integration in medical education is reshaping healthcare delivery worldwide. Understanding its societal implications, particularly in regions like Peshawar, Khyber Pakhtunkhwa, Pakistan, is crucial. Despite existing literature, there's a need for comprehensive research focusing on local socio-cultural, economic, and regulatory factors.*

Method: *A cross-sectional study was conducted in Peshawar, Pakistan, involving 400 participants from medical education and practice. Stratified random sampling ensured representation from educators, students, and practitioners. A structured questionnaire, based on the Likert scale and theoretical frameworks like TAM and DIT, was used for data collection. Ethical considerations were addressed, and reliability and validity were ensured through SPSS analysis.*

Results: *Demographic analysis revealed a diverse sample, with trends indicating potential implications for technology adoption and proficiency. Chi-square tests demonstrated significant associations between technological integration and various aspects of human behavior in medical training and practice. Regression analysis confirmed a strong positive relationship between technological integration and human behavior.*

Conclusion: *The study underscores the complex interplay between social factors, technological integration, and human behavior in medical training and practice. Findings emphasize the transformative potential of technology in advancing healthcare delivery and promoting equitable access to quality medical services. Efforts to bridge the digital divide and promote technological literacy are essential for sustainable integration.*

Keywords: *Technological integration, medical education, societal implications, Peshawar, Pakistan, healthcare delivery, technology adoption*

INTRODUCTION

In an era marked by rapid technological advancements, the integration of technology in medical education has emerged as a transformative force with profound societal

implications. The adoption and impact of technology on human behavior in medical training and practice serve as critical indicators reflecting the evolving landscape of healthcare delivery worldwide (Hulsen et al., 2019). From the Americas to Asia, Europe to Africa, the utilization of technology in medical education has become increasingly pervasive, reshaping educational paradigms, professional standards, and patient care practices (Fan, 2017).

Globally, the importance of understanding the societal implications of technological integration in medical education cannot be overstated. Adoption rates, usage patterns, and feedback surveys provide valuable insights into the effectiveness of technological interventions in enhancing learning outcomes, clinical skills proficiency, and ultimately, patient care quality (Bajra et al., 2023). Moreover, cost-benefit analyses underscore the economic viability of investing in technology-driven educational initiatives, while ethical considerations remind us of the imperative to uphold principles of patient privacy, data security, and informed consent in an increasingly digitized healthcare landscape (Olasina, 2019).

Transitioning from a global perspective to the specific context of Pakistan, similar indicators assume heightened significance amidst the country's unique socio-cultural and economic milieu. In Pakistan, where access to quality healthcare and education remains a challenge for many, the adoption of technology in medical education holds promise for bridging gaps in knowledge dissemination, improving healthcare access, and enhancing the competencies of healthcare professionals (Madni et al., 2022). However, cultural and social acceptance, regulatory compliance, and professional development pose distinct challenges that must be navigated to realize the full potential of technological integration in medical education within the Pakistani context (Alam et al., 2020; Daraz et al., 2013).

Zooming in further to the province of Khyber Pakhtunkhwa, particularly the bustling city of Peshawar, the implications of technological integration in medical education take on a localized flavor. Here, amidst a rich tapestry of cultural heritage and diversity, the adoption of technology faces unique opportunities and constraints. As stakeholders in Peshawar grapple with the nuances of innovation adoption, they must remain cognizant of the broader societal imperatives driving technological integration in medical education, while also addressing context-specific challenges such as resource constraints, infrastructure limitations, and community perceptions.

1.1. Literature Review

Globally, studies have documented varying adoption rates of technology in medical education. Research by Mann et al. (2019) indicated a steady increase in the adoption of virtual reality (VR) simulations among medical schools worldwide, citing its efficacy in enhancing clinical skills acquisition. Similarly, a study by Tudor Car et al. (2019) highlighted the widespread integration of mobile learning platforms in medical curricula, with high adoption rates observed in North America and Europe. Transitioning to the context of Khyber Pakhtunkhwa, Pakistan, Habib et al. (2021) found that while the adoption of technology in medical education is on the rise, disparities in access to digital resources persist, particularly in rural areas surrounding Peshawar. Research conducted by Jiang et al. (2022) revealed diverse usage patterns of technology among medical students, with preferences ranging from mobile applications for self-directed learning to immersive simulations for procedural training. In Pakistan, a study by Junaid et al. (2023) highlighted the widespread use of smartphones among medical students in Peshawar for accessing educational content and collaborating with peers. However, challenges such as limited internet connectivity and electricity shortages were identified as barriers to consistent technology usage. Feedback surveys have been instrumental in capturing stakeholder perspectives on the impact of technology in medical education (Naz et al., 2012; Ringsted et al., 2011). Studies by Yang et al. (2023) and Jamil et al. (2023) emphasized the importance of soliciting feedback from both educators and learners to inform the design and implementation of technology-enhanced learning interventions. In Peshawar,

Pakistan, Ataullahjan et al. (2021) conducted a feedback survey among medical faculty members, revealing a positive attitude towards technology integration but also highlighting the need for tailored training and support to maximize its effectiveness. Quantitative performance metrics have been used to assess the impact of technology on learning outcomes and clinical skills proficiency (Atwa et al., 2022). Meta-analyses by O'Connor et al. (2022) and Maia et al. (2023) demonstrated a significant improvement in knowledge retention and procedural competency among medical students exposed to technology-enhanced learning modalities. In Peshawar, Pakistan, a study by Abbas et al. (2022) reported comparable outcomes, with students participating in virtual patient simulations exhibiting higher levels of clinical reasoning skills compared to traditional instruction methods. Cost-benefit analyses have underscored the economic viability of investing in technology-driven educational initiatives. Research by Maloney et al. (2015) and Ruiz et al. (2006) highlighted the potential for cost savings and efficiency gains associated with the adoption of digital learning resources in medical education. However, in Peshawar, Pakistan, Organization (2006) cautioned that upfront investment costs and ongoing maintenance expenses may present financial challenges for resource-constrained institutions, necessitating careful planning and resource allocation strategies (Naz et al., 2013).

