# TRANSFORMING PUBLIC SECTOR THROUGH DIGITAL GOVERNANCE INITIATIVES IN KHYBER PAKHTUNKHWA: BUREAUCRATIC CONDUCT, TRANSPARENCY IN SERVICE DELIVERY AND CITIZEN CENTRIC E-GOVERNANCE

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## ABSTRACT

Under the motto, '*Technology is Our New Ideology*,' the Khyber Pakhtunkhwa's two-time elected Pakistan Tehreek-e Insaaf (PTI) provincial government is undertaking a number of key governance reforms focused on digitizing public service delivery in various provincial government departments. This research attempts to investigate how digitization is affecting bureaucratic efficiency, transparency and inclusivity in public service delivery in education and health and what impacts are resultantly generated on organizational culture. Further, whether digitalization has affected citizen's trust in the provincial government. It attempts to do so from the perspective of public service providers, i.e., the bureaucracy and end users, i.e., the public (school and college students and hospital patients). The study employs both qualitative and quantitative methods to reach its findings. The findings of the study suggest that significant digital interventions were made by the provincial government in both education and health sectors and the Covid emergency provided a big push to digitalization of government services. These interventions are driven by the desire to generate policies based on evidence-based data and to optimize efficiency, transparency and accessibility of services. However, the ICT induced impacts on service delivery varied depending on the nature and the context of digitization interventions, which resultantly had differing results. In the context of most notably the education sector, for example, access to online tele-learning services were limited by student's economic background and paucity of funding, inhibiting IT infrastructure in public schools. Most of the health and education e-initiatives focus on registering online complaints, applying for e-transfers, online admissions, or printing online forms, which makes it a managerial type of government, as Chadwick and May suggest, measures that steered towards greater government control and less public participation in policy making. Additionally, the propensity of significant groups being left out, either due to the non-availability of resources, such as computers, internet, feedback booths or accessibility being limited to ICT literate population only, leaves the aspect of biased data a greater possibility. Since there is very little political deliberation and discussion in a 'cyber virtual civil society' group, therefore, the prospect of ICT governance being 'participatory' is even less visible. The findings also suggest that ICT induced transformations in bureaucracy's organizational culture in terms of its values, expectations and practices also gives rise to bureaucratic resistance and skepticism of ICT introduced reforms. Such limitations may prove a big stumble in the Khyber Pakhtunkhwa government's vision to provide speedy, efficient, accountable, and inclusive services to the public.

## PREFACE

The primary object of this research project was to explore how the use of Information and Communication Tools (ICT) is affecting efficiency, transparency and inclusiveness in service delivery by the provincial bureaucracy in Khyber Pakhtunkhwa and making it undergo organizational and cultural changes. Further, how digitalization affects citizen's trust on government's service delivery in the province. The case study of the project were two government departments of Education and Health. The Khyber Pakhtunkhwa Education and Health Departments spearheaded a number of policy initiatives focused on promoting e-government in schools/ colleges and hospitals with the aim to provide quality education and improved healthcare to the residents of Khyber Pakhtunkhwa. The research team of the project collected data through quantitative surveys, interviews, focus group discussions and analysis of government documents, reports and other secondary sources of data.

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## TABLE OF CONTENTS

**INTRODUCTION** ..... **1**
1.1 Introduction ..... 1
1.2 Literature Review ..... 2
1.3 Problem Statement ..... 5
1.4 Research Objectives ..... 6
1.5 Research Questions ..... 6
1.6 Justification ..... 6
1.7 Theoretical Framework ..... 7
1.8 Methodology ..... 9
1.9 Pre-Empirical Conceptual Framework ..... 13
1.10 Operationalization Of Terms ..... 13
**CHANGING THE FACE OF PUBLIC SERVICE DELIVERY IN KHYBER PAKHTUNKHWA: DIGITIZATION OF EDUCATION** ..... **16**
2.1 Introduction ..... 16
2.2. The Khyber Pakhtunkhwa Elementary And Secondary Education Department (Kpesed) And The Higher Education Department (Kphed) ..... 16
2.3 Is Technology The Silver Bullet For Education?' Findings And Discussions From The Field ..... 17
*Icts And Provincial Government's Digital Vision In Education* ..... 17
*Efficiency, Ict Tools And Service Delivery In Education* ..... 19
*The Smart Board Challenge* ..... 19
*Computer/ It Labs* ..... 22
*Computer Programming And It Essentials Initiative* ..... 23
*Digital/ E- Learning Programs* ..... 24
*Digitization Of Teachers Training* ..... 28
*The Learning Management System* ..... 31
*The Promise Of Paperless Communication* ..... 32
*Online Admission System* ..... 33
*Digitized Monitoring* ..... 34
*Transparency, Ict Tools And Service Delivery* ..... 35
*E-Transfer – Beginning Of An End To Political Interference* ..... 37
*Biometric Attendance – Solving Teacher's Absenteeism Issue* ..... 38
*Monitoring Student Attendance* ..... 42
*The Computer Based 'Nts' Meritocracy* ..... 42
*Inclusivity, Ict Tools And Service Delivery* ..... 43
2.4 What Are The Issues In Digital Governance In Education ..... 50
*Is Change Management & Organizational Culture An Issue?* ..... 51
*How Far Regular It Trainings And Proper Equipment Mattered?* ..... 53
*How Much Of An Attitude Of Enthusiasm And Innovation And Technological Savviness At Policy Making Levels Help?* ..... 53
*Does Resource Scarcity And Technical Issues Matter?* ..... 54
*Is There Sharing Of Inter-Provincial Ict Best Practices In Education?* ..... 58
*How Far Is Data Security An Issue?* ..... 59
2.5 Icts, Service Delivery And Citizen Trust In Government ..... 59
*Awareness Of Digital Education Policies/ Programs & Participation In Digital Education Initiatives* ..... 62
2.6 Conclusion ..... 63

**CHANGING THE FACE OF PUBLIC SERVICE DELIVERY IN KHYBER PAKHTUNKHWA: DIGITIZATION OF HEALTH ..... 64**
3.1 INTRODUCTION ..... 64
3.2 PAKISTAN'S HEALTH CARE SYSTEM ..... 64
3.3 DIGITALIZATION OF HEALTH SERVICE DELIVERY IN KHYBER PAKHTUNKHWA ..... 68
3.4 THE KHYBER PAKHTUNKHWA HEALTH DEPARTMENT (KPHD) AND DIRECTORATE GENERAL OF HEALTH SERVICE (DGHS) ..... 69
*KP HEALTH DEPARTMENT* ..... 69
*DIRECTORATE OF HEALTH* ..... 69
*DISTRICT HEALTH MANAGEMENT SYSTEM* ..... 70
3.5. ICTS AND DIGITAL HEALTH VISION OF KHYBER PAKHTUNKHWA GOVERNMENT ..... 70
3.6 IS TECHNOLOGY THE 'SILVER BULLET' FOR HEALTH SERVICE DELIVERY? FINDINGS AND DISCUSSIONS FROM THE FIELD ..... 71
*ICT TOOLS AND SERVICE DELIVERY IN HEALTH* ..... 72
*MEDICAL REPORTS/ LABORATORY TESTS* ..... 75
*ELECTRONIC RECORD SYSTEM [ERS], THE HOSPITAL MANAGEMENT INFORMATION SYSTEM (HMIS)* ..... 76
*E-VACCS* ..... 77
*CIVIL REGISTRATION & VITAL STATISTICS (CRVS)* ..... 79
*TELEMEDICINE* ..... 79
*INTERNATIONAL TELE ROUNDING* ..... 80
*TRAININGS IN ICT NEEDS* ..... 80
*IMU HEALTH KP APP* ..... 81
*PATIENT PRIVACY* ..... 82
3.7 IMPACTS: EFFICIENCY IN HEALTH SERVICE GENERATION ..... 82
*REAL TIME DATA = EFFECTIVE DECISION MAKING* ..... 82
*QUICK RESPONSE TO DISEASE OUTBREAK* ..... 82
*IDENTIFICATION OF HEALTH EMERGENCIES* ..... 83
*COST-EFFECTIVE* ..... 83
*TIME MANAGEMENT* ..... 83
*CAN TECHNOLOGY BRING EFFICIENCY IN THE REAL SENSE?* ..... 84
3.8 IMPACTS: TRANSPARENCY IN HEALTH SERVICE GENERATION ..... 85
*BIOMETRIC ATTENDANCE FOR DOCTORS* ..... 86
*NO ONLINE FEEDBACK ABOUT QUALITY OF SERVICES RECEIVED* ..... 88
*COMPLAINT REGISTRATION* ..... 88
3.9 IMPACTS: INCLUSIVITY IN HEALTH SERVICE GENERATION ..... 91
*SEHAT SAHULAT CARD'* ..... 91
*THE TRADITONAL WAYS PREVAIL: GOING PAPERLESS – NOT EASY AS IT SEEMS* ..... 92
*ONLINE DOCTORS APPOINTMENT* ..... 92
*ACESS TO MEDICAL TEST REPORTS* ..... 95
*AWARENESS & USE OF E-HEALTH INITIATIVES* ..... 98
3.10 IS CHANGE MANAGEMENT AN ISSUE IN ICTS AND HEALTH SERVICE DELIVERY? ..... 101
3.11 ... ARE RESOURCE SCARCITY AND TECHNICAL GLITCHES ISSUES IN ICTS AND SERVICE GENERATION IN HEALTH? ..... 102
3.12 ..... ICT TOOLS, SERVICE DELIVERY IN HEALTH AND PEOPLE'S TRUST ON GOVERNMENT 103
3.13. CONCLUSIONS ..... 106

**RECOMMENDATIONS AND POLICY IMPLICATIONS ..... 107**
**CONCLUSIONS ..... 111**
5.1 POST-EMPIRICAL CONCEPTUAL FRAMEWORK ..... 112
**REFERENCES ..... 114**
**APPENDICES ..... 120**
APPENDIX A: INTERVIEW QUESTIONS - EDUCATION DEPARTMENTS ..... 120
APPENDIX B: INTERVIEW QUESTIONS - HEALTH DEPARTMENT ..... 125
APPENDIX C: INTERVIEW CONSENT FORM ..... 129
APPENDIX D: EDUCATION SURVEY QUESTIONNAIRE ..... 130
APPENDIX E: HEALTH SURVEY QUESTIONNAIRE ..... 131
APPENDIX F: HEALTH AND EDUCATION SECTOR – SURVEY SITES IN PESHAWAR AND ABBOTTABAD ..... 132
APPENDIX G: THE KP GOVERNMENT ICT POLICY 2015-16; KP DIGITAL POLICY 2018-2023; AND ..... 134
GOOD GOVERNANCE STRATEGY (PMRU 2019) ..... 134
APPENDIX H: INFORMATION ABOUT GOVERNMENT COLLEGES SURVEYED ..... 135
APPENDIX I: INFORMATION ABOUT GOVERNMENT SCHOOLS SURVEYED ..... 136
APPENDIX J: A COMPARISON OF EDUCATION INDICATORS IN THE REGION (SOUTH ASIA) ..... 137
APPENDIX K: WEB PRESENCE OF KP SCHOOLS/ COLLEGES ..... 138
APPENDIX L: LADY READING HOSPITAL MTI, PESHAWAR & AYUB TEACHING HOSPITAL MTI, ABBOTTABAD 139
APPENDIX M: KPHED PERMISSION LETTER ..... 140
APPENDIX N: KPESED PERMISSION LETTER ..... 141
APPENDIX O: KP EDUCATION MONITORING AUTHORITY PERMISSION LETTER ..... 142
APPENDIX P: KPESED PERMISSION LETTER ..... 143
APPENDIX Q: KPESED PERMISSION LETTER ..... 144
APPENDIX R: HEALTH DEPARTMENT PERMISSION LETTER ..... 145
APPENDIX S: LRH MTI PERMISSION LETTER ..... 146
APPENDIX T: ATH MTI PERMISSION LETTER ..... 147
APPENDIX U: ADDITIONAL INSTITUTIONS CONNECTED WITH KPE&SED ..... 148
APPENDIX V: ADDITIONAL INSTITUTIONS CONNECTED WITH KPHED ..... 149
APPENDIX W: TOTAL NUMBER OF SCHOOLS & MADRASSAH IN KHYBER PAKHTUNKHWA (KPEMA) ..... 150
APPENDIX X : TOTAL NUMBER OF COLLEGES IN KHYBER PAKHTUNKHWA (KPEMA) ..... 151
APPENDIX Y: EARLY AGE PROGRAMMING AND IT ESSENTIALS INITIATIVE' KPE&SED ..... 152
APPENDIX Z: INFORMATION ON DIFFERENT APPS LAUNCHED BY KPE&SED ..... 153

**LIST OF FIGURES**

*Figure 1: Triangulation Mixed Method of Data Collection* ..... 10
*Figure 2: Pre-Empirical Conceptual Framework of Causal Chain* ..... 13
*Figure 3: Mind Map on Efficiency, Transparency & Inclusiveness in Service Delivery* ..... 15
*Figure 4: Digital Initiatives Introduced by KPESED & KPHED* ..... 18
*Figure 5: Show Survey Outcomes of Likert scale statements on ICTs and Efficiency in Service Delivery* ..... 19
*Figure 6: Students Response on Regular Use of Smart Boards in Class* ..... 21
*Figure 7: Students Response on Smart Boards being Better Than Conventional White Boards* ..... 22
*Figure 8: Deficiencies in the IT Lab Pointed out by Students* ..... 23
*Figure 9: Students Response to Skills Gained in Computer Classes* ..... 24
*Figure 10: Students Response to Digital Learning Programs* ..... 26
*Figure 11: Reasons for Lack of Enthusiasm for Online Education among Students* ..... 27
*Figure 12: Students Satisfaction Level with Online Education System* ..... 28
*Figure 13: Students Response on Whether the Teachers Were Digitally Supportive or Not* ..... 30
*Figure 14: Student's Satisfaction Level with Online Admission System* ..... 34
*Figure 15: Students Response on - Camera Scanners on School/College Gates have Improved* ..... 35
*Figure 16: Transparency in Service Delivery in Education* ..... 36
*Figure 17: Students response to Biometric Attendance of Teachers and Improvement in Teacher's Absenteeism Issue* ..... 40
*Figure 18: Inclusive Service Delivery in Education* ..... 44
*Figure 19: Computer Classes and Student's Accessibility Issues* ..... 46
*Figure 20: Parent/ Guardian Income of Students in KP Higher Secondary Schools & Colleges in Peshawar & Abbottabad* ..... 47
*Figure 21: Access to Electronic Devices/ Internet/ Electricity (Students in KP Higher Secondary Schools & Colleges – Peshawar & Abbottabad* ..... 47
*Figure 22: Online Forums of Communications between Teachers and Students in Public Schools and Colleges* ..... 50
*Figure 23: KP Government Spending on Education (2015-2020)* ..... 56
*Figure 24: KP Government Spending on Elementary and Secondary Education (2013-2018)* ..... 58
*Figure 25: Survey Results Showing Students Perception of KP Government Commitment to Digital Education Initiatives and Student Level of Trust on Government* ..... 61
*Figure 26: Level of Awareness of the Digital Initiatives in Education & Highest Used Digital Tools* ..... 62
*Figure 27: Khyber Pakhtunkhwa Health Network under Health Department of Khyber Pakhtunkhwa (including Merged Districts)* ..... 66

*Figure 28: Department wise Khyber Pakhtunkhwa Budget for 2020-21* ..... 67
*Figure 29: Department wise Khyber Pakhtunkhwa Budget for 2020-21* ..... 67
*Figure 30: Graph Shows Why 40% Patients Preferred to Go to Tertiary Hospitals* ..... 73
*Figure 31: The Number of BHUs Serving Population in Peshawar and Abbottabad* ..... 75
*Figure 32: Survey Results Showing the Percentage of Patients Taken Corona Vaccine* ..... 78
*Figure 33: Most frequently used e-Health facility during Covid-19 Pandemic* ..... 79
*Figure 34: Patients Response to any Delay Faced in Accessing Healthcare Services in Public Hospitals in KP* ..... 84
*Figure 35: Survey Response Showing Patients Waiting Time to be Examined by a Doctor* ..... 87
*Figure 36: Complaint Registration about Health Services* ..... 89
Figure 37: Survey Results Showing Percentage of Patients Visiting the Hospital Website ..... 90
*Figure 38: Patient Knowledge of Healthcare Services through Different Channels* ..... 91
*Figure 39: Citizens Response on How They Get Doctor's Appointment* ..... 93
*Figure 40: Patient Survey Response to Online Doctor's Appointment* ..... 94
*Figure 41: Patient Access Level to Electronic Devices, Internet and Electricity Necessary for Use of Digital Initiatives in the Health Sector* ..... 96
*Figure 42: Survey Results Showing Awareness Level and Use of E-Health Initiatives among Patients Visiting Tertiary Hospitals* ..... 99
*Figure 43: How Patients Came to Know about e-Health Initiatives* ..... 99
*Figure 44: Level of Awareness of the e-Health Initiatives & Use of e-Health initiatives* ..... 100
*Figure 45: Survey Results Showing Citizens Response to KP Government Commitment to E-Health & Increase in Citizen Trust* ..... 105
*Figure 46: Post-Empirical Conceptual Framework* ..... 112