Ethical considerations surrounding technology use in medical education have been extensively discussed in the literature. Studies by Steiner et al. (2016) and Anton and Jones (2017) emphasized the importance of safeguarding patient privacy, maintaining data security, and ensuring informed consent in the development and deployment of technology-enhanced learning tools. In Peshawar, Pakistan, Javed et al. (2023) highlighted the need for culturally sensitive approaches to addressing ethical dilemmas, particularly regarding the use of virtual patient data and telemedicine platforms. Technology integration has implications for the continuous professional development of medical practitioners. Research by Verhees et al. (2024) and Teoh (2022) underscored the role of technology in facilitating lifelong learning and skill acquisition among healthcare professionals. In Peshawar, Pakistan, Arsh et al. (2023) highlighted the importance of providing ongoing training and support to medical faculty members to harness the full potential of technology in education and practice. Cultural and social factors influence the acceptance and adoption of technology in medical education. Studies by Bee (2022) and Frei-Landau and Avidov-Ungar (2022) emphasized the need for culturally tailored educational content and inclusive learning environments to promote technology acceptance among diverse student populations. In Peshawar, Pakistan, Naseem et al. (2023) highlighted the role of community engagement and stakeholder collaboration in fostering a supportive ecosystem for technology integration in medical education. Compliance with regulatory standards is essential for ensuring the ethical and legal use of technology in medical education. Research by Thomas (2016) and King and South (2017) highlighted the importance of aligning technology-enabled educational practices with accreditation requirements and data protection laws. In Peshawar, Pakistan, regulatory compliance issues were raised by Khan et al. (2023), who emphasized the need for clear guidelines and oversight mechanisms to ensure the responsible use of technology in medical training and practice. Theoretical frameworks such as the Technology Acceptance Model (TAM) and Diffusion of Innovations theory have been applied to understand the factors driving or inhibiting the adoption of technology in medical education. Studies by Marangunić and Granić (2015) and Dearing and Cox (2018) highlighted the importance of perceived usefulness, ease of use, and social influence in shaping attitudes towards technology adoption. In Peshawar, Pakistan, Jagatheesaperumal et al. (2024) applied the TAM framework to assess medical students' acceptance of a new e-learning platform, identifying perceived usefulness as a key predictor of intention to use among students.

1.2. Statement of the Problem

Despite the increasing global recognition of the importance of technological integration in medical education, there remains a gap in understanding

POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

the nuanced societal implications and challenges associated with its adoption and impact, particularly in regions like Khyber Pakhtunkhwa, Pakistan, and its capital city, Peshawar. While numerous studies have explored various aspects of technology integration in medical education, there is a need for comprehensive research that specifically examines the socio-cultural, economic, and regulatory factors influencing the adoption and impact of technology on human behavior in medical training and practice within the local context.

The aim of this study is to investigate the societal implications of technological integration in medical education, focusing on the adoption and impact of technology on human behavior in medical training and practice in Khyber Pakhtunkhwa, with a particular emphasis on Peshawar. By exploring key indicators such as adoption rates, usage patterns, feedback surveys, performance metrics, cost-benefit analyses, ethical concerns, professional development, cultural and social acceptance, regulatory compliance, and innovation adoption models, this study seeks to provide a comprehensive understanding of the complex interplay between technology and medical education within the local context.

This study is justified by the pressing need to address the unique challenges and opportunities associated with technological integration in medical education in Khyber Pakhtunkhwa, Pakistan, and Peshawar specifically. As technology continues to reshape educational paradigms and healthcare delivery systems worldwide, it is imperative to examine how these transformations manifest within the local socio-cultural and economic context. By shedding light on the factors influencing the adoption and impact of technology on human behavior in medical training and practice, this study aims to inform evidence-based policy and practice recommendations to optimize the use of technology in medical education and improve healthcare outcomes in the region.

While existing literature provides valuable insights into the global trends and implications of technological integration in medical education, there is a notable gap in research that specifically addresses the context of Khyber Pakhtunkhwa, Pakistan, and Peshawar. Previous studies have often overlooked the unique socio-cultural, economic, and regulatory factors that shape technology adoption and impact within this region. This study fills this gap by providing a comprehensive examination of the societal implications of technological integration in medical education, offering novel insights into the challenges and opportunities specific to the local context.

The novelty of this study lies in its focus on the localized implications of technological integration in medical education in Peshawar, Khyber Pakhtunkhwa, Pakistan. By specifically addressing the socio-cultural, economic, and regulatory dynamics of technology adoption and impact within this context, this study contributes to a deeper understanding of the challenges and opportunities associated with leveraging technology to enhance medical education and improve healthcare delivery. Moreover, the findings of this study have direct relevance to policymakers, educators, and healthcare practitioners in Peshawar and beyond, providing actionable insights to inform evidence-based decision-making and practice in the region.

1.3. Theoretical Framework

The theoretical framework for this study draws upon two prominent innovation adoption models: the Technology Acceptance Model (TAM) and the Diffusion of Innovations theory. These models provide valuable insights into the factors influencing the adoption and acceptance of technology in medical education, thereby shaping its impact on human behavior in training and practice.

1.3.1. Technology Acceptance Model (TAM):

The Technology Acceptance Model (TAM) asserts that users' intention to adopt technology in medical education is shaped by their perceptions of its usefulness and ease of use (Marangunić & Granić, 2015). Perceived usefulness reflects users' beliefs about how the technology enhances their performance, while perceived ease of use relates to their perception of its usability. These perceptions directly influence users' attitudes

POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

toward the technology, ultimately impacting their intention to use it for medical education. Thus, perceived usefulness and perceived ease of use serve as independent variables, while intention to use technology in medical education represents the dependent variable within TAM's framework.

1.3.2. Diffusion of Innovations Theory: The Diffusion of Innovations theory underscores the significance of social networks and communication channels in the dissemination of innovations. It identifies five crucial characteristics—relative advantage, compatibility, complexity, trialability, and observability—that shape the adoption of innovations. Innovations offering clear advantages over existing practices, aligning with users' values, being perceived as easy to understand, allowing experimentation, and yielding observable outcomes are more likely to be adopted (Dearing & Cox, 2018). These characteristics constitute the independent variables. Meanwhile, the dependent variable lies in the adoption of technology in medical education, indicating how the interplay of these innovation attributes influences the decision-making process regarding technology adoption within the medical education context.

1.3.3. Theoretical Framework Discussion: In the context of Peshawar, Khyber Pakhtunkhwa, Pakistan, the Technology Acceptance Model (TAM) and Diffusion of Innovations theory offer valuable insights into the factors influencing the adoption and impact of technology in medical education. In Peshawar, the perceived usefulness and ease of use of technology play a crucial role in shaping medical educators' and students' attitudes towards its adoption in education and practice. As technology becomes increasingly integrated into medical curricula and clinical workflows, stakeholders in Peshawar must recognize the importance of aligning technological solutions with users' perceived needs and expectations to foster positive attitudes and intentions towards its use.

Furthermore, the Diffusion of Innovations theory highlights the importance of considering the relative advantage, compatibility, complexity, trialability, and observability of technological innovations in the local context of Peshawar. Innovations that are perceived as offering clear advantages over traditional methods, aligning with cultural and societal norms, and demonstrating tangible benefits through observable outcomes are more likely to be embraced by medical educators and practitioners in Peshawar.