**LIST OF TABLES**

*Table 1: Details of Research Data Collection* ..... 11
*Table 2: KP Government Expenditure on Education (2015-2020)* ..... 55
*Table 3: KP Government Expenditure on KPESED (2013-2020)* ..... 57
*Table 4: Health Indicators in the Region (2019)* ..... 65
*Table 6: Number of BHUs Available to the Population of Peshawar & Abbottabad* ..... 74

## LIST OF ABBREVIATIONS

| | |
|---|---|
| ADP | Annual Development Program |
| ATH | Ayub Teaching Hospital |
| BHU | Basic Health Unit |
| BISEs | Board of Intermediate and Secondary Education |
| CMEEF | Chief Minister Education Endowment Fund |
| CNIC | Computerized National Identity Card |
| DFID | Department for International Development |
| DPD | Directorate of Professional Development |
| DGHSKP | Directorate General Health Services, Health Department, Government of Khyber Pakhtunkhwa |
| DoIT | Directorate of Information Technology |
| EGDI | E-Government Development Index |
| EMIS | Education Management Information System |
| ESRU | Education Sector Reforms Unit |
| FATA | Federally Administered Tribal Areas |
| FGD | Focus Group Discussion |
| GoKP | Government of Khyber Pakhtunkhwa |
| HCI | Human Capital Index |
| HETTA | Higher Education Teachers Training Academy |
| HEMIS | Higher Education Management Information System |
| HRMIS | Human Resource Management Information System |
| ICT | Information and Communication Technology |
| IDEA | International Institute for Democracy and Electoral Assistance |
| IT | Information Technology |
| LMS | Learning Management System |
| LRH | Lady Reading Hospital |
| MTI | Medical Teaching Institute |
| KP | Khyber Pakhtunkhwa |
| KPEMA | Khyber Pakhtunkhwa Education Monitoring Authority |

| | |
|---|---|
| KPESED | Khyber Pakhtunkhwa Elementary & Secondary Department |
| KPGRS | Khyber Pakhtunkhwa Grievance Redressal System |
| KPHED | Khyber Pakhtunkhwa Higher Education Department |
| KPPSRA | Khyber Pakhtunkhwa Private Schools Regulatory Authority |
| KPITB | Khyber Pakhtunkhwa Information Technology Board |
| MM | Mixed Method |
| NADRA | National Database and Registration Authority |
| NEGC | National E-Government Council |
| NPM | New Public Management |
| NTS | National Testing Service |
| OCDE | Organization for Economic Co-operation and Development |
| OPD | Outpatient Department |
| PAL | Police Assistance Lines |
| PAS | Police Access Service |
| PMRU | Performance Management and Evaluation Unit |
| PPAF | Pakistan Poverty Alleviation Fund DFID |
| PSRA | Private School Regulatory Authority |
| PTI | Pakistan Tehreek-e-Insaf |
| RTI | Right to Information |
| SBT | Smart Board Technology |
| ST&IT | Science and Technology & Information Technology |
| TII | telecommunication Infrastructure |
| UNDESA | United Nations Department of Economic and Social Affairs |
| UNESCAP | United Nations Economic and Social Commission for Asia and the Pacific |
| UNDP | United Nations Development Programme |

# INTRODUCTION

## 1.1 Introduction

Governance in modern times has undergone significant changes in terms of policies and practices, especially those designed to increase citizen participation in broader political processes. The evolution of governance practices in the 20th Century and that of the 21st are made possible primarily through growth in modern means of communications and technology. The state today is heavily reliant on the Information and Communication Technology (ICT) tools to undertake its responsibilities. This form of governance which relies on electronic communication devices, the computers and internet to provide services to the people and engage them in the sphere of politics is termed as 'e-governance'. The ICT revolution is supposedly reshaping the concept of governance throughout the world, but more so in developing societies, such as Pakistan, where the government bodies, political parties, pressure groups and other institutions are increasingly using electronic communication devices, the computers and internet to provide services to the people and engage them in the sphere of politics and governance. The sub-national governments in Pakistan, including the government of Khyber Pakhtunkhwa are undertaking a number of e-governance reforms in its various departments, including health, education and district management offices for attaining the objectives of efficient, transparent and inclusive service provision in the province.

Pakistan was introduced into the e-governance system comparatively late than its regional compatriots. It was in the year 2000 (August) that the government came up with its first 'National IT Policy and Action Plan' for inducting IT tools in government agencies; 2.6 million PKR were allotted in 2001 to promote 'e-governance in the country' (Ghayur, 2006: p. 1016). This was followed by the establishment of the Electronic Government Directorate (EGD) inside the Ministry of Science and Technology for initiating projects and providing guidelines and standards for software and infrastructure in the field. By 2005, "E- Government Strategy Five Year Plan," approved by the National E-Government Council (NEGC) provided for introducing e-applications in all government agencies, delivering efficient, cost-effective, e-services to citizens and ensuring transparency and accountability in government decision making (Ilyas, 2016: pp. 57-58). Very soon the mantra, 'e-governance for good governance' as the basis for a transparent, accountable, efficient cost effective and participatory service provision to the citizens was getting attention by policy makers in the field (Ghayur, 2006).

The Pakistan Tehreek-e-Insaaf (PTI) two-time elected government in Khyber Pakhtunkhwa under its motto 'technology is our new ideology' (Ibrahim, April 23, 2015), claims to take a broader view of e-government to mean not just automation of government departments, but also using technology to provide the public 'a central point of access to government services', thereby placing communities and individuals in 'responsive networks of knowledge, service, trust and accountability' (G of KP DoIT website, n.d). The Directorate of Information Technology (DoIT), which was established in March 2004 and mandated with promoting and facilitating e-governance initiatives in all government departments (G of KP, Science and Technology and Information Technology website, n.d) lays out as its vision the provision of efficient, diligent, honest and transparent delivery of public services, which in-turn promotes 'citizen empowerment' (G of KP Directorate of Information Technology, n.d). The four-major e-

governance initiatives of Khyber Pakhtunkhwa government outlined in its website include, e-Right to Information Act e-RTI, e-showcasing (e-market for free online buying and selling of KP industrial product), e-Complaint (registering of grievances online) and e-Recruitment (digitally created repository for unemployed youth) (G of KP 'e-RTI/ Right to Information'; G of KP 'e-showcasing; G of KP 'e-Complaint/ Grievance Redressal System'; G of KP 'e-Recruitment', n.d). Of these, E-Complaint is a part of the Khyber Pakhtunkhwa Grievance Redressal System (KPGRS); launched as an interactive platform, this mechanism allows ordinary citizens to register their complaints and grievances online, get digital notification on the progress of complaints and redressal in a stipulated time period (G of KP 'e-Complaint/ Grievance Redressal System', n.d). In a phase wise implementation of this step, it was first introduced in health, education, police, local government and revenue departments in Khyber Pakhtunkhwa and later on, is expected to be extended to all provincial level departments (G of KP 'e-Complaint/ Grievance Redressal System', n.d).

The nature of the completed and ongoing e-government projects reveals that some are focused on creating IT infrastructure and others on provision of IT training. Some projects, including, Online Hospital Management System for Lady Reading Hospital focuses on e-service delivery in health areas. Others, such as Virtual Teachers for Schools in Khyber Pakhtunkhwa, establishment of Science and Computer Labs in schools, System Analysis and Re-engineering programmes for recruitment and promotion in schools target the education sector (G of KP DoIT 'Completed Projects', n.d.). The classroom education is getting revolutionized through touch screen computers for learning of science subjects (Naveed, November 29, 2016). In higher education, Online College Admission System for public sector colleges is hailed as a very convenient system for students, which also enhances transparency in the admissions process (Mustafa, June 23, 2017). Other technology-oriented approaches include the 'KP Open WiFi', which aims at providing round the clock free WiFi facility to students at Khyber Pakhtunkhwa universities, thereby enhancing prospects for youth empowerment and employment generation (Ibrahim, May 5, 2016). While these digitization engagements are enhancing people's trust in government, there is a need to understand how these are improving the efficiency, transparency and inclusivity of service delivery in the province.

## 1.2 Literature Review

Use of technology is today seen as an off shoot of direct democracy in politics. Internet is now supposedly providing a timeless and placeless paradigm of politics. Many developed and developing countries have embarked upon the journey of e-governance believing that ICT has the power of reshaping governance. As such, technology has been credited with renewal of democracy and termed as an 'instrument of democratic liberation' (Chadwick and May, 2003: 272). The use of the internet as an active agent for participation in the political process has been defended on several counts. Internet provides a medium for participation in the political process, whilst maintaining the secrecy of their private identities; the subjects could otherwise be discriminated against by the state as being incapable of participating in mainstream politics (Smith, 2015). 'Internet subjects' can even challenge the traditional representative democracies subject to the limitations of size and place and scale. The internet can give more freedom in terms of participation in political debates and decision making. The democratic governments have access to a wide range of public views enhancing plurality which in turn allows the diffusion of power among the political actors. This culminates in cultural, political, and religious pluralism.

Such a plurality can otherwise be challenged in open spaces of political participation, where divergent opinions could generate conflicts. Traditionally politics was considered as something that would attract the older respondents. Data from the Pew Internet Survey of online communities (2001) shows interesting results as regards youth, traditionally a non-political group. Youngsters are indeed slightly more likely to be in contact with political groups or organizations online than other age groups (Gibson, Römmele & Ward, 2004: p. 4-5).

The ability of the internet and the ICT to meaningfully affect democratic governance, however, depends on the ability of the governments to devise and implement appropriate policies for citizen's participation. This point is further emphasized by Bill Dutton who while contending that 'digital government can enhance or erode democratic processes', argues that this will depend not only on the use of latest technology, but also on 'policy choices, management strategies and cultural responses' (Dutton, 1999). A further aspect of ICT in politics is that it has lowered the cost of communication between the government and citizens and revitalized the representative system by opening up channels to those who traditionally were not allowed to participate or had constraints of leaving their homes. Among the many other advantages of e-government are enhanced efficiency and competence, saving of time resources, improved communication and coordination between governments and businesses and citizens, public facilitation through online access to services, greater transparency and more accountability (Joseph, September 2015).

Some scholars consider information and communication technology as an essential requisite for freedom. As such connectivity is indispensable for democracy and democratization of IT is adulated in the press. The ends for which IT is used and citizens' access to it will determine the influence of technologies in democracy and politics in the real sense (Wilhelm. 2000. P. 149). While the use of ICT in governance has certainly altered governments and governance, however, the question about how far such an alteration has promoted democracy remains open to debate. The reasons why the expectation of democracy promotion through e-policies is not bearing fruit is that these reforms may be burdened by pre-existing biases and constraints of history and ideologies and the technology procurement from private firms on limited budgets by states compromises the use and purpose of such hardware (Chadwick and May, 2003: 274). The establishment of direct communication between the executive and the citizens, internet voting and consultations, it is argued may lead to partial erosion of the state; Bimber calls it a direct action-politics dominating the society (Bimber, 1998).

There are several other limitations highlighted in the use of ICT tools in governance. For example, it is argued that digital governance techniques may be more suited to an audience, who are literate and have access to modern gadgets, which not only excludes the disadvantaged and marginalized groups in the society, but also senior citizens, who often are obliged to get help from customer service officers to access essential government services. Internet devices, electronic hard wares, routers, connectivity devices, and the need for regular training, as well as costs incurred on dissemination of IT tools of governance among the public are other prohibitions. Cyber security issues and the resultant trust deficit on applying for online services through divulging essential customer financial information is also significant. The issue of hyper-surveillance of the public by the governments in the guise of e-governance tools is also debatable. And lastly, the government's manipulation of essential data and therefore possibility of fake transparency are important (Joseph, September 2015).

Despite the introduction of ICT measures, the participatory uses of the system are very rare as it has become a one-sided flow of public information to the citizens. E-consultation is also not very common; the Westminster Parliament undertook ten e-consultations between 1998 and 2002 (Gibson, Lusoli, Römmele, & Ward, 2004: 8-9). Another limitation comes from the indifference or lack of response from the members of the parliament to the grievances or concerns of the citizens. Neo-futurists believe that democracy can be made transparent by providing e-mail to all. Politics is made up of clashing values and ideas, desires and preferences and visions of good life. It cannot be made transparent through technology because it involves humans and human ideals tend to change with time (Wilhelm. 2000. P. 153). A significant issue is cyber security of data and information. There is a consensus that the government information primarily leaks on networks, which makes 'information leakage control critical in government network design' (Hassan & Khalifa, June 2016). Anthony G. Wilhelm in his book 'Democracy in the Digital world: Challenges to Political life in Cyberspace' (2000) extensively discusses such e-governance limitations.

The literature on e-government extols its different dimensions for effecting accountability, efficiency and inclusivity in the case of developing countries. In Bangladesh for example, studies report increased transparency, more information provision and smooth access to citizens as a result of the introduction of electronic procurement and monitoring systems in four of its departments. The pace of such initiatives in electronically invited 'tenders' increased rapidly from 3 % in 2012 to 25% in 2013. Similarly, India's example shows that the introduction of Right to Information or the RTI Act allowed citizens to request information from any government authority, thereby helping to reduce corruption and improve transparency in public service delivery (International IDEA, 2016). Further evidence from Sri Lanka also suggests that the UNDP aided introduction of 'Citizen's Charter' provided useful services in electronic grievance redressal mechanisms and news monitoring to enable public officials to listen to citizens views (International IDEA, 2016).

Other compatible evidence is more challenging. In a survey conducted on 1200 government officials across 70 countries on the issue of how digital technology was transforming the public sector operations and service delivery, an overwhelming majority argued about digital interventions having a major impact on the governments, but a clear majority or around three-fourths of the respondents argued that such digital technologies were disrupting the public sector. It is interesting to note that most of these governments where surveys were conducted were in their early stages of this journey. Not to mention the fact that around 70% of the government officials accepted that they lagged behind the private sector in e-service delivery. The study also indicated two drivers for this transformation: cost and budgetary pressures; and citizens' demands (Eggers and Bellman, 2015).

Some of the published literature suggest that ICTs can be effectively utilized to enhance the dissemination of information, ameliorate public service delivery, ensure governmental accountability, and bring inclusiveness in terms of citizens' participation in governance, thereby enhancing the citizens' trust and confidence in the government. It was assumed that the use of information and communication technologies (ICT) in the public sector will enhance efficiency, policy effectiveness and democratic values (OCDE 2003). E- governance is regarded as a form of good management and a step towards the New Public Management process in this information and knowledge society (Tsankova, 2010). For example, Bhatnagar (2014) argues that since governments are the largest providers of information and services to the people, therefore, their

outdated methods of service delivery results in corruption and inefficiency. He suggests that well-designed e-governance projects with process reforms that target enhanced transparency and accountability reduces the discretion vested with civil servants and in turn help enhance efficiency and lower corruption (Bhatnagar, 2014, p 23). As contended by Rana et al., public organizations in democracies are programmed to deliver services to the citizens and the more the level of accountability, the more efficient the public service delivery will be (Rana et al., 2019). ICTs are argued to ensure transparency, particularly, by granting citizens access to crucial policy related information and in this way allowing citizens to keep a check on the government. The ICTs encourage citizens' participation in governance through exchange of knowledge, ideas and experiences between citizens and government. In this capacity, e-governance is an enabler for citizens (UNDESA, 2018, p. 5).

Shim and Eom (2009), identify three traditional approaches to end corruption: administrative reforms such as merit-based hiring and promotions for the department; law enforcement approach of punishing corruption through strict rules; and social change approach by capacity building of citizens to participate in reform movements. In all these approaches, the two things, citizen's access to information and ability to monitor government actions that provide a bulwark against corruption are ensured by the ICTs. However, cultural influence can be a challenge to openness and anti-corruption drives (Carlo Bertot et al., 2010). That is why it is argued that *'ICTs can be used to promote transparency in cultures that have a tradition of government openness and those that do not,'* however effects of ICT intervention on transparency is more evident in countries with a tradition of openness (Carlo Bertot et al., 2010, p 268). '*Transparency in a democratic system enables people to participate more easily in the decision-making process. The institutions can only enjoy greater legitimacy and effectiveness as long as they remain fully accountable to citizens*' (European Parliament, n.d). It was more than a decade ago that Thomas Barnebeck Anderson (2009) talked about the introduction of ICT system in the entire tax department, to reduce contact between the tax collectors and taxpayers. This restructuring aimed at reducing the opportunities for bribes. Similarly, India's online property record system (Bhatnagar, 2003), e-procurement systems in Philippines and Chile, US government websites giving access to data of government expenditure, file tracking system are all examples of how e-government has been used to reduce corruption and promote transparency (Anderson, 2009). To Subhash Bhatnagar (2003) ICT initiatives can reduce corruption and ensure transparency by: providing information on government rules, citizens' rights, government decisions and actions; by monitoring government actions, spending; and evaluating government performance.

## 1.3 Problem Statement

While revolutionary steps in e-governance are being undertaken by the provincial government in Khyber Pakhtunkhwa, there is a need to understand more specifically how such e-governance practices in public management is changing bureaucratic culture and ensuring a more efficient, transparent and inclusive service delivery. There is a further need to analyze in what manner the citizen's trust on government is being impacted through digitized service delivery and how far bureaucratic culture is undergoing change. There is hardly any in-depth academic research focused on how digitalization is impacting public sector performance. For Khyber Pakhtunkhwa, there is a need to do a thorough study on how e-governance reforms are impacting the delivery of public services and which problems are limiting the effectiveness of such ICT tools of governance. Unless bureaucratic adjustments to technology influences are not researched, it will

be difficult to realize the goals of efficient service delivery and grievance redressal, which are the essence of a rational bureaucratic system.