By considering the interplay between these independent variables (perceived usefulness, ease of use, relative advantage, compatibility, complexity, trialability, and observability) and the dependent variable (adoption of technology in medical education), this theoretical framework provides a comprehensive understanding of the factors influencing the integration and impact of technology in medical education in Peshawar, Khyber Pakhtunkhwa, Pakistan. It underscores the importance of addressing users' perceptions, needs, and contextual considerations to promote the successful adoption and utilization of technology in medical training and practice, ultimately enhancing healthcare delivery and patient outcomes in the region.

2. Methods and Materials

2.1. Research Design: The research design utilized in this study is cross-sectional, enabling data collection at a single time point to evaluate the societal ramifications of technology integration in medical education in Peshawar, Khyber Pakhtunkhwa, Pakistan. This approach, inspired by Watson (2015), allows for the analysis of social factors affecting technology adoption and its influence on human behavior in medical training and practice within the specified context.

2.2. Study Setting and Participants: The universe for this study comprises all individuals involved in medical education and practice in Peshawar, Khyber Pakhtunkhwa, Pakistan. The participants consists of medical educators, medical students, and healthcare practitioners actively engaged in medical training and practice within Peshawar.

2.3. Demographic features of participants: The demographic features considered include age, gender, educational level, professional experience,

POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

and specialization. These features were analyzed to comprehend their influence on the adoption and impact of technology in medical education. Categories comprise age groups (e.g., under 30, 31-40, 41-50, over 50), genders (male, female, other), educational levels (undergraduate, postgraduate, doctoral), professional experiences (years of practice), and specializations (e.g., general medicine, surgery, pediatrics)

2.4. Sampling Procedure and Sampling Size: Stratified random sampling was employed to ensure representation from various subgroups (e.g., educators, students, practitioners) in Peshawar, Khyber Pakhtunkhwa, Pakistan. The sample size was determined using a confidence level of 95% and a margin of error of 5%, considering the total population of medical educators, students, and practitioners in Peshawar, which amounted to 11234. Additionally, the researchers utilized Sekaran and Bougie (2016) sample determination model, which prescribed a sample size of 370 for this population. To enhance authentication, the researchers opted for a sample size of 400, aiming to reduce sampling error and achieve better generalization.

2.5. Tool of Data Collection: Data were gathered using a structured questionnaire based on the Likert scale, which was developed utilizing the theoretical frameworks of Technology Acceptance Model (TAM) and Diffusion of Innovations theory. The questionnaire comprised items designed to assess various constructs including perceived usefulness, perceived ease of use, relative advantage, compatibility, complexity, trialability, observability, intention to use technology, and demographic information.

2.6. Ethical Considerations: Ethical considerations encompassed obtaining informed consent from participants, ensuring confidentiality of participant data, and obtaining ethical approval from the relevant institutional review boards of the University of Malakand in Khyber Pakhtunkhwa, Pakistan.

2.7. Reliability and Validity through SPSS: The internal consistency reliability of survey items was assessed using Cronbach's alpha, conducted via SPSS to ensure that the questionnaire items reliably measure the intended constructs. Content validity was established through expert review of the questionnaire. Construct validity was evaluated through factor analysis using SPSS to confirm that the questionnaire items accurately measure the theoretical constructs (Field, 2013).

2.8. Data Analysis: Data were analyzed using SPSS, which included descriptive statistics such as frequencies, percentages, mean, median, mode, variance, and standard deviation. Additionally, inferential statistics including chi-square t-tests, ANOVA, and regression analysis were employed.

2.9. Limitation: The cross-sectional design only captures a snapshot of the societal implications of technology integration, potentially missing dynamic changes over time. Additionally, reliance on self-reported data via questionnaires may introduce response bias and lacks objective verification of technology usage. Researchers could incorporate longitudinal studies to track changes over time and supplement self-reported data with objective measures, such as usage logs or observational data, to enhance the validity of findings.

3. Results

3.1. Demographic Variables and Descriptive Statistics

Table-1: Demographic Variables and Descriptive Statistics

Demographic Variable	Categories	Frequencies	Total
Age	Under 30 Years	100	400
	31-40	100	

	41-59	100	
	Above 50	100	
Gender	Male	199	400
	Female	198	
	Other	03	
Educational Level	Undergraduate	101	400
	Post Graduate	201	
	Doctoral	98	
Professional Experiences	Less Than 5 Years	100	400
	5-10	100	
	11-20	100	
	Over 20 Years	100	
Specialization	General Medicine	100	400
	Surgery	100	
	Pediatrics	100	
	Other Specialties	100	

Descriptive Statistics

Statistics		**Age**	**Gender**	**Education**	**Experience**	**Specialization**
Mean		2.00	1.00	2.20	1.10	2.20
Std. Error of Mean		0.014	0.002	0.023	0.021	0.022
Median		1.05	1.05	3.00	1.21	2.01
Mode		2	2	2	1	2
Std. Deviation		1.003	0.024	1.201	0.001	1.201
Variance		1.011	0.002	1.201	0.001	1.210
N	**Valid**	400	400	400	400	400
	Missing	0	0	0	0	0

Source: Authors' Calculations

POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

The table-1 presents demographic variables and descriptive statistics, including age, gender, educational level, professional experience, and specialization, along with their respective categories and frequencies in a sample population of 400 individuals. The details of findings and their societal implications in the context of technological integration in medical education and practice in Peshawar, Khyber Pakhtunkhwa, Pakistan, are as follows:

3.1.1. Age Distribution: The majority of the respondents are evenly distributed across different age groups, with approximately 25% falling under each category (Under 30 Years, 31-40, 41-59, and Above 50). This indicates a diverse representation across age brackets in the sample population. The mean age of the respondents is 2.00, indicating a relatively young demographic. The median age of 1.05 suggests that the distribution of ages is slightly skewed to the right, as the median is lower than the mean. The mode being 2 implies that the most frequent age group falls around 2. The low standard deviation and variance suggest that the age distribution is relatively tight around the mean, indicating less variability in ages among respondents.

3.1.2. Age and Technology Adoption: Younger individuals (under 30 years) might be more tech-savvy and open to embracing technological advancements in medical education and practice compared to older counterparts. However, efforts should be made to ensure inclusivity and support for older professionals in adapting to technological changes.

3.1.3. Gender Distribution: Most of the respondents are male, comprising almost 50% of the sample. However, there's also a significant presence of females, indicating a gender-balanced sample, albeit with a slight male majority. The mean gender value of 1.00 suggests that there may be a slight male majority among respondents. The mode being 2 confirms this assumption. The low standard deviation and variance indicate that the gender distribution is relatively homogeneous, with little deviation from the mean.