## 1.4 Research Objectives

- To investigate the use of ICT tools by the Khyber Pakhtunkhwa government in education and health.
- To explore the effects of ICT interventions on bureaucratic service delivery in terms of efficiency, transparency and inclusiveness.
- To understand the perceptions of the general public in Khyber Pakhtunkhwa about bureaucratic conduct and service delivery through ICT tools.

## 1.5 Research Questions

1. How are education and health services delivered through ICTs in Khyber Pakhtunkhwa?
2. Are public sector technological interventions making service delivery efficient, transparent, and inclusive?
3. How is bureaucracy impacted with 'organizational and cultural change' brought by ICT usage in the public sector?
4. What are the different issues that hinder e-Government efforts/ initiatives in service delivery?
5. How far does the Khyber Pakhtunkhwa government's digital interventions affect the peoples' trust in government?

## 1.6 Justification

Digitization is perceived to ensure efficiency, accountability, transparency, better public service provision and above all a corruption-free Pakistan. The ICT interventions in Khyber Pakhtunkhwa need to be understood for impacts on responsible, accountable, speedy and inclusive service delivery. Already, International Financial Institutions are emphasizing e-governance tools for improved service delivery; for example, World Bank's report, 'Pakistan@100: Shaping the Future' recommends essential governance reforms to ensure citizen's accountability of service providers through ICT tools and e-procurement for transparency and reduced corruption (World Bank, March 18, 2019). For this, technology holds the key. Health and education are the most essential services, whose transparent provision can improve public perception of the government. Modern economists consider Education and Health as the key to improving human capital and ultimately increasing the economic output of the nation (Almendarez, 2013). Though Pakistan's public health spending of under 2 % of budget is very meager, however, the introduction of e-health initiatives at the tertiary level and basic levels will produce positive outcomes for ensuring a healthy population (Naseem et al., 2014). Similarly, investment in formal education is seen as an investment in human capital, more worthwhile than physical capital (Psacharopoulos & Woodhall, 1985). The main factors that keep children out of school in Pakistan are poverty combined with 'low quality of education, traditional style of teaching and corporal punishment, long distances to schools and high student-teacher ratio' (Aly, Feb 2007, p 36), factors that can be addressed through ICT interventions. Furthermore, ICT interventions are crucial to check

malpractices and ensure that public services are provided efficiently, transparently, and inclusively to all people.

## 1.7 Theoretical Framework

The literature on digital governance outlines two broad approaches for identifying the relationship between technology and society; namely, Technological Determinism and the Social Constructivism/ Social determinism (Winner, 1980; Chadwick, 2006; Johnson & Wetmore, 2009). The technological determinists argue that technology is an autonomous and powerful force, which determines society by producing direct and inalterable social changes. In this argument, technology follows a linear path of progression, uninfluenced and unrestrained by the social and political forces. Secondly, technology compels people and institutions to behave in certain ways (Johnson & Wetmore, 2009, pp. 93-95). In the opinion of Langdon Winner, a Technology's politics is determined by carefully examining its design, history, and use. To him, artifacts have political qualities perceived in their specific design and arrangement, which in turn establishes patterns of power and authority in a society (Winner, 1980). This argument can be extended to understand how ICTs shape and transform government's relationship with the society and that of the society with the government.

Conversely, the social constructivists contend that technology does not follow a natural or logical order of progression, rather it is controlled by man. They maintain that society through interest groups, laws, the economy, political decisions etc. shapes and controls the design, production, and dissemination of technology. Even the users of technology interpret and reinterpret technologies using them for purposes for which they were not designed (Johnson & Wetmore, 2009). Johnson and Wetmore, argue that technology and society are intertwined and simultaneously influence and even constitute each other. Although Winner, Johnson & Wetmore call Technology ``*socio-technical systems*" (Winner, 1980, p123; Johnson & Wetmore, 2009, p 94). However, while Winner believes that modern societies respond to technological imperatives, adapting human ends to technical means; Johnson & Wetmore on the other hand regard technology as '*not simply an assemblage of mechanical and electrical process; rather it is complex systems of people, relationships and artifacts*' (Johnson & Wetmore, 2009, p 94). To them, there are different ways in which technology and society are interwoven. For example: technology can be used by employers to subvert the autonomy of employees; it can reinforce or break down racial classification; and can be associated with lofty goals like equity, security and progress. Therefore, they stress that to draw a line between things to be categorized as "technical" and labeling everything on the other side of the line as "social" is misguided and doomed to fail (Johnson & Wetmore, 2009).

In a similar line of argument, Andrew Chadwick contends that to stick to any of the two assumptions or approaches would be difficult. He asserts that it is too convenient to assume that the effects of technology on society can be understood just by examining its innate properties. Similarly, it is equally problematic to assume that features of technology have no bearing on how it may be used politically. A more balanced position would be to recognize that technologies have political properties, simultaneously placing their use in political context (Chadwick, 2006). Chadwick examines in detail the influence of communication technologies on power, citizen participation, political parties, pressure groups, democracy, public bureaucracies, social movements, internet-enabled citizen activism, community empowerment and global governance.

He also discusses the issues of governance, political apathy, surveillance, privacy and security. Internet technologies are being used by the civil society and the governments simultaneously to posit their point of view. The flow of information is quick and cheap but again is restricted by government surveillances and public apathy (Chadwick, 2006). Like Winner, who believed that some artifacts are inherently political in nature shaping the patterns of power and authority in the society, Chadwick understands new communication technologies as 'political artifacts' which exist in political context. He assumes that the 'politicization of the Net' arises from the nature of the technology itself and it, in part, structures a society's social and political action (Winner, 1980, p 122; Chadwick, 2006, p 20).

In the realm of e-governance, Andrew Chadwick and Cristopher May (2003) identify three models of e-interaction between states and citizens. The three heuristic models of interaction include the *Managerial model*, the *Consultative model* and the *Participative model*. The *Managerial model* is characterized by the provision of information to the public more efficiently through the use of ICTs. The *Consultative model* focuses on communication between citizens and government. particularly, communicating the opinion of citizens to the government directly without involving intermediaries. In the *Participative model*, the citizens are truly active and participate in government affairs. However, this interaction and participation takes place through multiple associations, actors and platforms. Therefore, this is a multi-directional interactive model (Chadwick & May, 2003). The e-governance initiatives by the Khyber Pakhtunkhwa can be understood using Chadwick and May's *'Managerial, Consultative or Participative Model of Interaction*.' It helps us understand how far participative the practice of e-governance in Khyber Pakhtunkhwa is and to what extent it follows the general path of information dissemination alone and discourages an active engagement of citizens in consultation and participation. For example, the facility of citizens' online complaints can hardly be termed 'consultative', as the public can communicate their grievances to department concerned and give feedback on government response to grievance redressal, however, the aspect of citizen's consultation in making and running the different applications remain limited. Therefore, we come to Chadwick and May's argument that democratic interaction is being sidelined by managerialism.

The theory of Critical Realism that emerged in 1970s in UK, with Roy Bhaskar, Margaret Archer and Andrew Sayer and others can also be used as for theoretical understanding of the ICTs in governance. The complexity of how and why things work or do not work in the public sector can fall under the ambit of critical realism. Public service delivery happens in the social reality where things are interconnected. Just as the bureaucracy's actions influences the organizational settings where they work, similarly the manner citizens act affects the social setting where they live. Neither the bureaucracy nor the ordinary citizen lives in isolation; they are part of the organizational or social system where they work or live. Their actions produce social reality. It's the decisions of people which create a social reality (a consensus of attitudes, opinions and beliefs held by the society). Whether they decide to accept and use the technological interventions will create an organizational and social reality. It is not an individual decision but an organizational or social decision which can create a reality. In his essay 'On Authority', Fredrich Engels as early as in 1872, confirmed automatic machinery to be more despotic than the capitalist class (Winner, 1980).

Foucault's 'dispositif' or 'apparatuses' as translated in English denotes the administrative and institutional mechanisms and knowledge structures in the society which either augment or

preserve the exercise of power (O'Farrell, 2021). This argument can be extended to argue that ICTs have tended to preserve the use of power by the bureaucracy by not overturning the processes, such as the hierarchical movement of communications between authorities, of permission, of compliance and of refusal or denial. It only re-enforced the system by providing a ubiquitous access to the use of power. The mechanisms or apparatuses of ICTs possess the power to generate movements by giving an impetus to the values and moralities that are upheld by the political system or the society at large.

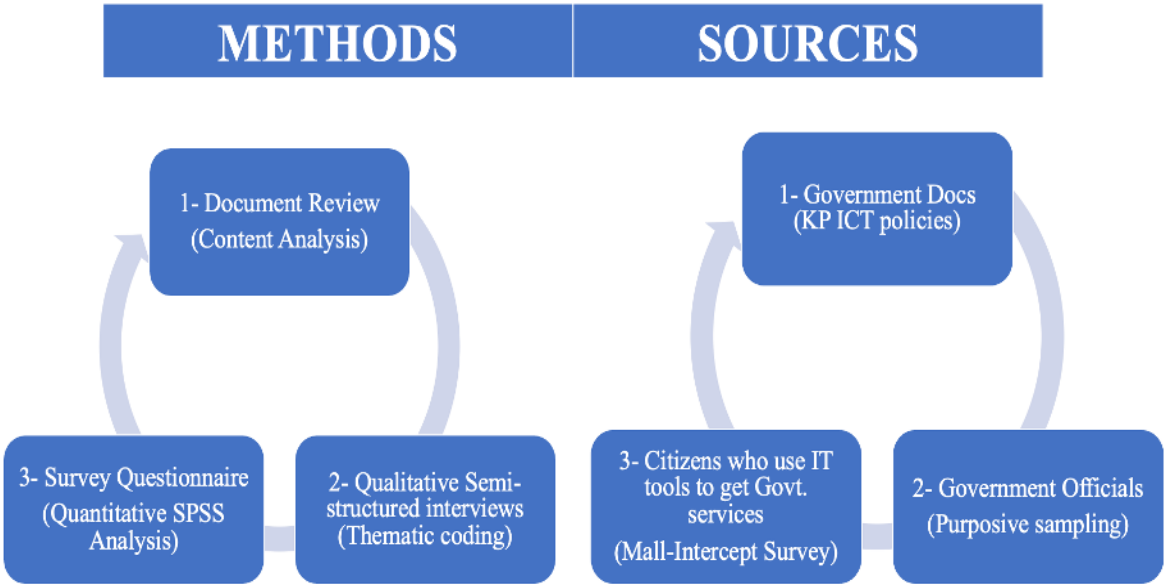
The values of efficiency, transparency and inclusiveness perceived in Khyber Pakhtunkhwa Government's service provision are said to be driven by ICT inventions. Efficiency in service delivery in terms of better management of resources, the quick delivery of services and the provision of quality services are said to be enhanced by the apparatuses of ICTs. Similarly, ICTs are also claimed to enhance transparency in terms of openness of government actions, activities and information to the general public. Justice as the value ethic of government agencies is shown in its principle of inclusivity: the ability to provide services to all regardless of their language, religion, culture, ethnicity, area of habitat, their political affiliations and above all their social condition. An in-depth search for reality as to whose interest these ICT technologies serve and who is excluded or included are critical. Just as Kühn (2019) is worried about the dominant narrative in education technology of finding out and implementing universal technological solutions supported by the inventions of Silicon Valley. He calls these narratives as deterministic in their approach. This deterministic approach encourages forces other than our free will to govern our behavior; the Khyber Pakhtunkhwa government's digital policy narrative about its capacity of transforming the government 'apparatuses', mechanisms and processes, regulating and supervising our actions/ behaviours over which we have no control. Canguilhem 'recognizes the logical primacy of the abnormal over the normal' (Pasquinelli, 2015); adopting his stance, one can say that the manual disposition of work by bureaucracy has become 'abnormal' according to the 21st century reinventing government narrative of David Osborne and Ted Gaebler. So, to bring this 'abnormal' to 'normal', digital interventions are necessary. Digitization hence becomes the new normal; any defiance will be regarded as abnormal. This brings us to what the technological determinists would say that technology compels people and institutions to behave in certain ways (Johnson & Wetmore, 2009).

## 1.8 Methodology

Since the research questions were exploratory and analytical, therefore, the research made use of Mixed Methods of Data collection from qualitative as well as quantitative sources. Mixed Method designs are used because 'the challenges of implementing evidence-based and other innovative practices, treatments, interventions and programs are sufficiently complex' to allow for a single methodological approach to be adequate (Palinkas et al. 2015, pp. 533–544). The research is evidence based and exploratory because it explores the use of various ICT tools by the Khyber Pakhtunkhwa government for service delivery. It is analytical because such ICT interventions are analyzed to understand in what manner and to what extent service delivery is becoming more efficient, transparent and inclusive and whether if any organizational and cultural changes are taking place in the provincial bureaucracy. And by way of extension how far the public's trust in the government is changing with ICT usage. The basic premise behind using MM research design is that combining more than one type of data source provides a fuller understanding of the research problem than a single or mono-method approach (Guest, Greg &

Fleming, Paul, 2015, pp 581-610). This involves multiple research phases and helps enhance the study with a second method (Creswell and Plano Clark, 2011, p. 7-11). Since research methods are like a kaleidoscope revealing different colors and configuration of objects to the researcher (Denzin, 2017, p. 298-342); therefore, a mixed methods approach had been identified for this research as seen in **Figure 1.**

**Figure 1**: Triangulation Mixed Method of Data Collection




Since the research employed Triangulation Design: Multi-level model, the following line of action was adopted:

***LEVEL-1***

In Level-1, secondary data was explored. Besides the published literature, books, journals, reports and newspaper articles, official documents were decoded, including the Khyber Pakhtunkhwa ICT Policies and other related policy outlines. Secondary literature review helped in understanding the key variables and concepts, e-government, efficiency, transparency, inclusivity, bureaucratic culture and the like. Besides information on and knowledge about the working of ICT tools as reported in print and social media and on government websites was also collected. Content analysis of KP Government policies was carried out, such as the Khyber Pakhtunkhwa ICT Policy 2015-16; Khyber Pakhtunkhwa Digital Policy 2018-23; PMRU Good Governance Strategy 2019 and other related policy outlines. Interview Questions were drawn, and survey questionnaires were developed under relevant themes. Sample size and sites were also finalized in education and health. Research assistants were utilized to submit letters and arrange for official permissions to conduct interviews and survey questionnaires. The researcher and her team conducted all the interviews. The survey team consisted of 10 enumerators including the researcher herself.

***LEVEL -2***

In Level-2, primary data was collected through qualitative semi-structured in-depth interviews from official respondents (BPS 17 and above executive officers who were involved in policy making and execution) selected through purposive sampling from two sets of government departments: firstly, from provincial government IT focused departments, including Science and Technology & Information Technology department (ST&IT), Performance Management and Reforms Unit (PMRU), and Khyber Pakhtunkhwa Information Technology Board (KPITB); and secondly from provincial government service providing departments, including education and health. The IT departments generate, facilitate, promote and regulate e-government activities in the different government departments at the provincial level. In education, Elementary and Secondary Education Department (KPESED), Education Monitoring Authority (KPEMA), and Higher Education Department (HED) and in health, Directorate General Health Services, Health Department, Lady Reading Hospital (MTI), Peshawar (Deputy Director IT) and Ayub Teaching Hospital, Abbottabad (Director Hospital & Deputy Director IT) were targeted for interviews. The reason for choosing education and health departments was that most of the key ICT interventions are taking place in these and are highly publicized by the provincial government. These departments are the primary service providers to the people and people's perception and trust on government is most significantly impacted by how these departments perform their functions. The goal of qualitative research is the attainment of saturation. Researchers have suggested different sample sizes. For example, for grounded theory, Morse (1994) suggested 30-50 interviews, and Creswell recommends 20-30 interviews. In phenomenological research, Creswell (1998) suggests 5-25. Under this research, 25 interviews/ FGDs were conducted. All the interviews were audio-recorded with the permission of the respondents except 3; where permission was not provided, the information was recorded through descriptive field notes Analysis and syntheses of the interviews helped find further themes/ patterns that emerged in participants' experiences and connection between the experiences. See **Appendix A** for Education Interview Questions and **Appendix B** for Health interview Questions arranged thematically. The respondents were also given a consent form. See **Appendix C** for the Consent Form). The results of the research will be shared with the participating institutions.

*Table 1: Details of Research Data Collection*

| Data Collection | Education Department | Health Department | IT focused Departments: ST&IT; PMRU; KPITB | Total |
|---|---|---|---|---|
| Interview | 4 | 7 | 3 | 14 |
| FGDs | 6 | 1 | 4 | 11 |
| Survey sites | 8 | 2 | - | 10 |
| Survey respondents | 201 (Approx. 100 each from KPESED & KPHED | 104 | - | 305 |

***LEVEL -3***

In Level-3, Survey Questionnaire was used to collect data from a sample size comprising of 305 respondents. The rationale for choosing a 300 sized sample was to represent in equal numbers the end users from secondary level education (schools), higher level education (colleges) and major tertiary hospitals. The aim was not only to understand the penetration of ICT tools among end users, i.e., students and patients, but to know how far service generation through ICTs had increased citizen's trust in the provincial government. The standard method for learning public perception and thinking is survey research (Morgan, 1997). The Survey contained questions on respondent's demographics, availability and access to digital devices, internet, electricity, etc., and a likert scale section to understand impacts of ICT tools. This survey was uploaded Kobo Toolbox, data generated was processed through SPSS software and generalizations were derived. See **Appendix D** for Education Survey Questionnaire and **Appendix E** for Health Survey Questionnaire.

Since the research focused on performance and service delivery through ICTs in 2 critical government departments, therefore the site selections were made keeping in view these service providing departments. Two major districts of Khyber Pakhtunkhwa, including Peshawar district and Abbottabad district were chosen for data collection. In education, total 8 institutions representing secondary and higher secondary (4) and college education (4) were selected from Peshawar and Abbottabad that had the highest enrolments of students. Out of these, 2 were boys and 2 were girls institutes. Around 25 respondents were chosen from each of the 8 survey sites, bringing the number of total respondents to around 200. Systematic random sampling techniques were adopted to select respondents in schools and colleges. See **Appendix F** for education survey sites.

In health, one tertiary hospital in Peshawar- Lady Reading Hospital Medical Teaching Institute (MTI) and one in Abbottabad- Ayub Teaching Hospital (ATH) were targeted. Both these hospitals were chosen because of the fact that these provide health care to thousands of patients daily. A total of 100 surveys were conducted from these two hospitals: 50 from each hospital site. The survey respondents in the hospital were primarily either patients or their relatives who accompanied them to hospitals for seeking medical attention. See **Appendix F** for health survey sites. The non-probability convenience sampling was adopted for hospitals because it was more appropriate for mall-intercept survey methods (Malhothra, 2010, p 377) and it has also been used by researchers working on the public perception of service delivery by governmental departments (Moletsane, 2012).

Permission request letters for data collection were issued by the Department of Political Science, University of Peshawar to the concerned departments/ organizations to facilitate the researcher/ research assistants with the scheduled interviews and survey questionnaire. Several visits were made to the concerned departments to dispatch letters, get receiving letters, undertake follow up visits to seek permissions and conduct interviews. Some officials couldn't be reached despite several visits to their offices. Separate letters were sent to the departments asking for permission to conduct surveys which was also a time-consuming process. All the related protocols were followed while conducting interviews and surveys.

## 1.9 Pre-Empirical Conceptual Framework

The survey aimed to study the relationship between 'digital Transformation of the public sector' and 'improved service delivery' on one hand and 'citizens' perception and trust' on the other. The variables under this study included:

Independent Variable:

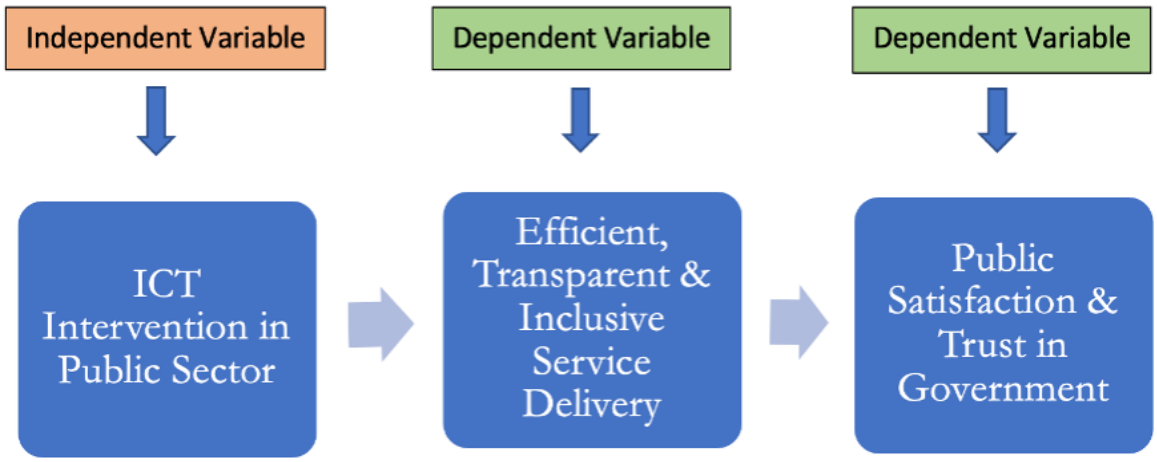
- ICT interventions in service delivery

Dependent Variables:

- Improved performance of the public sector (efficiency, transparency, inclusiveness)
- Citizen perception and trust

The type of causal relationship indicated in the research is that of causal chains – one cause triggers an effect, which triggers another effect. See **Figure 2** below.

*Figure 2: Pre-Empirical Conceptual Framework of Causal Chain*




## 1.10 Operationalization of Terms

***Transforming/Transformation***

The terms 'transforming' or 'transformation' for the purpose of this paper is understood as 'digital transformations,' which includes not only the various ICT interventions in public service delivery, but also the changes that result from such initiatives in the organizational practices, processes, skills, approaches, capacities and culture (work environment) of the bureaucracy in Khyber Pakhtunkhwa. Hess et al (2016) identify 4 dimensions of 'digital transformation,' including: use of technology to enhance a company's capabilities; value creation by digital transformation; structural changes in organization in terms of skills needed to exploit new technology, improved processes, new approaches in terms of collaboration with new actors, competitors and customers; and changes in the financial capability of the organization. Hence, the paper uses the term 'transforming' in the context of 'digital transformations' or as Thomas Hass et al., (2016, p. 3), term 'digitalization.'

### *Efficiency*

We follow Herbert Simon's (1997), understanding of efficiency as getting the most for least or achieving the desired objective for the lowest costs; he argues that such efficiency come primarily from correct administrative decisions. In economics and organizational analysis, efficiency is a measure of the input a system requires to achieve a specified output; a system that uses few resources to achieve its goals is efficient, in contrast to one that wastes much of its input (Grossman, 2019). To Ridley and Simon (1938), it is the function of the administrator 'to maximize the attainment of the governmental objectives… by the efficient employment of the limited resources that are available' (Ridley and Simon, 1938, p. 22). For the purpose of this research, a dynamic digital transformation in the public sector is understood to create 'efficiency' in terms of first, better coordination, connectivity and teamwork in processes and practices; second, optimized decision making (clear objectives); third, citizen-centric services (serving the people); fourth, value addition, (by introducing new services or improving the old ones); and last, resource efficiency (minimum input versus maximum output ratio).

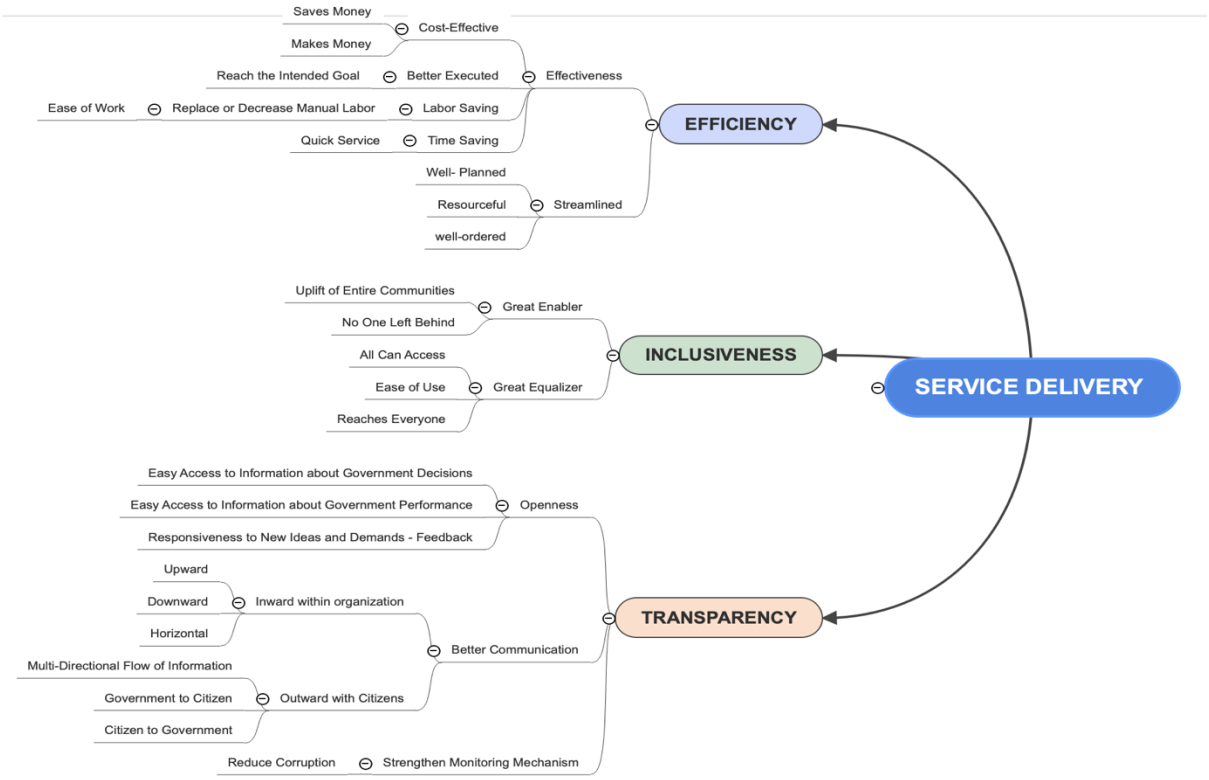
### *Inclusiveness/ Inclusivity*

This research understands 'inclusiveness' as 'inclusive service delivery' through e-government initiatives. Basic public services, such as security, health, education, water and sanitation, sound infrastructure and utilities important for improving the quality of life (UN DESA, 2018) should be available to all, leaving no one behind. However, there may exist a negative correlation between digital use and social exclusion; online access enables 'e-inclusion,' but there is also the risk of digital divide, when sections of population face social exclusion because of lack of devices or insufficient net access (UN DESA, 2018). UN e-Government knowledge database considers e-participation of citizens as a cornerstone of socially inclusive governance. Inclusive e-participation initiatives have 3 goals: to improve citizens access to information and public services (E-information sharing); to promote citizens participation in public decision making, enabling citizens to co-design policy options and co-produce service components and delivery modalities (E-decision making); and to interact with stakeholders and engage citizens in deliberations on public services and policies (E-consultation) (UN e-participation Index, n.d.).

### *Transparency/ Accountability*

ICTs can improve transparency by providing access to information, which also increases accountability and makes it possible to co-create public services and collaborate on evidence-based decision and policymaking, both across the silos of national government as well as across borders (UN DESA, 2018, P 5). According to K. M. Lord (2006), transparent governments produce more information and share much of the information. For the purpose of this research, transparency means three things: the public servants should follow rules and regulations while making and enforcing decisions; people who are affected by government decisions and actions should have access to information, especially for grievance redressal; information should be available in an easy and comprehensible manner through accessible media (UNESCAP, n.d). (See **Figure 3** for Mind Map on Efficiency, Transparency & Inclusiveness)

*Figure 3: Mind Map on Efficiency, Transparency & Inclusiveness in Service Delivery*



# CHANGING THE FACE OF PUBLIC SERVICE DELIVERY IN KHYBER PAKHTUNKHWA: DIGITIZATION OF EDUCATION

## 2.1 Introduction

'Bring change through education' is the motto of the Pakistan Tehreek-e-Insaf (PTI) government in Khyber Pakhtunkhwa. In the general elections of 2013, the Pakistan Tehreek-i-Insaaf's (PTI) election campaign was driven by slogans of 'inclusive and equitable education for all;' resultantly, an 'education emergency' was declared in the hwa province when the PTI party was voted to power. This led to emphasis on fresh educational reforms, digital education being one of them. The set of educational reforms that the PTI government focused included: teacher recruitment through the National Testing Service (NTS) system; change in textbooks of schools; transformation of the examination system; teacher's promotion centered on seniority; and the reconstruction of schools (Fazal et al., 2014). In 2018, the PTI formed a second government in the province and set out its educational reforms in the official 'Education Blueprint 2018-2023' document, which presents a comprehensive 5-year blueprint for education in the Khyber Pakhtunkhwa. This blueprint envisages an education system which is fair and provides equal opportunity to enable every child to achieve their full potential regardless of their economic status, gender, location or disability; thereby creating a fairer society (Education Blueprint 2018-2023, KPESED).

The Education Department of the Khyber Pakhtunkhwa government was divided in July 2021 into two separate departments: the Elementary and Secondary Education Department (KPE&SED) and the Higher Education Department (KPHED) that deal with school and college level education respectively (GoKP Higher Education Department, n.d.).

## 2.2 The Khyber Pakhtunkhwa Elementary and Secondary Education Department (KPESED) and the Higher Education Department (KPHED)

The KPESED (ese.kp.gov.pk) Logo, *Ta'aleem- sab key leay*, (Education for all) represents the Khyber Pakhtunkhwa government's priority of extending education to all groups and regions in the province. Within the KPESED, there are additional connected institutions tasked with different responsibilities in the field of school education in the province. For example, the Education Monitoring Authority (KPEMA), the Education Sector Reforms Unit (ESRU) and the Private Schools Regulatory Authority (KPPSRA). See **Appendix U** for information on Additional Institutions Connected with the KPE&SED. The KPESED is responsible for Primary (15539), Middle (2089), High (1693) and Higher Secondary (513) schools. See **Appendix W** for KPESED School System.

KPHED also called the Higher Education, Archives and Libraries Department is composed of three attached departments: Directorate of Higher Education (dhe.gov.pk; website not furnished with any detail); Directorate of Archives and Libraries (kpdal.gov.pk); and Higher Education Teachers Training Academy (HETTA) (no separate website). Other allied institutions, besides DoHE and HETTA, include Project Management Unit, Higher Education Regulatory Authority (HERA), Educational Testing and Evaluation Agency (ETEA), Frontier Education Foundation (FEF), and Employee Education Foundation (EEF) (HED GoKP, c, n.d). The HED website (hed.gov.kp.pk) mentions provision of 'affordable quality education' and 'transferring of skills' through 'market-

oriented courses' to 'develop knowledge-based economy' as the purpose behind its establishment (HED GoKP. a, n.d.). See **Appendix V** for Additional Institutions Connected with KPHED. Around 189 colleges, employing more than 5531 teaching staff with around 164,886 students are managed and controlled by the HED (HED GoKP. a, n.d.). See **Appendix X** for KPHED College figures.

## 2.3 Is Technology the Silver Bullet for Education?' Findings and Discussions from the Field

The following analysis draws on findings generated from the service providers end, i.e., the education department officials, as well as the end user's perspective, i.e the public on how digital initiatives are improving efficiency, transparency and inclusivity/ accessibility in service delivery. The service provider's perspective is drawn from data generated from interviews conducted with officials from both the above-mentioned Education Departments and their affiliated institutions. The end user, i.e public perception about ICTs and impacts on services is based on data from quantitative survey questionnaires collected from students at leading public schools and colleges in Peshawar and Abbottabad districts. Secondary data sources are utilized to complement or contest the claims generated from primary data sources.

***ICTs and Provincial Government's Digital Vision in Education***

All the respondents from the two Education Departments of KPE&SED and the KPHED underscored the importance of ICTs in education in the light of the necessities of current times (A. Khan, personal interview, July 5, 2021; S. M. Khan, personal interview, July 14, 2021; A. A. Khan, personal interview, July 14, 2021). Generally speaking, the officials expressed confidence in the current provincial government possessing enough enthusiasm and innovation to bring ICT related changes in service delivery, including education (S. I. Hussain, M. Nasir & M. Ghufran, FGD, July 15, 2021; A. A. Khan, personal interview, July 14, 2021; S. Hussain & W. Khan, FGD, July 14, 2021; S. M. Khan, personal interview, July 14, 2021). To quote the Director Education Management Information System (EMIS) in KPE&SED, 'IT intervention is the first priority of this [PTI] government, especially our Minister [E&SE] and our secretary [E&SE] are highly committed to it' (S. M. Khan, Personal interview, July 14, 2021). Most of them also highlighted the impetus provided by the Corona pandemic for giving a push to government efforts for digitizing the education sector in Khyber Pakhtunkhwa (S. M. Khan, Personal interview, July 14, 2021; A. A. Khan, personal interview, July 14, 2021; Sohail, personal interview, July 30, 2021). A former secretary of E&SE as well as HED, citing Chitral and Kohistan emphasized that IT in education was highly needed in their province where geographical terrain and sparse population in the mountainous regions made it difficult for the government to establish schools in far flung areas (A. Khan, personal interview, July 5, 2021). The Minister for Higher Education, Mr. Kamran Bangash also declares online that the 'adoption of e-government technology is a step towards good governance capabilities of public organizations' (HED GoKP, n.d.). See **Figure 4** for KPESED & KPHED Digital Initiatives. (see Appendix G for The KP Government ICT policy 2015-16; KP Digital Policy 2018-2023; and Good Governance Strategy (PMRU 2019)).