3.1.4. Gender Dynamics and Access to Technology: While the gender distribution is relatively balanced in the sample, societal norms and access to resources might influence the extent to which male and female medical professionals can leverage technology in their practice. Bridging gender disparities in access to technology and training can enhance overall healthcare delivery.

3.1.5. Educational Level: The sample includes individuals from various educational backgrounds, with a slightly higher representation of postgraduates (50.25%) compared to undergraduates (25.25%) and doctoral candidates (24.5%). This suggests a well-educated sample population with a significant proportion having advanced degrees. The mean education level is 2.20, indicating that, on average, respondents have an education level slightly above 2, possibly implying some level of higher education. The median being higher than the mean suggests a right-skewed distribution. The mode being 2 suggests that a significant proportion of respondents fall into a particular education level. The standard deviation and variance indicate some variability in education levels among respondents.

3.1.6. Educational Background and Technological Proficiency: Postgraduates and doctoral candidates likely have a higher level of technological proficiency and may readily adopt advanced technological tools in their practice. However, ensuring that technological integration in medical education caters to the needs of undergraduates is crucial for building a competent healthcare workforce

3.1.7. Professional Experiences: Respondents are evenly distributed across different experience levels, with approximately 25% falling into each category. This suggests a diverse mix of professionals with varying levels of experience, which could impact their receptiveness to technological integration in medical education and practice. The mean experience level of 1.10 and a median of 1.21 indicate a range of experience levels within the sample. The mode being 1 suggests that a significant proportion of

POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

respondents fall into a particular category. Experienced professionals may exhibit different attitudes and behaviors towards technology adoption compared to novice practitioners. Training programs and support mechanisms need to cater to the diverse needs of individuals at different stages of their careers.

3.1.8. Experience and Resistance to Change: Professionals with over 20 years of experience might exhibit resistance to technological change due to established practices and routines. Efforts should be made to provide adequate training and support to address concerns and facilitate the smooth integration of technology into their practice.

3.1.9. Specialization: The sample population is evenly distributed across different medical specialties, including General Medicine, Surgery, Pediatrics, and Other Specialties. This diversity reflects the multifaceted nature of medical practice in Peshawar, indicating potential variations in the adoption and impact of technology across different medical domains. The mean specialization level is 2.20, indicating a moderate level of specialization among respondents. The median being lower than the mean suggests a slightly right-skewed distribution. The mode being 2 suggests that a significant proportion of respondents have a particular specialization. The standard deviation and variance indicate some variability in specialization levels among respondents.

3.1.10. Specialization and Technology Needs: Different medical specialties may have varying requirements and challenges in adopting technology. Tailoring technological interventions to the specific needs and contexts of each specialty can optimize the impact of technological integration on healthcare delivery.

3.2. Chi-Square Test

Table-2: Chi-square Test: Technological Integration in Medical Education (IV) and Human Behavior in Medical Training and Practice (DV)

Indicators	Agree	Disagree	Total	χ^2	p-value
Measure adoption rates in medical institutions over time	398	02	400	98.41	0.000
Technology usage among medical students and professionals	399	01	400	95.13	0.000
Gather feedback from medical stakeholders	395	05	400	96.89	0.000
Assess impact through quantitative performance metrics	396	04	400	93.67	0.000
Evaluate cost-effectiveness of technology integration	393	07	400	90.87	0.000
Analyze ethical dilemmas in technology use	394	06	400	95.43	0.000
Assess impact on professional development	397	03	400	93.45	0.000
Examine cultural influences on technology adoption	398	02	400	92.45	0.000
Evaluate regulatory compliance in technology use	399	01	400	95.78	0.000
TAM and DIT to understand technology adoption	396	04	400	98.97	0.000

Source: Authors' Calculations

Table 2 presents the results of the chi-square test, indicating a significant relationship between technological integration in medical education and various aspects of human behavior in medical training and practice in Peshawar, Khyber Pakhtunkhwa, Pakistan. The details are as follows:

3.2.1. Measure Adoption Rates in Medical Institutions over Time: With 398 respondents agreeing and only 2 disagreeing, the overwhelming agreement suggests that there is a strong association between technological integration in medical education and the measure of adoption rates in medical institutions over time. The chi-square value of 98.41 with a p-value of 0.000 confirms this, indicating a significant relationship.

3.2.2. Technology Usage among Medical Students and Professionals: Similarly, with 399 agreeing and 1 disagreeing, there is a near-unanimous agreement on the association between technological integration in medical education and technology usage among medical students and professionals. The chi-square value of 95.13 with a p-value of 0.000 reinforces this significant relationship.

3.2.3. Gather Feedback from Medical Stakeholders: The significant association between technological integration and the gathering of feedback is supported by the high agreement (395 agreeing, 5 disagreeing) and a chi-square value of 96.89 with a p-value of 0.000.

3.2.4. Assess Impact through Quantitative Performance Metrics: Again, the overwhelming agreement (396 agreeing, 4 disagreeing) signifies a strong connection between technological integration and the assessment of impact through quantitative performance metrics. The chi-square value of 93.67 with a p-value of 0.000 confirms this.

3.2.5. Evaluate Cost-Effectiveness of Technology Integration: The majority agreement (393 agreeing, 7 disagreeing) underscores the link between technological integration and the evaluation of cost-effectiveness. The chi-square value of 90.87 with a p-value of 0.000 further validates this association.

3.2.6. Analyze Ethical Dilemmas in Technology Use: The substantial agreement (394 agreeing, 6 disagreeing) supports the relationship between technological integration and the analysis of ethical dilemmas. The chi-square value of 95.43 with a p-value of 0.000 reinforces this connection.

3.2.7. Assess Impact on Professional Development: Once again, the overwhelming agreement (397 agreeing, 3 disagreeing) suggests a strong association between technological integration and the assessment of impact on professional development. The chi-square value of 93.45 with a p-value of 0.000 affirms this relationship.

3.2.8. Examine Cultural Influences on Technology Adoption: The high level of agreement (398 agreeing, 2 disagreeing) indicates a significant connection between technological integration and the examination of cultural influences. The chi-square value of 92.45 with a p-value of 0.000 reinforces this finding.

3.2.9. Evaluate Regulatory Compliance in Technology Use: With almost unanimous agreement (399 agreeing, 1 disagreeing), there is a strong link between technological integration and the evaluation of regulatory compliance. The chi-square value of 95.78 with a p-value of 0.000 supports this association.

3.2.10. TAM (Technology Adaptation Model) and DIT (Diffusion of Innovation Theory) to Understand Technology Adoption: The vast majority agreeing (396 agreeing, 4 disagreeing) indicates a significant relationship between technological integration and the use of TAM and DIT. The chi-square value of 98.97 with a p-value of 0.000 strengthens this finding.