*Figure 4: Digital Initiatives introduced by KPESED & KPHED*

**Khyber Pakhtunkhwa Elementary & Secondary Department**

- Smart Boards
- NTS testings for Recruitment of Teachers
- Google Play Applications
- Biometric Attendance System
- Teachers Trainings
- Digital Learning Programs
  - KP Learning Portal
  - Learn Today: Lead Tommorrow
  - Taleem Ghar
  - Learn Smart Pakistan
  - Virtual Teacher Question & Answer Forum
- IT Labs in Schools
- Installation of Security Cameras at school gates

KPESED Digital Initiatives

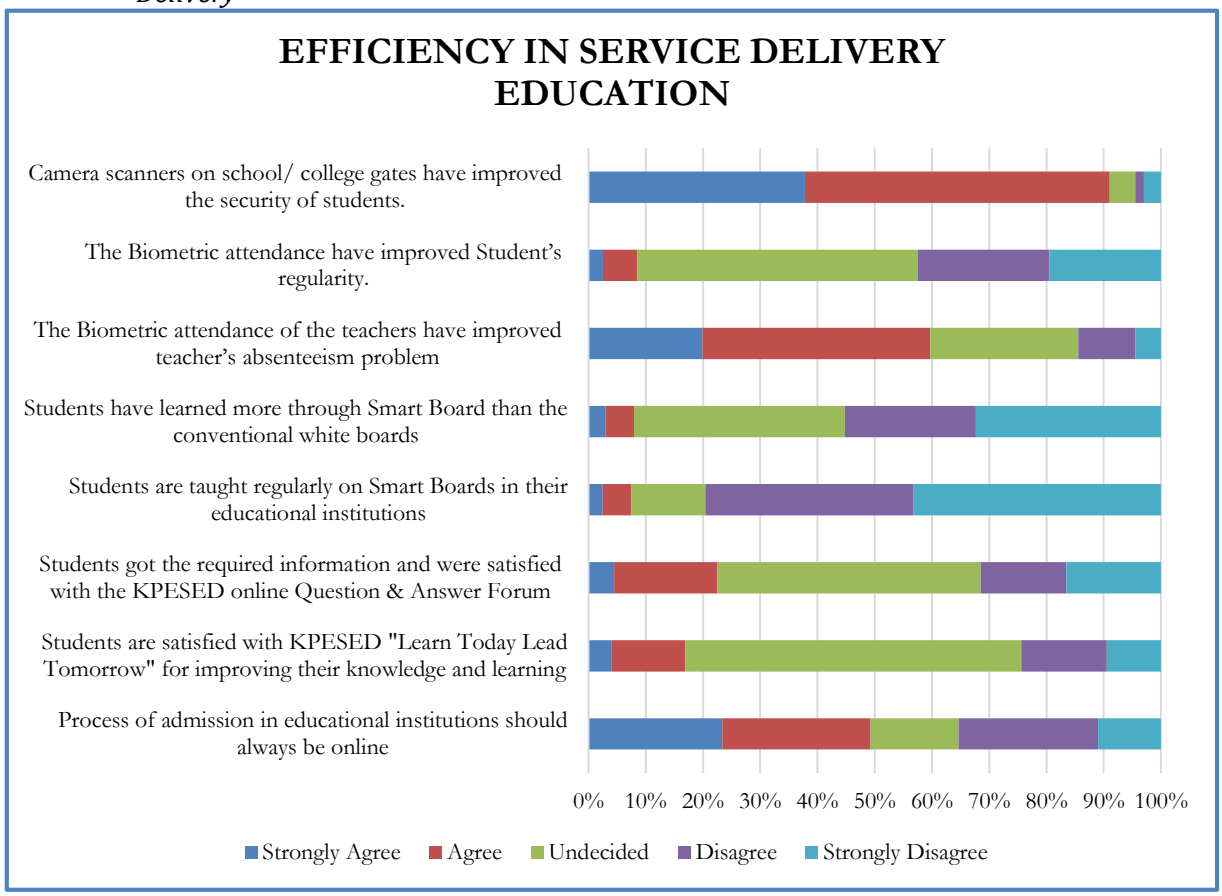
**Khyber Pakhtunkhwa Higher Education Department**

- HEMIS
- Learning Management System
- Digitization of all Colleges Data
- Biometric Attendance System
- Introduction of e-Office in HED
- File Tracking System
- Online College Admission
- Hawwa ki Beti App
- Installation of security cameras outside classrooms
- Online Teachers Trainings
- HRMS
- NTS for Recruitment of Teachers
- Digital Library

KPHED Digital Initiatives

***Efficiency, ICT Tools and Service Delivery in Education***

*Figure 5: Figure 5 Show Survey Outcomes of Likert scale statements on ICTs and Efficiency in Service Delivery*




ICTs, it is claimed by education officials, have improved the standard of education in government schools (K. A. Afridi, personal interview, July 30, 2021; S. M. Khan, personal interview, July 14, 2021); the Secretary HED termin the digitization programme as primarily an 'efficiency programme' (D. Khan, personal interview, July 30, 2021) and 'efficiency interventions' which reduce human interventions and avoids human discretion in official working, ensuring quick disposal of work (D. Khan, personal interview, July 30, 2021). To officials, improvement in organizational efficiency through ICTs is seen as sharing of official data on WhatsApp, which helped the officials connect and share timely information with each other. Such official correspondence and coordination were even taking place in off timings too, as the Secretaries message beforehand to subordinates to prepare presentations and share information even on a day's notice (J. Iqbal and T. Khan, FGD, August 8, 2021); arguing it to be a *'very good management tool'* (J. Iqbal and T. Khan, FGD, August 8, 2021). Besides WhatsApp, the emails are also seen as a swift ICT communication medium for sharing official dispatches (A. A. Khan, personal interview, July 14, 2021).

***The Smart Board Challenge***

On inquiry about important digitization projects in government schools, the KPE&SE department officials spoke enthusiastically about the **'One Screen' project** [an Interactive white board also

termed the Smart Board Technology-ISBT], under which as reported most of the subject contents in higher secondary schools were placed on a digital platform accessible to teachers and students alike (S. Hussain, & W. Khan, FGD, July 14, 2021; S. M. Khan, Personal interview, July 14, 2021; A. A. Khan, personal interview, July 14, 2021). The EMIS officials reported on providing at least a three-time training to teachers in the schools where smart boards were installed (S. Hussain, & W. Khan, FGD, July 14, 2021). *'This one screen is a digital screen which includes all our learning materials, for example [previously] a compass was used on the [black] board while teaching the students which was difficult to teach on the board, but now with digital tools and software it is easier to teach children. The contents of all the subjects such as chemistry and physics are being kept there [smart board]. The department has also developed some content which is kept in the laptop and shown on a big screen. So, it is a touch screen which is used by the teacher for teaching'* (S. Hussain, & W. Khan, FGD, July 14, 2021).[1] Though, the total number of schools which were provided smart board facilities is difficult to ascertain, however, more importantly and on a downside, the 2016 DAWN report (Ashfaq, September 5, 2016) cited around 70 % of such white boards not being used by the teachers. The reasons cited were that the technology being new did not arouse the interest of the teachers and a limited two-day training could not give them enough expertise or enthusiasm to handle such boards for undertaking successful teaching. However, those who were able to use it successfully cited much convenience in teaching in comparison with the traditional methods (Ashfaq, September 5, 2016).

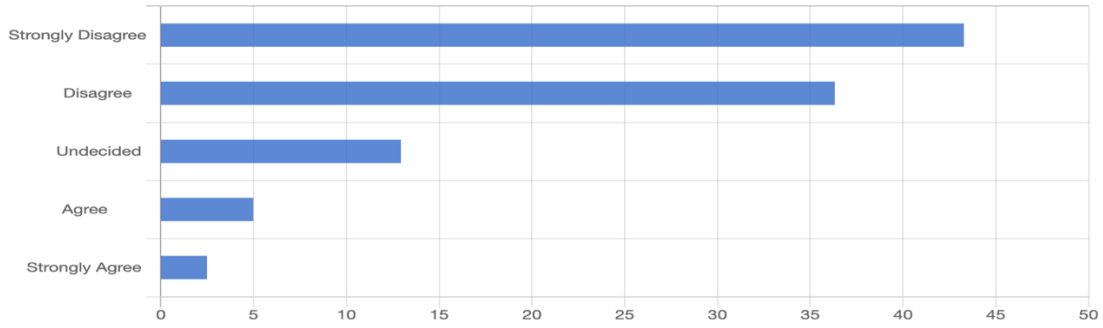
In the surveys, when students were asked if they if smart boards were regularly used to teach them, a staggering 79.6% of the students held that they were not taught regularly on smart boards, whereas around only 8 % answered in positive (See figure 6). When students were probed if smart boards were used to provide them online lectures from outside the school/ college, 66.17% were negative and only 10% of the students answered in affirmative.

[1] In the Abbottabad girls school, a big Smart TV wired to a desk top computer hung on the computer lab wall, which was referred to as smart board. During the few hours the survey team spent in the school, it was observed that there was no electricity. The teacher casually stating that it was a routine thing that school was without electricity for many hours on daily basis.

*Figure 6: Students response on regular use of Smart Boards in Class*

11. We have been taught on smart board regularly in our educational institutions.

TYPE: "SELECT_ONE". 201 out of 201 respondents answered this question. (0 were without data.)



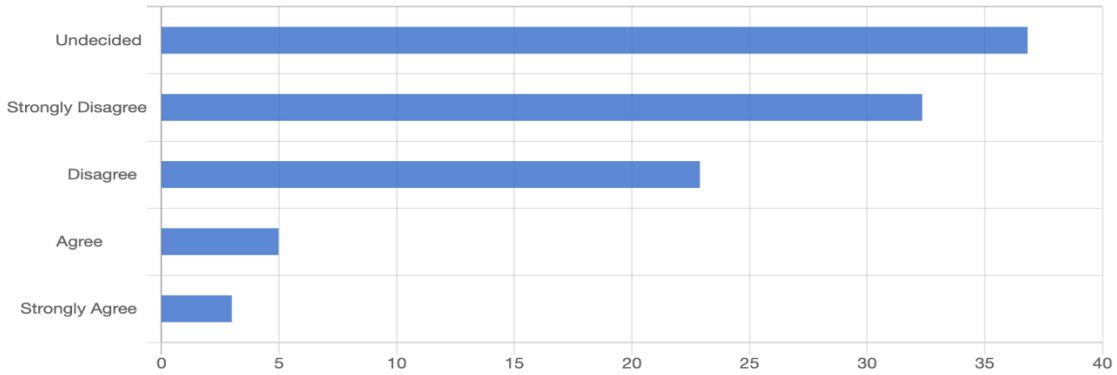

| Value | Frequency | Percentage |
|---|---|---|
| Strongly Disagree | 87 | 43.28 |
| Disagree | 73 | 36.32 |
| Undecided | 26 | 12.94 |
| Agree | 10 | 4.98 |
| Strongly Agree | 5 | 2.49 |

It is perhaps because of the less usage of smart board that a majority of students (55. 23%) believed that conventional white boards were better and that they understood the lecture better when the teachers used white boards; only a small number of students (7%) presumed that they would learn more through smart boards. 37% of the students remained undecided as they said they were never taught on smart boards, so they were unaware of the benefits of smart boards.

*Figure 7: Students response on Smart Boards being better than conventional White Boards*

12. I have learned more through smart board than the conventional white board.

TYPE: "SELECT_ONE". 201 out of 201 respondents answered this question. (0 were without data.)




| Value | Frequency | Percentage |
|---|---|---|
| Undecided | 74 | 36.82 |
| Strongly Disagree | 65 | 32.34 |
| Disagree | 46 | 22.89 |
| Agree | 10 | 4.98 |
| Strongly Agree | 6 | 2.99 |

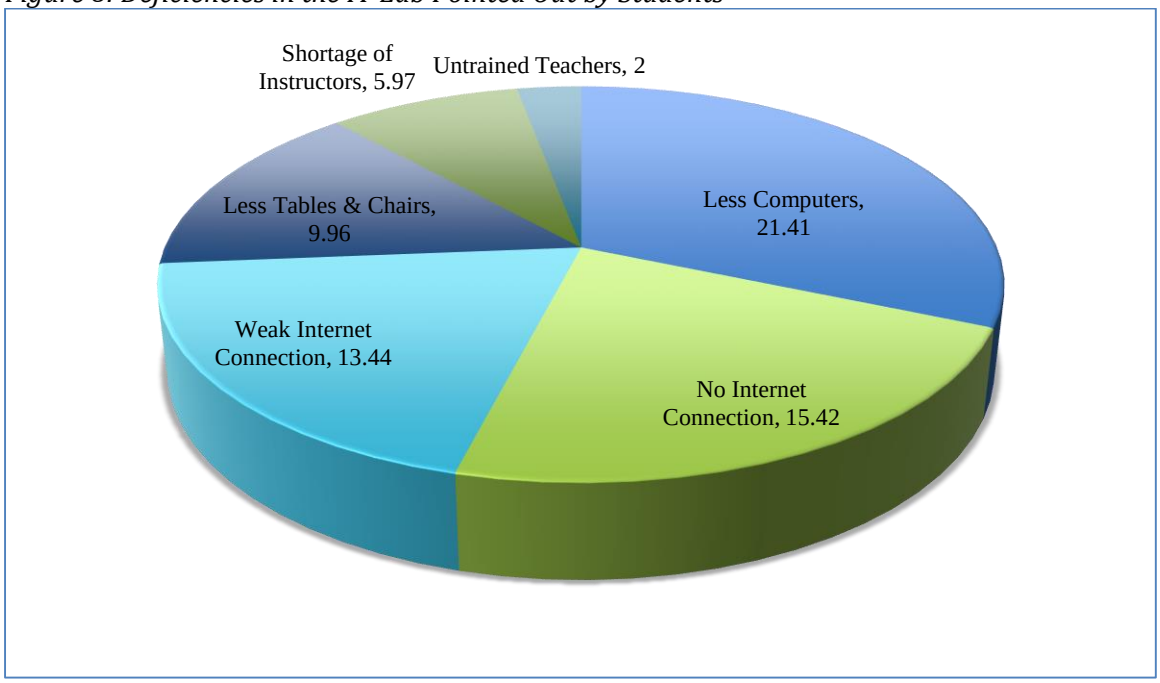
### *Computer/ IT labs*

Another important development towards e-education as reported in interviews was the introduction of **computer/ IT labs** in up to 60 to 70 % of the higher secondary schools in Khyber Pakhtunkhwa, where computer literacy was imparted to the students (S. Hussain, & W. Khan, FGD, July 14, 2021; A. A. Khan, personal interview, July 14, 2021). Establishment of 1700 plus IT labs with a total cost of PKR 5 billion was the biggest ICT project for the Khyber Pakhtunkhwa schools (A. Khan, personal interview, July 5, 2021). In the words of director EMIS, *'You need to know that there are 1400 + IT Labs (working) and this year there is a project to provide 1400 more to (schools) in merged districts'* (S. M. Khan, personal interview, July 14, 2021). The IT labs are also connected to the internet, but children are not allowed to use them outside of teacher supervision… *'The students use the computers and internet under the teacher's supervision, when he gives them a topic for lesson preparation'* (S. Hussain, & W. Khan, FGD, July 14, 2021).

All schools with IT Labs were also provided with **qualified IT teachers** called computer teacher (SS-Grade 17) and computer lab in-charge. The establishment of IT labs and recruitment of IT teachers is regarded as a major achievement with some divulging that the current IT teaching staff in schools was mostly composed of MS, Mphil and Ph.d., level teachers (Sohail, personal interview, July 30, 2021). The Director HEMIS also mentioned launching **Computer labs and English Language Labs (492 labs)** in 303 colleges for which the HED received $60,000 from the CSR (Corporate Social Responsibility) (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). The **'digital library'** in colleges connected with the HEC digital library provided college students access to soft copies of books, journals and other reading material (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021).

According to the survey results, a little above half of the students (51%) thought their school/ college Computer laboratory to be fully equipped. While 5% of them were not aware of the existence of any IT lab, 39% of the students reported their school/college computer lab was not fully equipped. When asked about the deficiencies in the computer lab, majority (21.41%) complained of not having sufficient number of computers. Other deficiencies pointed out by the students included: no internet connection (15.42%); weak internet connection (13.44%); lack of tables and chairs (9.96%); and shortage of instructors (5.97%) with only 2% complaining about untrained teachers. Several students had either no idea about it (don't know) or had never visited or seen the computer lab as (for some) it was not their subject, so they didn't bother to look for it, such as the humanities/ science / pre-medical students. In Khyber Pakhtunkhwa schools, Computer was not a compulsory but optional subject left to the choice of students to choose from among Arabic, Pushto and other languages.