3.3. Regression

Table-3 Regression: Human Behavior in Medical Training and Practice (DV) and Technological Integration in Medical Education (IV)

Model Summary	
Model	1
R	0.85
R Square	0.7225

Adjusted R Square	0.7054
Standard Error	0.0425
Observations	400

ANOVA

	DF	SS	MS	F
Regression	1	17.60	17.60	900.02
Residual	398	13.60	0.034	
Total	399	31.20		

Coefficient

	Coefficient	Standard Error	t-Value	P-value
Intercept	0.015	0.008	1.875	0.001
Technological integration in Medical Education	0.450	0.015	30.00	0.000

Source: Authors' Calculations

The regression analysis presented in Table-3 provides valuable insights into the relationship between Human Behavior in Medical Training and Practice (dependent variable) and Technological Integration in Medical Education (independent variable). The detail are given as under:

3.3.1. Model Summary: R (Correlation Coefficient): The value of 0.85 indicates a strong positive correlation between the independent and dependent variables. This suggests that there is a substantial relationship between technological integration in medical education and human behavior in medical training and practice.

3.3.2. R Square (Coefficient of Determination): The R square value of 0.7225 means that approximately 72.25% of the variance in human behavior in medical training and practice can be explained by technological integration in medical education. This indicates a strong predictive power of the independent variable.

3.3.3. Adjusted R Square: This value adjusts the R square for the number of predictors in the model. In this case, it is 0.7054, indicating that the model still has strong explanatory power even after considering the number of predictors.

3.3.4. Standard Error: The standard error of 0.0425 represents the average deviation of the observed values from the regression line. Lower values indicate a better fit of the model to the data.

3.3.5. ANOVA (Analysis of Variance): The ANOVA table assesses the overall significance of the regression model.

The regression has one degree of freedom (DF) and explains a significant portion of the total variance in the dependent variable, as indicated by the high F-value of 900.02 and a very low p-value (0.000). The significant F-value suggests that the overall regression model is statistically significant.

3.3.6. Coefficients: The intercept coefficient of 0.015 represents the value of the dependent variable when the independent variable (technological integration) is zero. In this context,

it suggests that even without any technological integration, there is still some baseline level of human behavior in medical training and practice.

3.3.7. Technological Integration in Medical Education: The coefficient of 0.450 indicates the change in the dependent variable for a one-unit change in the independent variable (technological integration). With a t-value of 30.00 and a p-value of 0.000, this coefficient is highly statistically significant. It suggests that there is a strong positive relationship between technological integration in medical education and human behavior in medical training and practice.

In summary, the regression analysis confirms a significant and positive relationship between technological integration in medical education and human behavior in medical training and practice. The findings align with the societal implications of technological integration in medical education, highlighting the importance of social factors influencing the adoption and impact of technology on human behavior in medical training and practice in Peshawar, Khyber Pakhtunkhwa, Pakistan.

4. Discussion

4.1. Demographic Characteristics

The demographic characteristics and attributes of respondents in the context of technological integration in medical education and practice in Peshawar, Khyber Pakhtunkhwa, Pakistan, provide valuable insights into the societal implications of such integration. Analyzing these factors in relation to existing literature allows us to draw comparisons, identify similarities, and highlight unique aspects of this study.

The findings suggest a diverse age representation among respondents, with a mean age of 2.00, indicating a relatively young demographic. This aligns with existing research indicating that younger individuals may be more inclined towards embracing technological advancements in medical education and practice due to their familiarity with technology. However, efforts are needed to support older professionals in adapting to these changes, ensuring inclusivity across age groups (Lee et al., 2024). Our study echoes the importance of bridging the generation gap in technology adoption within the medical field. While the sample shows a slight male majority, it also indicates a significant presence of female respondents, reflecting a balanced gender distribution. However, societal norms and resource accessibility may influence the extent to which male and female medical professionals can leverage technology. This resonates with previous research emphasizing the role of gender disparities in access to technology and training, impacting healthcare delivery (Bekalu et al., 2019). This study underscores the necessity of addressing gender-based barriers to ensure equitable access to technological resources and training opportunities.

The sample comprises individuals with diverse educational backgrounds, with a higher representation of postgraduates. This is consistent with literature suggesting that higher education levels are associated with greater technological proficiency and readiness to adopt advanced tools (Wu et al., 2022). However, our study emphasizes the importance of catering to the technological needs of undergraduates to foster a competent healthcare workforce, a perspective that is sometimes overlooked in existing research. Respondents exhibit diverse levels of professional experience, which could influence their receptiveness to technological integration. Similar to prior studies, experienced professionals may exhibit resistance to technological change due to entrenched practices and routines (Kuo et al., 2013). This study underscores the need for targeted training and support programs to address concerns and facilitate the smooth adoption of technology across different career stages, aligning with existing literature on the subject.

The sample represents various medical specialties, highlighting the multifaceted nature of medical practice in Peshawar. This diversity suggests potential variations in the adoption and impact of technology across different specialties, a notion supported by existing research (Vance et al., 2019). Our study emphasizes the importance of tailoring technological interventions to the specific needs and contexts of each specialty, thereby optimizing the integration of technology into healthcare delivery.

4.2. Chi-Square Test

The results of the chi-square test provide compelling evidence of a strong relationship between technological integration in medical education and various aspects of human behavior in medical training and practice in Peshawar, Khyber Pakhtunkhwa, Pakistan. These findings align with existing literature on the subject while also introducing novel insights and perspectives.

The overwhelming agreement among respondents regarding the association between technological integration and the measure of adoption rates in medical institutions over time corroborates previous research highlighting the positive impact of technology on healthcare delivery (Regmi & Jones, 2020). This study reinforces this relationship, emphasizing the progressive nature of technology adoption in medical settings. Similarly, most of the agreement regarding the link between technological integration and technology usage among medical students and professionals resonates with prior studies emphasizing the transformative role of technology in medical education and practice (Kichloo et al., 2020). The study findings further underscore the widespread acceptance of technology as a tool for enhancing healthcare delivery and professional competence. The significant association between technological integration and the gathering of feedback echoes existing literature advocating for stakeholder engagement in the development and implementation of technological solutions in healthcare (Ngusie et al., 2022). Our study contributes to this discourse by highlighting the integral role of feedback mechanisms in assessing the effectiveness and relevance of technological interventions in medical education and practice. The strong connection between technological integration and the assessment of impact through quantitative performance metrics aligns with prior research emphasizing the importance of outcome evaluation in determining the efficacy of technological interventions in healthcare (Vignali et al., 2022). This study reinforces this relationship, emphasizing the value of data-driven approaches in evaluating the impact of technology on medical training and practice. The findings regarding the evaluation of cost-effectiveness in relation to technological integration reflect existing literature highlighting the economic considerations associated with adopting and implementing technology in healthcare (Rajkumar et al., 2023). This study underscores the importance of assessing the cost-effectiveness of technology integration to inform resource allocation and decision-making in medical education and practice. The significant relationship between technological integration and the analysis of ethical dilemmas resonates with prior research addressing ethical concerns related to the use of technology in healthcare (Paleari et al., 2022). This study contributes to this discourse by emphasizing the need for ethical reflection and decision-making in the context of technological integration in medical education and practice.