*Figure 8: Deficiencies in the IT Lab Pointed Out by Students*



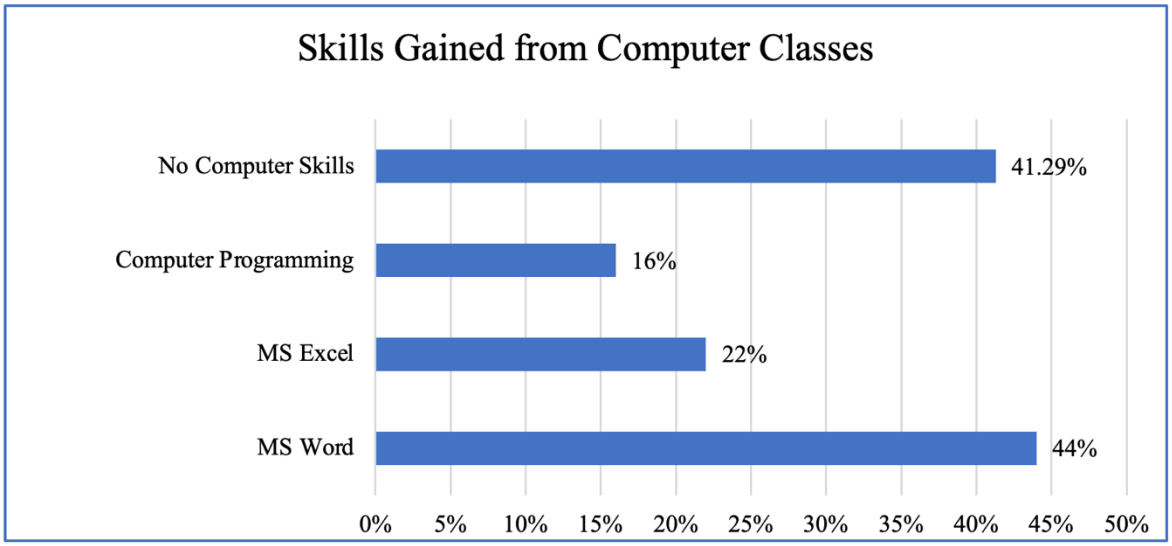

***Computer Programming and IT Essentials Initiative***

In the area of **computer programming courses** for public school children, an IT based computer programming initiative, **'Early age Programming and IT Essentials Initiative'** was launched by the Khyber Pakhtunkhwa Information and Technology Board (KPITB), in partnership with the KPESED. The program aimed at training the young generation in new trends of technology. Under this programme, grade 7 and 9 students at government schools are taught coding in the already established IT labs by their respective IT teachers also trained in coding. This project involved 20 trainers and was launched across 60 public sector schools in 14 Districts in Khyber Pakhtunkhwa; over 3,000 students learned programming and coding skills across the province in Phase I (Syed, December 29, 2017). (**see Appendix Y for Early Age Programming and IT Essentials Initiative' KPE&SED).** Children when exposed to computer programming/coding and software developing at young age, they learn quickly and are able to even compete internationally such as a 13-year-old boy of Government High School, Labar Kot, Mansehra, who won the first merit award for his computer game duck at the Asia Pacific ICT Alliance (APICTA) competition in Ha Long, Vietnam (TNN, November 25, 2019). **The 'Early age Programming and IT Essentials**

**Initiative'** falls under the Digital skills pillar of the 'Khyber Pakhtunkhwa Digital Strategy' and is praised by the KPITB website to have 'produced remarkable results' with the computer literacy and digital skill level of the marginalized students at government schools being improved significantly.' However, a click on the 'list of school' section shows that the URL is not available (GoKP, KPITB Early Age Programming, n.d.).

The survey result shows that around more than half of the students (58%) spoke of receiving some sort of computer classes at public schools/ colleges. Around 36% said to have received computer classes once a week. For those who learnt the computer skills, these included: MS Word (44%), Excel (22%), computer programming (16%) etc. However, an alarming number of students (41.29%) stated that they learned no skills, which supports the earlier figures of less meaningful exposure to computer literacy in schools and colleges. (See **Figure 9** below)

*Figure 9: Students Response to Skills Gained in Computer Classes*




***Digital/ E- Learning Programs***

For the KPESED run public schools, its website contains a digital learning platform, **'KP Learning Portal,'** which enables students to use digital materials to enhance their knowledge; teachers and parents can also access this portal. The around 287 animated videos dubbed in Urdu and 217 in Pashto for students of Grade 1-10 mostly cover topics related to Math, General Knowledge and Sciences (KPE&SE Department GoKP, n.d). The KPE&SED website further provides Grade 1-8 students an access to digital lessons through access to digital contents of **cable TV 'Taleem Ghar,'** which is run by the Schools Education Department of Government of Punjab. The officials said of this programme that the practice of borrowing videos from the Punjab government ran the problem of contents being different because of syllabus differences between the two provinces (S. Hussain, & W. Khan, FGD, July 14, 2021).

Another learning web portal on the KPE&SED website, **'Learn Smart Pakistan,'** classified as Pakistan's biggest gamified cloud learning platform includes 'curriculum-based learning material,' where more than 200000 students from Grade 6-10 are supposedly learning English, Sciences and Math. This knowledge platform has also partnered with telecom company JAZZ, providing a high-speed internet bundle at a very affordable price (Learn Smart Pakistan, KPESED, 2021). However, the officials had scanty information about it, except that it was an old initiative

which was launched probably under former education secretary Nadeem Aslam Chaudhry who being a tech visionary initiated many e-education programmes during Corona times (S. Hussain, & W. Khan, FGD, July 14, 2021).

The KPE&SE department has also launched a **'Virtual Teacher Question Answer Forum'** on Google Play Store, which claims to increase conceptual knowledge of students in the science and math subjects. Questions are put to be answered by technical experts on different subjects on the website (PSRA Department GoKP, n.d). This initiative as reported by the officials had been launched in the first phase of Covid-19 emergency and the KPE&SED secretary (Nadeem Aslam Chaudhry) thought of initiating a question/ answer forum on the pattern of Quora.com; a panel of 6 teachers was trained to handle the site (S. Hussain, & W. Khan, FGD, July 14, 2021).

The KPESED also ran a YouTube channel; a visit to the **'KPE&SE YouTube Channel: Learn Today, Lead Tomorrow'** (August 2020) channel shows that this was forced out of operation by the YouTube because of copyright of music that was used in these videos.[2] The officials interviewed from KPESED claimed that they were working on settling that issue to make the YouTube channel operational as soon as possible. It was also claimed that the Khyber Pakhtunkhwa government was developing a studio to help create teaching and tutorial contents with the help of teachers to resolve the issue of copyright material; it was as yet on paper only (S. Hussain, & W. Khan, FGD, July 14, 2021).

The EMIS officials also reported that the attempts by the KPESED to collaborate with private TV channels and radio station to provide educational content could not be materialized (S. Hussain, & W. Khan, FGD, July 14, 2021). It seems most of such initiatives were driven by the emergency under Covid and since these had to be undertaken from scratch, therefore some of such initiatives despite official interest could not materialize and especially for a longer period of time (S. Hussain, & W. Khan, FGD, July 14, 2021).

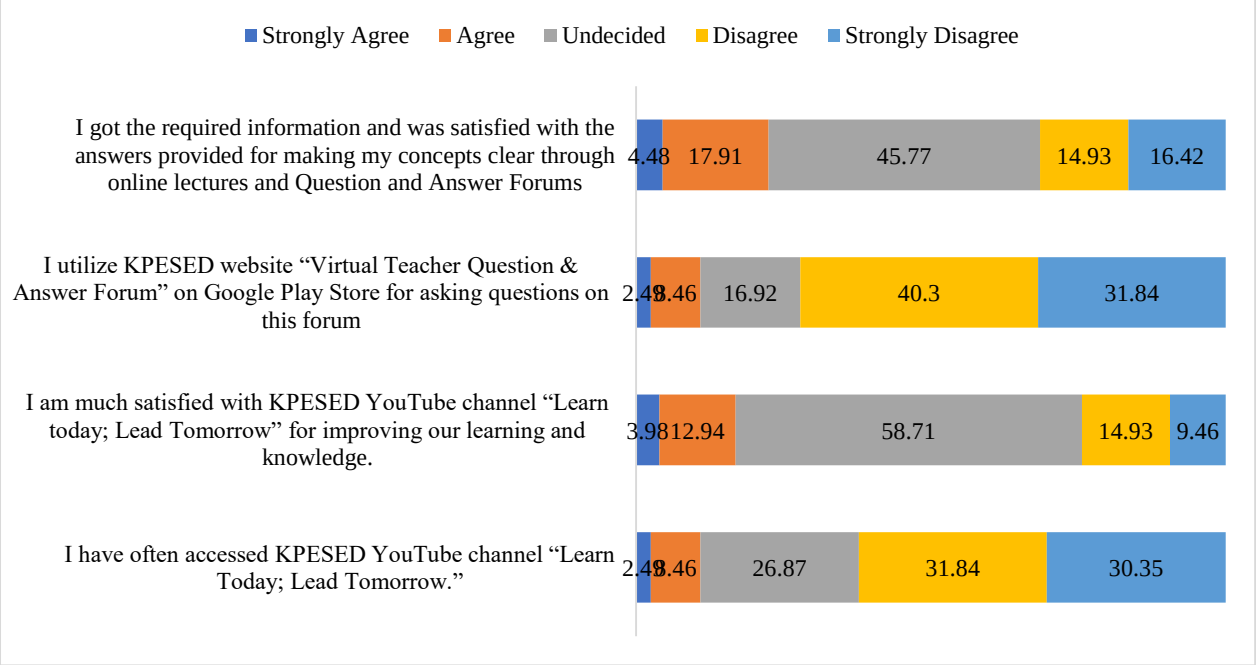
The E&SED developed and launched a number of apps on google play in the 2020s by different names, including **Books App, Virtual Teacher, HRIS, SQMI, e-Transfer etc.** Most of the apps had low app rating with complaints of the app not working properly, too sluggish, time-consuming, non-user interface etc. (See **Appendix Z** Information on Different Apps Launched by KPE&SED).

The results of surveys show that there was generally speaking a lack of awareness about the about the online digital/ e-education programmes among a majority of students (Figure 10). The education departments need a vigorous web presence as majority of students (55.72%) stated to have never visited the Khyber Pakhtunkhwa Education Departments websites (KPESED and KPHED) for any kind of information. Additionally, around 28.86 percent of students reported their ignorance about these online digital education programs. Though, the officials claimed these forums to be successfully imparting knowledge and improved learning experience. However, majority of the students reported otherwise. While a majority (62.12%) had never accessed the KPE&SED YouTube channel "Learn Today; Lead Tomorrow" and stated that they were unaware

[2] The click on the webpage redirects to the YouTube page where it is mentioned that this account was terminated because of multiple third-party claims of copyright infringement regarding material on the website. See (https://www.youtube.com/channel/UCiHheDKhebGDZv51eGEjGbQ).

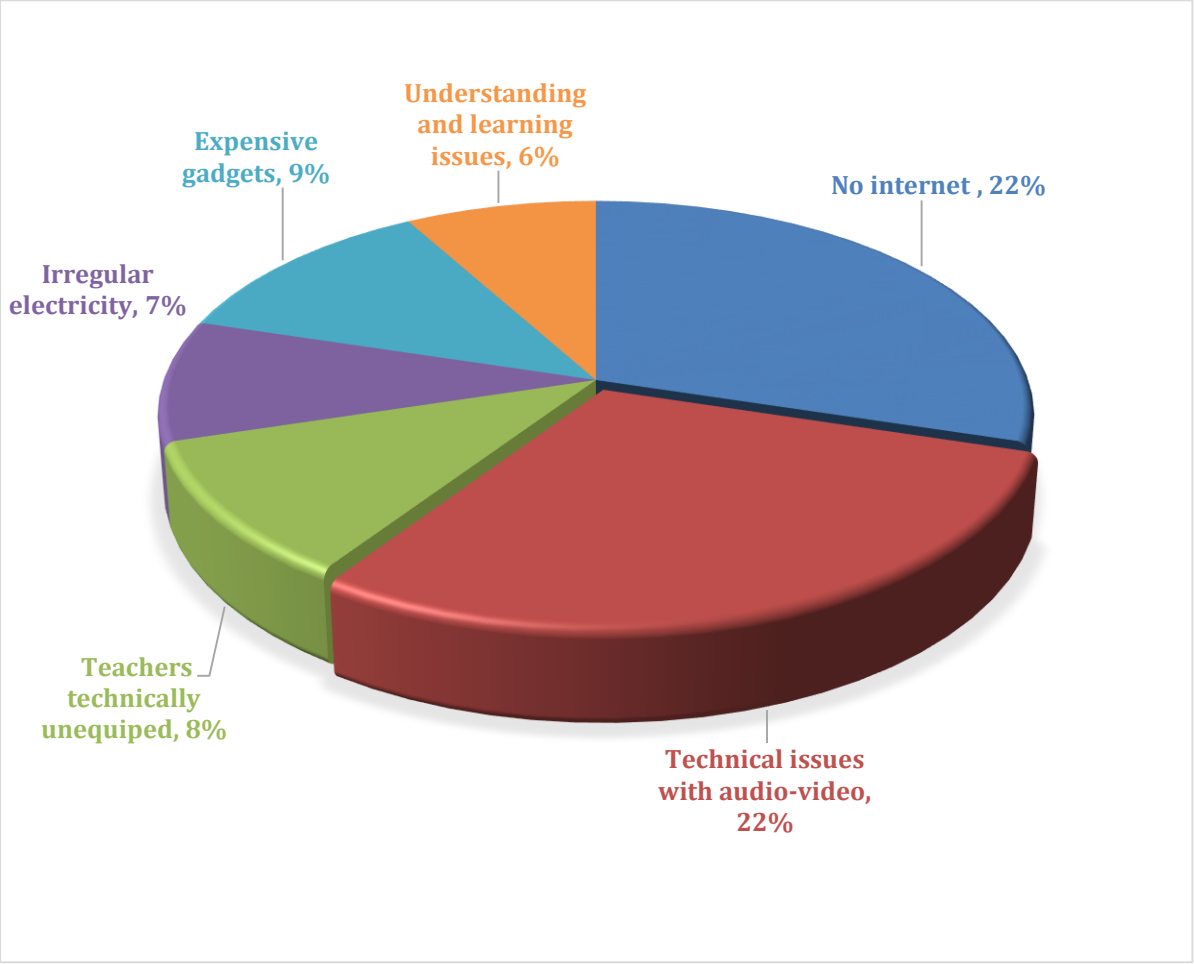
of the benefits of the channel (58.71%). Similarly, 72.14% had never utilized the "Virtual Teacher Question & Answer Forum," therefore were not in a position to rate that forum and were undecided about its ability to satisfactorily answer the queries (45.77%).

*Figure 10: Students response to Digital Learning Programs*



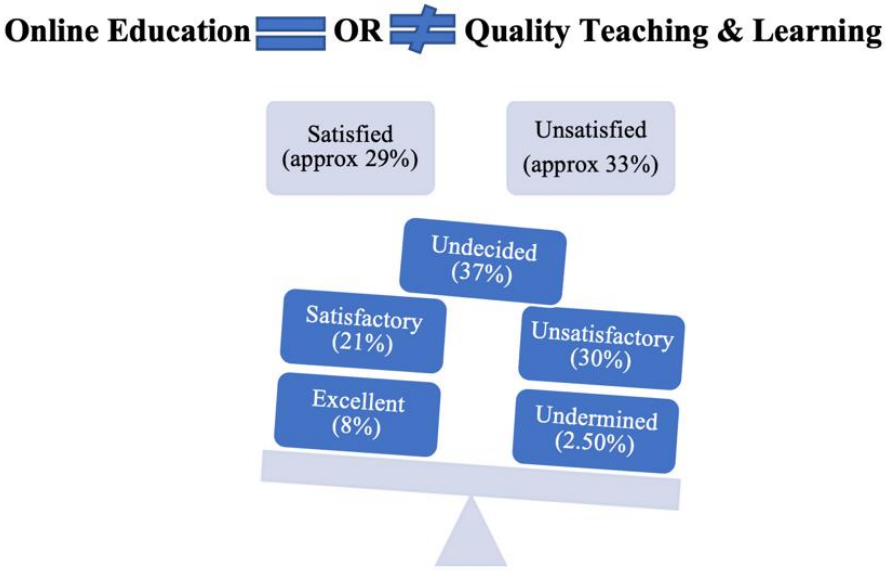

The survey results on Covid 19 emergency initiated online education show that 63% students confirmed to have received online education during the pandemic, whereas 36% of students said to have accessed no online learning during Covid. Those who said to have online classes referred to the WhatsApp group of their class as the most widely used forum for online classes; although many seemed to be not satisfied calling it a 'bad experience.' This is notwithstanding the fact that around 56% of the students preferred to be taught online whenever there is emergency. However, a substantial number, i.e., 44% showed lack of enthusiasm for online education because of many reasons: non-availability of the internet/technical issues with audio and video (22%); teachers not being technically equipped (8%); irregular electricity (7%); expensive gadgets (9%); lack of proper attention given in online education system resulting in understanding and learning problems (6%) (see Figure 11). The learning issues though are more frequent, as in our informal conversations with students, they complained about understanding issues as majority of the teachers used WhatsApp to instruct students to read certain chapters of books or do some homework which was never checked.

*Figure 11: Reasons for Lack of Enthusiasm for Online Education among Students*




The survey enquiry about online education and quality teaching/learning were not very encouraging. About 37% of the students were clueless as to whether online education system has improved upon the quality of teaching and learning in their schools and colleges. While some did not know where to rank the online education system, a considerable number of students (30%) were unsatisfied with the online education system. Around 21% rated it satisfactory and a lesser number of 8% rated the system as excellent. In the opinion of 29% students, online education system improved teaching and learning quality by providing: more regular online classes (19%); clear understanding (18%); easy accessibility (13%). A considerable number of students (35%) believed the online system to be a letdown because the teachers would use only WhatsApp to send messages and videos, and not take online classes.

*Figure 12: Students Satisfaction Level with Online Education System*




***Digitization of Teachers Training***

**Digitization of teacher's training** was made possible by the Covid Emergency. The Directorate of Professional Development Khyber Pakhtunkhwa (DPDKP) was managing an **online Learning and Management System (LMS)** for **training of schoolteachers via curating and sharing of subject wise videos** (DPDKP, 2021). Under this program, the newly inducted teachers were provided with tablets and assignments and papers were taken from them through online mode (S. Hussain, & W. Khan, FGD, July 14, 2021). DPDKP is responsible for the creation and provision of continuous professional development opportunities and services to teachers and educational managers in the province. The Director EMIS in KPESED reported this Directorate as promoting ICT culture through regular lecture and training series through purchase of Microsoft license for Zoom (S. M. Khan, Personal interview, July 14, 2021). The officials also recounted effectively using **ICTs in teachers training.** To quote former secretary E&SED and HED, *'In pre-covid times, the PITE institute could only train even with full capacity around 570 teachers per year… and the budget for salaries was 52 crore and for non-salaried expenses it was around 7 and a half crore…Each teacher was trained at an expense of 11 to 12 lakh Rs,'* (A. Khan, personal interview, July 5, 2021) implying that such precious revenue could be saved if online and digital mode of training was imparted to the teachers, instead of the physical one.

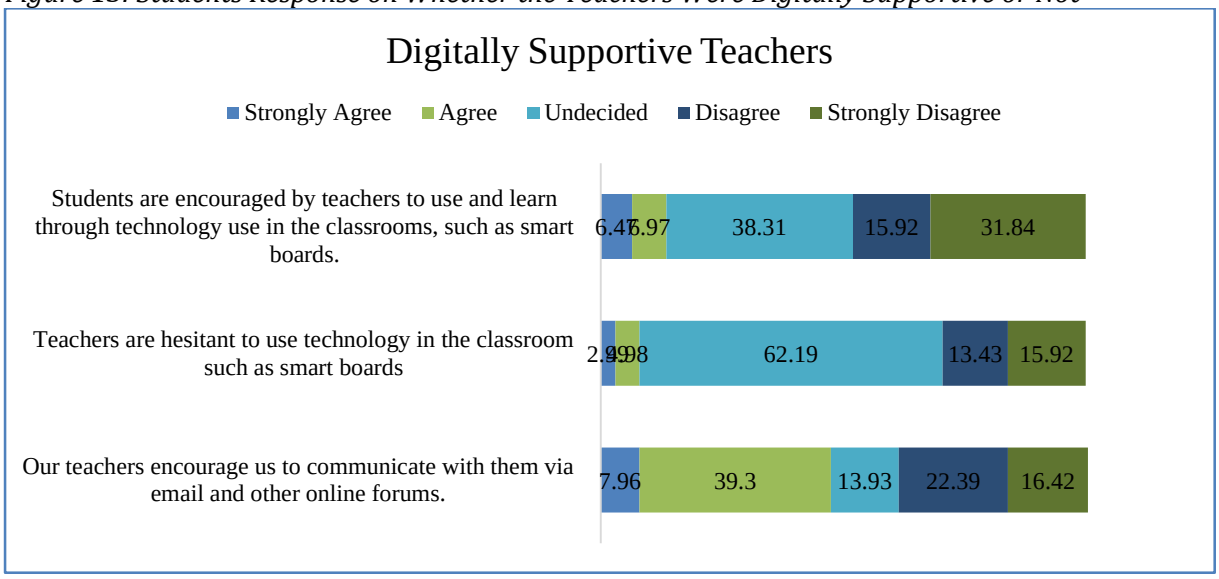
The online mode of teachers training has made the training system efficient by making it possible to train larger batches of teachers within limited resources. For example, **Higher Education Teacher's Training Academy (HETTA),** provides mandatory training to college teachers also necessary for their promotions. Before Covid, the institution annually trained 300 to 400 college teachers, each batch training based on 30-day residential training in their institute in Hayatabad, Peshawar. The Covid emergency transferred their trainings to online mode, using Zoom. This improved efficiency of teachers training in two ways: first, the institute trained more teachers than it could train physically, i.e., 1800 teachers, which was 6 times greater than the pre-pandemic era; second, only 45 % of the stipulated 100 % budget for physical training was spent on online one (M. I. Afridi and S. M. Ali, FGD, July 15, 2021). The budget cited for physical training was approximately 2.5 to 3 million Rs (M. I. Afridi and S. M. Ali, FGD, July 15, 2021). This signifies

that a relatively larger number of teachers were trained using online facilities, saving the HED millions of Rs in finances (M. I. Afridi and S. M. Ali, FGD, July 15, 2021). The officials were not sure if the online training will continue in the post-corona period … *'probably it will go parallel with the traditional mode of training… both online and physical … I will recommend it to be online always…they are mature teachers…they can do that easily'* (M. I. Afridi and S. M. Ali, FGD, July 15, 2021).

The Covid-19 pandemic showed that the majority of teachers lacked proper IT proficiency and did not possess the knowledge to teach remotely and digitally. It was during these trying times and, in a bid, to modernize the education system, improve literacy and tackle the challenges posed by online education system in the province that the Minister for Elementary and Secondary Education Shahram Khan Tarakai, launched a pilot **'Google G Suite for Education'** program in Peshawar. It aimed at integrating the provincial education system with the Google G Suite, a Google Workspace for Education Fundamentals. This program also aimed at digitally equipping teachers with Google training (The News, November 22, 2020). The EMIS officials of KPE&SED, however, called this online teacher training programme a temporary arrangement, undertaken by concerned department only when NGOs offered their services to train the teachers and provide certificates. (S. Hussain, & W. Khan, FGD, July 14, 2021).

The essential role of teachers in the use of technology cannot be denied. Schools/ colleges also require digitally confident and supportive teachers. It is the entwined forces of teachers, students and the school environment that can help produce digitally supportive schools and colleges. However, if the teachers are hesitant to use technology in the classroom (such as smart boards) as 29.35% of the students perceive (survey result), then the students will also lack the confidence to use technology. Around 62% of the students are undecided over their teacher's reluctancy to use technology (Figure 13). This is probably because around the same number earlier did not have exposure to the smart board technology teaching. In a similar vein, when students were asked if they were encouraged to use and learn through technology in the classrooms (such as smart boards), majority (47.76%) diverged, and a considerable percentage remained undecided (38.31%). About 39% students reported that their teachers in fact discouraged any form of communication on online forums. On a positive note, 47.26% of the students confirmed that their teachers encourage them to communicate with them via email and other online forums, however the use of email was low as compared to WhatsApp, which was the forum where most of the teacher-student communication took place.

*Figure 13: Students Response on Whether the Teachers Were Digitally Supportive or Not*




***Digitalization of School/ College Data***

Another efficiency generating instrument is **digitization of data from all government schools.** For this purpose, the **KPEMA** was created in 2014 as an institution under the KPESED and tasked with this responsibility. The KPEMA officials reported about their institution looking after the entire process of data collection from the schools to storage to analysis to dissemination to the stakeholders (K. A. Afridi, personal interview, July 30, 2021). The digitization of record keeping from schools was done because the manual record keeping, and printing was a very time consuming, as well as resource consuming exercise (K. A. Afridi, personal interview, July 30, 2021). The deputy director KPEMA informed about school data made accessible to the policy makers in education department, the EMIS, the UNICEF as well as the Khyber Pakhtunkhwa Textbook Board for better utilization of on data (Sohail, personal interview, July 30, 2021). Their was **electronic monitoring of schools in erstwhile FATA** region through offices and staff stationed there; however, the security and law and order issues had made data monitoring difficult in geographically distant and sparsely populated territories of North and South Waziristan tribal districts (Sohail, personal interview, July 30, 2021).

The digitizing **of data from all public schools in Khyber Pakhtunkhwa was** effectively done; the deputy director EMA claimed, *'we have no unsuccessful stories; we have all success stories…we have achieved all our targets [on digitizing essential school data by the EMA]'* (M. Sohail, personal interview, July 30, 2021). The data collected from schools is fed on a server and goes to the database, which maintains old records; from this database, data is transferred to a dashboard, which is then accessible to the respective DEO's offices. This helps in 'effective decision making and timely action,' for example in the case of a teacher's absence from duty (K. A. Afridi, personal interview, July 30, 2021). The KPEMA has even been tasked to collect data on community schools run by NGOs and those that are run on public private partnership, for example, data was collected on the 2500 community schools run by NCHD and BECS in the Khyber Pakhtunkhwa. Besides this, data on private schools, Cantt. Schools, Garrison schools, cadet colleges and convents etc., had also been collected and submitted to the government for help in effective policy making and planning (M. Sohail, personal interview, July 30, 2021). **KPEMA** also undertook the capacity evaluation of primary school students under its **'Literacy and Numeracy Drive'** for assessing

Grade 2 student performance in three basic subjects of English, Urdu and Math on monthly basis, however, the programme had suffered a set-back because of Covid-19 shutdown of schools (K. A. Afridi, personal interview, July 30, 2021; M. Sohail, personal interview, July 30, 2021).).

The **Higher Education Department cell by the name of Higher Education Management Information System (HEMIS) was e**stablished in 2005; the first MIS system ever started in a government department, it was tasked with automating all official correspondence for rapid information flow and timely decision making. The website information shows that it has stored **all information regarding colleges**, including staff in it, developing the Higher Education Department website and online admissions system in colleges, completion of file tracking system, besides some other digital steps (GoKP, HED Online College Admission System, n.d.). '*Our main concern is managing digital interventions in all the 303 colleges [in the province]'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

***The Learning Management System***

The digital interventions managed by the **HEMIS** also include developing a **Learning Management System (LMS) for increasing online interaction between teachers and students** in colleges. In this connection, the HEMIS officials reported agreements signed with Microsoft to provide 400,000 licenses to teachers/ students in government colleges for increasing student teacher e-learning and interaction capacities and online classes, especially in the pandemic times through Zoom and Google Meet. Training was also reportedly provided to college teachers for using the same for learning online modes of teacher-student interaction. This also included helping students to submit online assignments and quizzes. (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

The HEMIS officials also informed about the **LMS system** not yet developed enough to enable college teachers to upload presentations etc., which the students could access; or manage attendance of students online, reflected on dashboard, however tenders for the project were already launched (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). *'It is obvious that a greater number of teachers are in favour of the LMS… now all newly inducted teachers come with a Master qualification… around 70 percent of our teachers are MS/ Mphil and many are PhD… so there is now a greater awareness among the teachers that adoption of LMS is better for us'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The issue of connectivity was ignored by the officials. Ever since the **Management Information System (MIS)** was launched in 2013, the officials said that they have been revamping the system to enable students to use it to appraise teachers work each semester (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). This meant that the MIS system was being extended to the students to participate in **online Teacher's Review and complaints system in colleges**. For this the officials mentioned opening the system of student's online review of teachers, which was directly accessible to Secretary Higher Education Directorate, to be formally launched in a matter of two to three months (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

In the context of **online homework** for public school children, **the Directorate of Professional Development (DPD)**[3] was tasked with posting online homework with directions for students in

[3] It was established by merging different teacher training institutes and attached with the KPE&SED (GoKP, DPDKP, n.d.) The DPDKP is responsible for developing scheme of studies taught to the newly recruited

the subjects of English, Math, Urdu and General Science and with instructions to teachers to ensure that children got their homework; and further to keep in touch with the students and their parents. (GoKP, DPDKP, April 13, 2021). However, the officials reported that it was still in progress, meaning no tangible progress had been achieved so far… *'a studio will be made…working is being done on it, it is not yet initiated…content will be developed by proper teachers…they will be selected'* (S. Hussain, & W. Khan, FGD, July 14, 2021). This meant that despite proclamations on the website about it, the system was still under construction and had not been formally launched.

***The Promise of Paperless Communication***

Another initiative **Human Resource Management Information System (HRMIS)** will assist teachers to apply online for leave, for pensions and for applying to merit-based master training positions; the data will help make such appointments on merit on the basis of teachers details available with them (S. Hussain, & W. Khan, FGD, July 14, 2021). In HED too, the HEMIS was working to **digitize all college data on student's admission**, their promotion, attendance, semester records., etc; it was further claimed that work on it was almost complete and was to be initiated very soon in a matter of a month or two… '*all the colleges have our focal persons who are overlooking its functionality…similarly the two or three IT teachers there are also managing it there [in colleges]'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

Among the forthcoming digitization projects in the higher education included ending paper-work through initiating a system of **paperless communications** within the Education Directorate and Secretariat. The HEMIS officials were reportedly working to introduce **E-office** to **connect Higher Education Department's offices and sections**… *'we are working on e-office to end office file system and for that we have provided trainings to our department Deputy Secretaries and Section Officers … we will launch this e-office within a few days in the Higher Education Department'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The interviews were conducted in July/ August 2021. The plan still in the pipeline.

**KPEMA** officials also claimed to be the sole department in Khyber Pakhtunkhwa government to run **on electronic communication**… *'though we have parallel file work too just for the purpose of audit, because audit requires a backup… But our entire coordination, information sharing is on emails, so obviously it has improved our productivity… it has reduced the waste of time…we take decision one day and the very next day we start working on it.'* This reflects how such officials see digitization as improving the efficiency of their department's working in terms of time-saving and speedy disposal of work. However, keeping a backup of all the information in paper files contradict their stance.

The HEMIS officials noted a **'File Tracking System' already in vogue in the HED**, where files are monitored and tracked through a centralized dashboard. *'This File Tracking System is very fast…if a file comes to me, it can be checked as to how much time the file was delayed here because every file has a time period and timeline…now there is a regular performance monitoring on the basis of letters and files disposal'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The file

teachers under the Induction Program (IP) of KPESED (undergoing mandatory 9-month training program) with PITE (Provincial Institute for Teacher Education), which is an attached department of the KPESED (DPDKP, 2021).

is supposed to be disposed of by offices within 7 working days; resultantly, there was no chance of the file being held up in one office beyond the prescribed days, because it was constantly being monitored and tracked. It ensures quick disposal of cases/ files/ work (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). PMRU had introduced a file tracking system in all the departments of Khyber Pakhtunkhwa government (implemented in 2800 units/sections); 73% are active. Files are tracked through a barcode, and it shows file history and file pendency (GoKP, PMRU, n.d.). This 'File Tracking System' in HED, as reported by the HEMIS officials not only helped deliver official letters very fast, but also provided opportunities to track the letter to see in which desk the file took more time; and as each file was supposed to be disposed of in seven days, therefore, there was no chance it could be held for more in one office; as everything was now trackable, this has led to improved monitoring of performances of these offices4.

***Online Admission System***

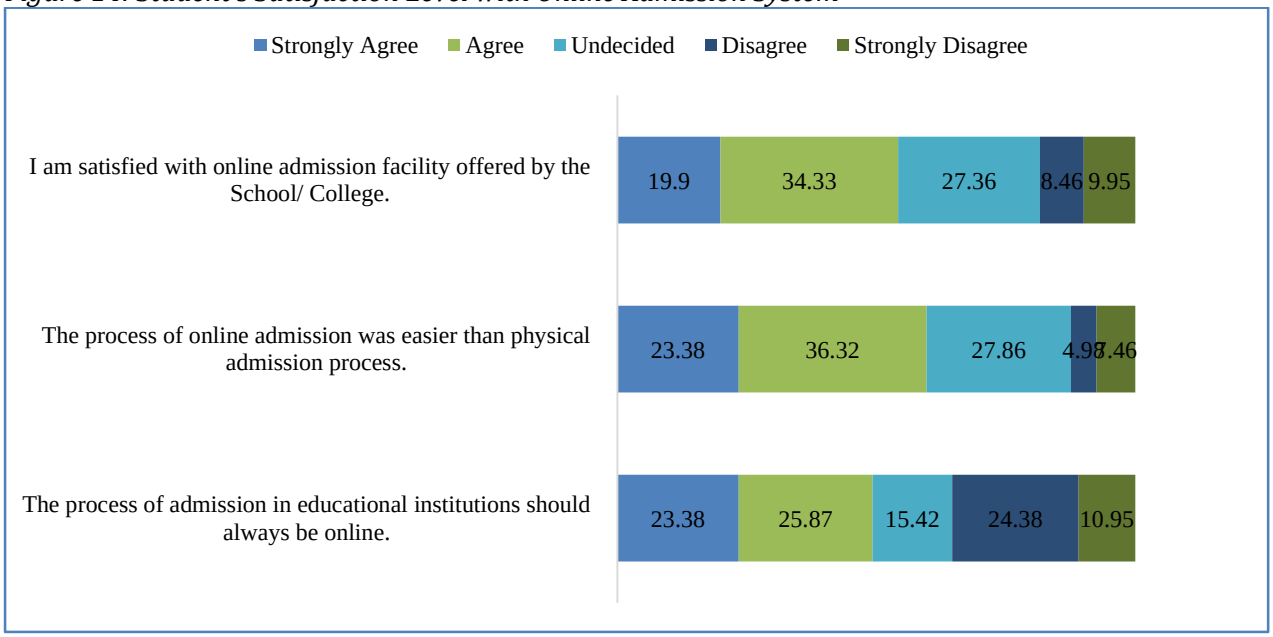
**The Online Admission System in colleges** is cited as the best project and a success story of Khyber Pakhtunkhwa's Higher Education Department (HED) by the HEMIS officials. The encouraging fact being the system was also extended to Merged District Colleges last year (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). This system started phase wise from 2014-15, beginning with Peshawar district and is now extended to almost all of the total 303 colleges… *'only one or two colleges have issues…are in remote areas or do not have internet facility may have been missed'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The HEMIS officials reported [for the current year] receiving more than 500,000 applications on an online portal for college admission, which were administered in 303 colleges of Khyber Pakhtunkhwa in collaboration with JAZZ Cash (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021; Q. Safi and S. I. Hussain, FGD, July 29, 2021).