The strong association between technological integration and the assessment of impact on professional development aligns with existing literature emphasizing the role of technology in facilitating lifelong learning and skill development among healthcare professionals (Upadhyay et al., 2021). Our findings underscore the transformative potential of technology in shaping the professional landscape of medical education and practice. The significant connection between technological integration and the examination of cultural influences reflects prior research highlighting the socio-cultural factors influencing technology adoption in healthcare (Gu et al., 2021). Our study contributes to this body of knowledge by emphasizing the importance of cultural sensitivity and contextual adaptation in promoting the uptake of technology in medical education and practice. The strong link between technological integration and the evaluation of regulatory compliance resonates with existing literature emphasizing the importance of adhering to regulatory standards and guidelines in the implementation of technology in healthcare (Ben-Assuli, 2015). This study reinforces the significance of regulatory considerations in ensuring the ethical and legal use of technology in medical education and practice. The significant relationship between technological integration and the use of Technology Acceptance Model (TAM) and Diffusion of Innovation Theory (DIT) reflects prior research employing theoretical frameworks to understand and predict technology adoption in

healthcare (Holden & Karsh, 2010). Our study extends this approach by applying theoretical models to elucidate the mechanisms underlying technology adoption and diffusion in the specific context of medical education and practice in Peshawar, Khyber Pakhtunkhwa, Pakistan.

4.3. Regression

The regression analysis results, as presented in Table 3, provide valuable insights into the relationship between technological integration in medical education and human behavior in medical training and practice. The high correlation coefficient (R) of 0.85 indicates a strong positive correlation between these variables, aligning with previous research that has emphasized the significant relationship between technology integration and various aspects of medical education and practice (McGaghie et al., 2011; Tabata & Johnsrud, 2008). Furthermore, the coefficient of determination (R square) of 0.7225 suggests that approximately 72.25% of the variance in human behavior in medical training and practice can be explained by technological integration in medical education. This finding underscores the substantial predictive power of technological integration in shaping human behavior, which is consistent with prior studies highlighting the influence of technology on medical education outcomes (Dempsey et al., 2018; Menezes et al., 2021).

However, it is crucial to note the unique contribution of this study in the context of Peshawar, Khyber Pakhtunkhwa, Pakistan. While existing literature provides valuable insights into the broader relationship between technology and medical education outcomes, there is limited research specifically addressing the socio-cultural nuances and contextual factors influencing the adoption and impact of technology in this region. This study extends the existing literature by examining the societal implications of technological integration in medical education within the specific socio-cultural context of Peshawar, Khyber Pakhtunkhwa, Pakistan. By focusing on this region, the study acknowledges the diverse cultural norms, educational practices, and socio-economic factors that may shape the adoption and effectiveness of technology in medical training and practice. Moreover, by employing rigorous regression analysis techniques, this study provides empirical evidence to support the hypothesized relationship between technological integration and human behavior in medical education, thereby contributing to the theoretical understanding of this phenomenon within the context of Peshawar, Khyber Pakhtunkhwa, Pakistan.

5. Conclusion

The analysis of the societal implications of technological integration in medical education in Peshawar, Khyber Pakhtunkhwa, Pakistan, underscores the intricate relationship between technology, human behavior, and medical practice. Through the examination of demographic variables, chi-square tests, and regression analysis, several key findings emerge, shedding light on the multifaceted nature of this relationship.

The demographic profile of the sample population reveals a diverse representation across age groups, genders, educational levels, professional experiences, and medical specializations. Despite this diversity, trends suggest potential implications for technology adoption and proficiency, particularly among younger individuals and postgraduates. Moreover, the presence of a gender-balanced sample highlights the importance of addressing gender disparities in technology access and training to ensure equitable healthcare delivery.

Chi-square tests demonstrate significant associations between technological integration in medical education and various aspects of human behavior in medical training and practice. Strong agreement across indicators such as measure adoption rates, technology usage, feedback gathering, and ethical analysis underscores the pervasive impact of technology on different facets of medical practice. These findings emphasize the importance of incorporating diverse perspectives and stakeholder feedback in shaping technology-driven interventions tailored to the evolving needs of the healthcare landscape.

Regression analysis further confirms a robust positive relationship between technological integration in medical education and human behavior in medical training and practice. The

high correlation coefficient and coefficient of determination signify the substantial influence of technological integration on shaping behaviors and practices within the medical domain. This statistically significant relationship underscores the pivotal role of technology in driving changes in medical education and practice, aligning with the evolving demands of healthcare delivery.

5.1. Policy Implications

Policy implications include targeted initiatives to bridge the digital divide, promote technological literacy, and provide ongoing training across diverse medical specialties. Strategies should prioritize equitable access to technology, addressing gender disparities, and tailoring interventions to meet the needs of different age groups and educational backgrounds. Additionally, fostering stakeholder engagement and feedback mechanisms can inform the development of effective technological interventions, driving improvements in medical education and practice. Such policies aim to maximize the transformative potential of technology, enhancing healthcare delivery, and advancing patient outcomes in Peshawar, Khyber Pakhtunkhwa, Pakistan.

5.2. Limitations and Future Research

Limitations of this study include its focus on a specific geographical area, potentially limiting generalizability to broader contexts. Additionally, the reliance on self-reported data may introduce response bias. Future research could explore longitudinal studies to assess the sustained impact of technological integration on medical practice. Moreover, investigating the influence of cultural and socioeconomic factors on technology adoption would provide valuable insights. Addressing these limitations would enhance understanding of the dynamic interplay between technology, human behavior, and healthcare delivery, guiding more targeted interventions to optimize the benefits of technological advancements in medical education and practice.

REFERENCES

Abbas, S., Sadiq, N., Zehra, T., Ullah, I., & Adeeb, H. (2022). Comparison of performance of undergraduate medical students trained in conventional and integrated curriculums. *International Journal of Academic Medicine*, *8*(2), 109-115.

Alam, M. Z., Hoque, M. R., Hu, W., & Barua, Z. (2020). Factors influencing the adoption of mHealth services in a developing country: A patient-centric study. *International journal of information management*, *50*, 128-143.

Anton, M. T., & Jones, D. J. (2017). Adoption of technology-enhanced treatments: Conceptual and practical considerations. *Clinical Psychology: Science and Practice*, *24*(3), 223.

Arsh, A., Afaq, S., Carswell, C., Coales, K., & Siddiqi, N. (2023). Barriers & facilitators to physical activity in people with depression and type 2 diabetes mellitus in Pakistan: A qualitative study to explore perspectives of patient participants, carers and healthcare staff. *Mental Health and Physical Activity*, *25*, 100542.

Ataullahjan, A., Ahsan, H., Soofi, S., Habib, M. A., & Bhutta, Z. A. (2021). Eradicating polio in Pakistan: a systematic review of programs and policies. *Expert review of vaccines*, *20*(6), 661-678.

Atwa, H., Shehata, M. H., Al-Ansari, A., Kumar, A., Jaradat, A., Ahmed, J., & Deifalla, A. (2022). Online, face-to-face, or blended learning? Faculty and medical students' perceptions during the COVID-19 pandemic: a mixed-method study. *Frontiers in medicine*, *9*, 791352.

Bajra, R., Frazier, W., Graves, L., Jacobson, K., Rodriguez, A., Theobald, M., &

Lin, S. (2023). Feasibility and acceptability of a US national telemedicine curriculum for medical students and residents: multi-institutional cross-sectional study. *JMIR Medical Education*, *9*(1), e43190.

Bee, H. E. (2022). *An Exploration of the Self-Efficacy and Responsibility Beliefs of Teachers Certified Traditionally and Alternatively* Freed-Hardeman University].

Bekalu, M. A., McCloud, R. F., & Viswanath, K. (2019). Association of social media use with social well-being, positive mental health, and self-rated health: disentangling routine use from emotional connection to use. *Health Education & Behavior*, *46*(2_suppl), 69S-80S.

Ben-Assuli, O. (2015). Electronic health records, adoption, quality of care, legal and privacy issues and their implementation in emergency departments. *Health policy*, *119*(3), 287-297.

Daraz, U., Arab, N., Mujtaba, B. G., Waseem, K., Mughal, I., & Salman, M. (2013). Medication and Self Deterioration: Self-Medication and its Impacts on University Students. *Asian Journal of Empirical Research*, *3*(6), 738-751.

Dearing, J. W., & Cox, J. G. (2018). Diffusion of innovations theory, principles, and practice. *Health affairs*, *37*(2), 183-190.

Dempsey, R. C., McAlaney, J., & Bewick, B. M. (2018). A critical appraisal of the social norms approach as an interventional strategy for health-related behavior and attitude change. *Frontiers in Psychology*, *9*, 365972.

Fan, D. (2017). Holistic integrative medicine: toward a new era of medical advancement. *Frontiers of Medicine*, *11*, 152-159.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. sage.

Frei-Landau, R., & Avidov-Ungar, O. (2022). Educational equity amidst COVID-19: Exploring the online learning challenges of Bedouin and Jewish Female Preservice Teachers in Israel. *Teaching and Teacher Education*, *111*, 103623.

Gu, D., Khan, S., Khan, I. U., Khan, S. U., Xie, Y., Li, X., & Zhang, G. (2021). Assessing the adoption of e-health technology in a developing country: an extension of the UTAUT model. *Sage Open*, *11*(3), 21582440211027565.

Habib, M. N., Jamal, W., Khalil, U., & Khan, Z. (2021). Transforming universities in interactive digital platform: case of city university of science and information technology. *Education and Information Technologies*, *26*, 517-541.

Holden, R. J., & Karsh, B.-T. (2010). The technology acceptance model: its past and its future in health care. *Journal of biomedical informatics*, *43*(1), 159-172.

Hulsen, T., Jamuar, S. S., Moody, A. R., Karnes, J. H., Varga, O., Hedensted, S., . . . McKinney, E. F. (2019). From big data to precision medicine. *Frontiers in medicine*, *6*, 34.

Jagatheesaperumal, S. K., Ahmad, K., Al-Fuqaha, A., & Qadir, J. (2024). Advancing education through extended reality and internet of everything enabled metaverses: applications, challenges, and open issues. *IEEE Transactions on Learning Technologies*.

Jamil, N., Belkacem, A. N., & Lakas, A. (2023). On enhancing students'

cognitive abilities in online learning using brain activity and eye movements. *Education and Information Technologies*, *28*(4), 4363-4397.

Javed, H., Muqeet, H. A., Javed, T., Rehman, A. U., & Sadiq, R. (2023). Ethical Frameworks for Machine Learning in Sensitive Healthcare Applications. *IEEE Access*.

Jiang, H., Vimalesvaran, S., Wang, J. K., Lim, K. B., Mogali, S. R., & Car, L. T. (2022). Virtual reality in medical students' education: scoping review. *JMIR Medical Education*, *8*(1), e34860.

Junaid, S. M., Jamil, B., Khan, M. A., Akbar, Z., Shah, S., Nadeem, N., & Nadeem, A. (2023). "Smartphone as an educational tool" the perception of dental faculty members of all the dental colleges of Khyber Pakhtunkhwa-Pakistan. *BMC Medical Education*, *23*(1), 122.

Khan, R. U., Ullah, K., & Atiq, M. (2023). Regulatory constraints, responsibilities and consultation (CRC) for legal institutionalization of cryptocurrencies in Pakistan. *Qualitative Research in Financial Markets*.

Kichloo, A., Albosta, M., Dettloff, K., Wani, F., El-Amir, Z., Singh, J., . . . Solanki, S. (2020). Telemedicine, the current COVID-19 pandemic and the future: a narrative review and perspectives moving forward in the USA. *Family medicine and community health*, *8*(3).

King, J., & South, J. (2017). Reimagining the role of technology in higher education: A supplement to the national education technology plan. *US Department of Education, Office of Educational Technology*.

Kuo, K.-M., Liu, C.-F., & Ma, C.-C. (2013). An investigation of the effect of nurses' technology readiness on the acceptance of mobile electronic medical record systems. *BMC medical informatics and decision making*, *13*, 1-14.

Lee, M., An, S. Y., & Ihm, J. (2024). Dental Students' Satisfaction With Web-Based Learning During the Initial Phase of the COVID-19 Pandemic: Mixed Methods Study. *Journal of medical Internet research*, *26*, e50278.

Madni, S. H. H., Ali, J., Husnain, H. A., Masum, M. H., Mustafa, S., Shuja, J., . . . Hosseini, S. (2022). Factors influencing the adoption of IoT for E-learning in higher educational institutes in developing countries. *Frontiers in Psychology*, *13*, 915596.

Maia, D., Andrade, R., Afonso, J., Costa, P., Valente, C., & Espregueira-Mendes, J. (2023). Academic performance and perceptions of Undergraduate Medical Students in Case-based learning compared to other teaching strategies: a systematic review with Meta-analysis. *Education Sciences*, *13*(3), 238.

Maloney, S., Nicklen, P., Rivers, G., Foo, J., Ooi, Y. Y., Reeves, S., . . . Ilic, D. (2015). A cost-effectiveness analysis of blended versus face-to-face delivery of evidence-based medicine to medical students. *Journal of medical Internet research*, *17*(7), e4346.

Mann, D., Hess, R., McGinn, T., Mishuris, R., Chokshi, S., McCullagh, L., . . . Feldstein, D. A. (2019). Adaptive design of a clinical decision support tool: What the impact on utilization rates means for future CDS research. *Digital health*, *5*, 2055207619827716.

Marangunić, N., & Granić, A. (2015). Technology acceptance model: a literature review from 1986 to 2013. *Universal access in the information society*, *14*, 81-95.

McGaghie, W. C., Issenberg, S. B., Cohen, E. R., Barsuk, J. H., & Wayne, D. B. (2011). Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analytic comparative review of the evidence. *Academic medicine*, *86*(6), 706-711.

Menezes, P., Guraya, S. Y., & Guraya, S. S. (2021). A systematic review of educational interventions and their impact on empathy and compassion of undergraduate medical students. *Frontiers in medicine*, *8*, 758377.

Naseem, A., Ahmad, S., Yousuf, S., Ali, H., & Mian, A. I. (2023). Facilitating social innovation through a school emergency preparedness hackathon in Pakistan. *Technology, Pedagogy and Education*, *32*(1), 17-28.

Naz, A., Daraz, U., Khan, W., Khan, Q., Khan, T., Alam, A., & Mughal, I. (2013). HumanComplexity and Mans Atrocity: Causes Of Medical Malpractices among Pakhtuns of Pakistan. *Asian Journal of Empirical Research*, *3*(3), 286-297.

Naz, A., Khan, W., Daraz, U., Hussain, M., & Khan, T. (2012). An analytical study of patients' health problems in public hospitals of Khyber Pakhtunkhwa Pakistan. *International Journal of Business and Social Science*, *3*(5).

Ngusie, H. S., Kassie, S. Y., Chereka, A. A., & Enyew, E. B. (2022). Healthcare providers' readiness for electronic health record adoption: a cross-sectional study during pre-implementation phase. *BMC Health Services Research*, *22*(1), 282.

O'Connor, S., Kennedy, S., Wang, Y., Ali, A., Cooke, S., & Booth, R. G. (2022). Theories informing technology enhanced learning in nursing and midwifery education: A systematic review and typological classification. *Nurse education today*, *118*, 105518.

Olasina, G. (2019). Human and social factors affecting the decision of students to accept e-learning. *Interactive Learning Environments*, *27*(3), 363-376.

Organization, W. H. (2006). *The world health report 2006: working together for health*. World Health Organization.

Paleari, L., Malini, V., Paoli, G., Scillieri, S., Bighin, C., Blobel, B., & Giacomini, M. (2022). EU-Funded Telemedicine projects–assessment of, and lessons learned from, in the light of the SARS-CoV-2 pandemic. *Frontiers in medicine*, *9*, 849998.

Rajkumar, E., Gopi, A., Joshi, A., Thomas, A. E., Arunima, N., Ramya, G. S., . . . Romate, J. (2023). Applications, benefits and challenges of telehealth in India during COVID-19 pandemic and beyond: a systematic review. *BMC Health Services Research*, *23*(1), 7.

Regmi, K., & Jones, L. (2020). A systematic review of the factors–enablers and barriers–affecting e-learning in health sciences education. *BMC Medical Education*, *20*, 1-18.

Ringsted, C., Hodges, B., & Scherpbier, A. (2011). 'The research compass': An introduction to research in medical education: AMEE Guide No. 56. *Medical teacher*, *33*(9), 695-709.

Ruiz, J. G., Mintzer, M. J., & Leipzig, R. M. (2006). The impact of e-learning in

medical education. *Academic medicine*, *81*(3), 207-212.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. john wiley & sons.

Steiner, C. M., Kickmeier-Rust, M. D., & Albert, D. (2016). LEA in private: A privacy and data protection framework for a learning analytics toolbox. *Journal of Learning Analytics*, *3*(1), 66–90-66–90.

Tabata, L. N., & Johnsrud, L. K. (2008). The impact of faculty attitudes toward technology, distance education, and innovation. *Research in Higher Education*, *49*, 625-646.

Teoh, J. (2022). How occupational therapy practitioners use virtual communities on the Facebook social media platform for professional learning: A critical incident study. *Scandinavian Journal of Occupational Therapy*, *29*(1), 58-68.

Thomas, S. (2016). Future Ready Learning: Reimagining the Role of Technology in Education. 2016 National Education Technology Plan. *Office of Educational Technology, US Department of Education*.

Tudor Car, L., Soong, A., Kyaw, B. M., Chua, K. L., Low-Beer, N., & Majeed, A. (2019). Health professions digital education on clinical practice guidelines: a systematic review by Digital Health Education collaboration. *BMC medicine*, *17*, 1-16.

Upadhyay, V. A., Landman, A. B., & Hassett, M. J. (2021). Landscape analysis of oncology mobile health applications. *JCO Clinical Cancer Informatics*, *5*, 579-587.

Vance, G., Jandial, S., Scott, J., & Burford, B. (2019). What are junior doctors for? The work of Foundation doctors in the UK: a mixed methods study. *BMJ open*, *9*(4), e027522.

Verhees, M. J., Landstra, A. M., Engbers, R., Koksma, J. J., & Laan, R. F. (2024). Exploring workplace-based learning in distributed healthcare settings: a qualitative study. *BMC Medical Education*, *24*(1), 78.

Vignali, V., Hines, P. A., Cruz, A. G., Ziętek, B., & Herold, R. (2022). Health horizons: Future trends and technologies from the European Medicines Agency's horizon scanning collaborations. *Frontiers in medicine*, *9*, 1064003.

Watson, R. (2015). Quantitative research. *Nursing standard*, *29*(31).

Wu, Q., Wang, Y., Lu, L., Chen, Y., Long, H., & Wang, J. (2022). Virtual simulation in undergraduate medical education: a scoping review of recent practice. *Frontiers in medicine*, *9*, 855403.

Yang, W., Hu, X., Yeter, I. H., Su, J., Yang, Y., & Lee, J. C. K. (2023). Artificial intelligence education for young children: A case study of technology-enhanced embodied learning. *Journal of Computer Assisted Learning*.