**The Online Admissions System** is also reportedly serving the less input, more output scenario in efficient service generation. This system of admissions in colleges is claimed to have not only saved the government money on unnecessary printing of prospectus, etc., but also created additional income for other more necessary expenditure required in colleges. The cost effectiveness of online admissions in higher education was also emphasized by the Special Secretary HED… *'Now we have issued a 100 rupees form for admission. The prospectus formerly cost us Rs 500 to print. So now, 90 rupees are deposited in college exchequer while 10 rupees goes to the KPITB. The merit list system is also very transparent, and you can say that our admission system is working transparently'* (A. Q. Safi and S. I. Hussain, July 30, 2021). As reported by the officials, only a specific amount of money was being given to a third party (Cellphone company) for service charges (JAZZ) and the rest went to the colleges, which was then spent by the colleges on development/ renovation etc. of respective schools (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). '*The increase in college ability to generate more revenue is a big success story for the colleges…'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). As the system ensures transparency… *'people are very happy with this system of online admissions'* (M. I. Afridi and S. M. Ali, FGD, July 15, 2021).

4 Our research team faced delays of several weeks in seeking permission to conduct interviews (more than a month) with education department officials and carry surveys (3 weeks) in schools and colleges in Peshawar and Abbottabad.

The survey results show that online admission system is a successful venture of the KPHED with majority showing their satisfaction with the system (54.23%). The majority of students perceived of online admission to be easier (59.7%) as well than physically going to the college and applying for admission as was previously done. Only around 13 % considered it to be less convenient. As a considerable percentage of students acknowledged the convenience the online admission system provided, consequently around one-half of them hoped the process of admission in educational institutions to be always online (49.25%) (see Figure 14)

*Figure 14: Student's Satisfaction Level with Online Admission System*



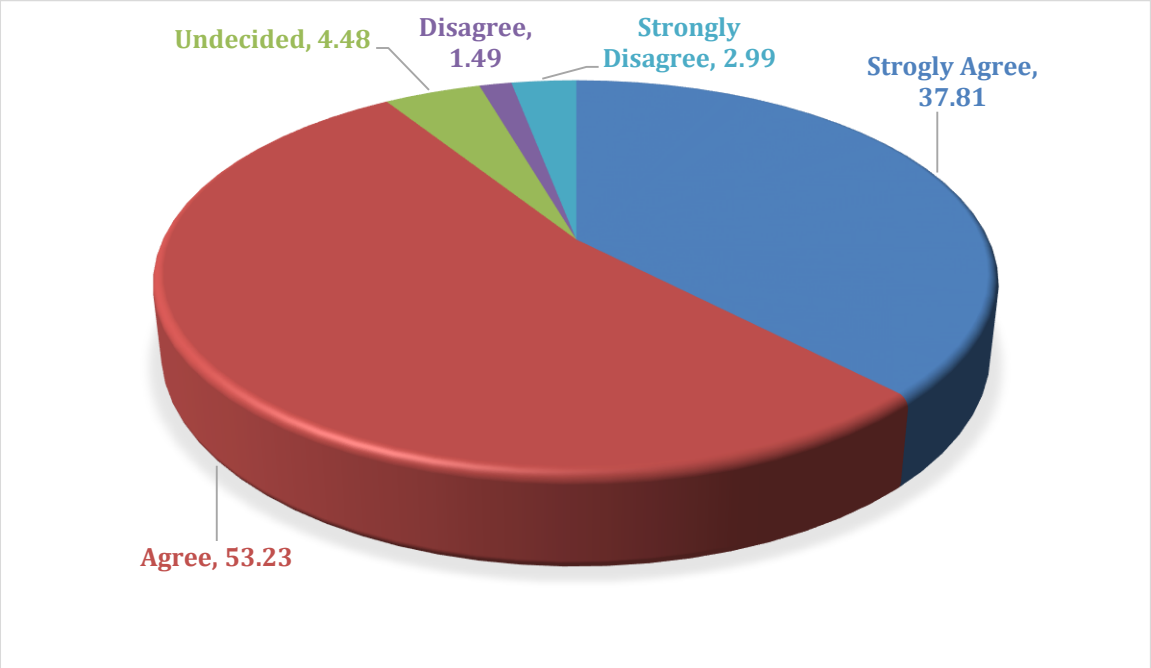

***Digitized Monitoring***

The HEMIS officials claimed to monitor colleges through a **'dashboard'.** An interesting finding was that the 'focal persons' in colleges were sharing **'Daily Situation Report'** digitally with the HEMIS, which not only provided situation reports on monitoring of Covid, but also any kind of political disturbances and other issues, which were then displayed on the Dashboard and emergency situations promptly handled… *'we have made an app to monitor the situation in colleges …what is the situation of Covid, are examinations happening, is there any political interference, or fighting, so instead of the DC going there, the focal person sends a few pages electronically, which is then uploaded on our dashboard to understand the current situation [in colleges]'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The HED sent its **'data collectors' or 'monitoring teams'** on field visits to colleges; they collected real time data through GIS and report to concerned sections (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). The **monitoring of colleges** was focused on absenteeism, infrastructure, cleanliness, administration, student enrollments, student attendance, political activities by students, taking of feedback about teacher performance and absenteeism from students which are directly reported to concerned section, for example, absenteeism issue is reported to the Secretary directly for him to take action on it. Infrastructure shortages in colleges, constructing new building, expansion of colleges etc. are reported by the monitoring teams to the Chief Planning Officer (CPO) for making up for the shortages and dealing with cases (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

The HEMIS officials also claimed Khyber Pakhtunkhwa colleges, with the exception of Newly Merged Districts (erstwhile FATA) being installed **with 5-10 cameras (outside the classrooms), which were being regularly monitored on the Dashboard** (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). Only halls and not classrooms were fitted with cameras to monitor examinations. Extending the same to the merged district colleges was pending and required permission by the P&D department of the provincial government (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The HEMIS officials also reported on Peshawar Board taking the initiative of installation of high-definition cameras with sound system in examination halls to identify movements for a check on cheating in Board examinations (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

The survey results show that out of the 77% who knew about cameras being installed in their school/college gates, a majority of them (91%) agreed with the proposition that camera scanners on school/college gates have improved the security of students. A small number (9%) were either undecided or did not agree that cameras can assure student security on campus (see Figure 15 below).

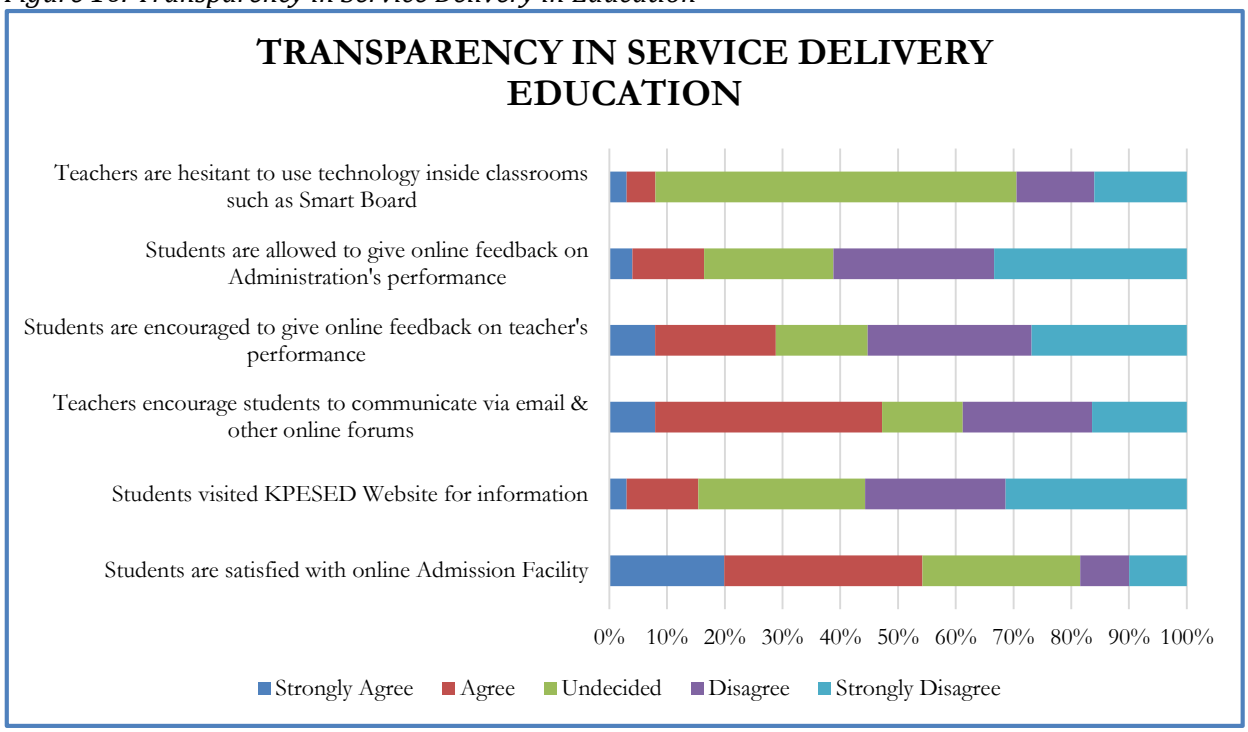
*Figure 15: Students Response on - Camera Scanners on School/ College Gates Have Improved*




***Transparency, ICT Tools and Service Delivery***

Figure below Showing Survey Outcomes of Section C of the questionnaire - Likert scale questions to understand the public response on the use of ICT tools and service provision.

*Figure 16: Transparency in Service Delivery in Education*




Access to information and transparency is one of the themes of digital government and researchers agree that in the information society of today governance involves how information is collected, analyzed, used and disseminated (Dawes, 2009; Scholl, 2006 & 2014). Internet portals of the government institutions help reduce perceptions of corruption against the government and its institutions (Garcia-Murillo, 2013) and government institutions strong web presence also ensures transparency and citizen participation (Jones, 2011).

In the realm of transparency and accessibility to data on the HED and the KESED websites, most of the data/ information on the Higher Education Department (HED) website is outdated, dating back to the year 2018 or earlier. Several links for projects and service, for example, 'Monthly Stipend for Unemployed youth' and 'Chief Minister Education Endowment Fund (CMEEF)' do not reveal information (HED GoKP. a, n.d.); with no relevant information on which students availed this scholarship, or which unemployed youth got the stipend and under which criteria, the entire exercise of allocating 500 million PKR for scholarships and an additional 300 million scholarship (Higher Education endowment Fund), lacks transparency. It also negates what the Minister says in his message on the HED (hed.kp.gov.pk) website about most information being open and free to access (HED GoKP. b, n.d.). The HEMIS officials were hesitant about open data but showed concern on certain departmental issues decelerated, but work was underway to revamp the deficient websites within two months. They also claimed that the new website shall also carry all the statistics on MIS (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). However, a glance on their website even today shows that there is not much of information revamping of the website in terms of digitization of higher education.

The KPESED website on the other hand is more interactive, lively and information providing. However, a closer look at information on the website reveals that much of the information for user access is outdated one, containing mostly figures related to the years 2008, 2009 and 2010. There is clearly a failure to update the website and provide up-to-date information to the citizens.

No information is provided on the website about education for children with disabilities, or recent progress on related reforms introduced in the education sector. The KPE&SED website also shows a suggestion corner through which any citizen can give their suggestions through an email (KPE&SE Department GoKP, n.d). Invitation to tenders, minutes of meetings of procurement committee, advertisements for stationary and other items, annual school Census report 2017-18 and the annual school Census Questionnaire are placed on the website (E&SE Department GoKP, n.d).

The School/ college websites were either almost non-existent or not of much value. When students were asked about their school/ college website, a majority of students (77%) confirmed about the availability of school/ college website, but only 47% seemed to have used those websites. A majority (52%) never felt the need to use their educational institution website. Those who confirmed, went on the website either once a month (20%) or once or more a year (14%). The website was utilized mostly (17%) to know about class results; information about examination date sheets (17%); information about the courses/ syllabus (13%). A very less number were interested in inquiring about the subject specialists/ staff members (2%), online admissions (1.5%), notifications about vacations, school/college events (0.5% each). While many students said to have no idea about the school/college website but were aware of school/college Facebook page which was often visited to inform themselves about the events/ exam date sheets etc.

The facts about school / college websites was revealed after a survey of the public school/ college websites. The students who said their school/ college had a website were referring to the Facebook pages. Almost all the school website link would open on KPESED webpage showing nothing but a brief history of the school. Similarly, the colleges were linked up with the 'online College Admission System' website sponsored by HEMIS Cell of HED. Most of the schools and colleges had their own unofficial Facebook pages. The KPHED Archives and Libraries Department website shows online college admission system for colleges in KP. Most of the merit lists shown on the website are outdated relating to year 2018. The website had information about the different KP Colleges brief history; the college address, phone number and email addresses, easing access to people; college faculty; news and events; merit list. The KPHED website through a centralized HEMIS system handles the public colleges admissions throughout the province.

Interestingly on one of the post given on the Facebook page of Abbottabad Degree College 'Closure of Educational institutes as per instructions of NCOC' (April 24, 2021), one comment read, '*Online classes on WhatsApp and exam on campus is totally injustice with students … Classes on WhatsApp is the insult of online education.'* Unfortunately, most of the public schools do not have a website of their own. Parents and students sometimes rely on educational information websites in Pakistan (such as eduvision: TopSchools: etc.), which contain disturbing images and advertisements constantly popping up.

***E-transfer – Beginning of an End to Political Interference***

A very recent IT intervention (September 2021) in the education department is the **system of E-Transfers,** which has been introduced by the Khyber Pakhtunkhwa government with the claim that it will 'revolutionize teachers' transfer and pave the way for quality learning. Publicized also as a grievance redressal mechanism for teachers to submit their grievances online (E&SE Department GoKP, n.d). This app was praised a lot by the official respondents for bringing

transparency in postings and transfers and eliminating political interference by 60 to 80%, or even zero. (S. Hussain, & W. Khan, FGD, July 14, 2021). It ensures transparency as. the EMIS officers argued, *'it is like the teachers got an interpretation to their dreams because I have seen teachers who have been circling the offices for the past 20 years and have yet to be transferred…now because of e-transfer, they have been transferred'* (S. Hussain, & W. Khan, FGD, July 14, 2021). An official said, *'the system was fool-proof and machine operated and without any human interference…any respective applicant could get an information on where he scored vis a vis other applicant and whether someone was lying…this meant receiving a just treatment'* (A. Khan, personal interview, July 5, 2021). The KPE&SE **E-Transfer, MIS** with already 10,000 installs had complaints about the web server not working properly.

The system of **E-Transfers** by April 16, 2021 was launched **for colleges** too, which is supposedly allowing 10000 college teachers to use the app and save themselves the trouble of visiting offices (Urdu Point, Associated Press of Pakistan, April 16, 2021). Transfer on merit will help end the reference based transfer system and ensure transparency, also saving time and providing ease of use to teachers coming from far flung areas. To quote the Special Secretary HED on e-transfer, *'usually we would face a lot of problems in manual systems, such as the loss of documents and political influence… but now the system is responsible for impartial transfer of officials'* (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021).

***Biometric Attendance – Solving Teacher's Absenteeism Issue***

The HEMIS officials talked in length about the **Biometric Attendance System** for teachers introduced in 288 colleges, out of a total of around 300 colleges (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The biometric attendance of colleges was being managed on a **Single Centralized Board by the HEMIS** (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021; E&SE Department GoKP, n.d). Termed as *'zabardast tabdeeli,'* meaning a 'great change,' by EMIS officials at KPESED, the system was limited to 60-70 % of the schools … 'it will take time to get introduced in primary schools' (S. Hussain, & W. Khan, FGD, July 14, 2021). All education offices also reportedly had bio-metric attendance systems. DEO offices in districts were connected to the EMIS and *'running 100% correct,'* (S. Hussain, & W. Khan, FGD, July 14, 2021). On children's attendances through bio-metric system, it was reported by the EMIS officials that the manual attendances of children were taken and then uploaded on electronic system; however, it was restricted to high school and higher secondary schools (S. Hussain, & W. Khan, FGD, July 14, 2021).

Official interviews confirm that the introduction of **biometric attendance for teachers in schools has brought down teacher's absenteeism.** Some respondents claimed that teacher attendance improved by 95%. However, this system is being reportedly implemented in only 60 to 70 % of the schools. A look online to ascertain these figures showed some contradictory assessments. A monthly government report from January 2020, declared performance of teachers, students and relevant staff in Khyber Pakhtunkhwa's 347 higher secondary schools as well as in district education offices as unsatisfactory and used the term 'very discouraging' for teachers in some schools of district Peshawar, as well as other districts. It was reported that the teachers remained absent from duty after registering their bio-metric attendance. The student attendance was also not very satisfactory. It was not clear why this happened (Yousafzai, February 9, 2020). In the context of colleges in the NMTDs, there was an admission that in the reportedly 43 colleges there, there was a scheme to introduce a biometric through installation of

Camera Scanners on college gate to monitor the departure and arrival of teachers through facial recognition to be introduced within a span of a few months (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). However, this was a future planning and not yet implemented.

In order to **cross-check on misuse of biometric attendance,** the HEMIS officials reported the Higher Education Department having their own 'data collectors' or 'monitoring teams' which pay random visits to colleges to check teacher absenteeism, their attendances, infrastructure damage, enrollments, student political group's activities and take feedback from the students about the teachers. Such absenteeism of either the teachers or principals is then reported to the Secretary concerned for calling explanations, formal inquiries and action on the same (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). These data collectors collected real time data through the GIS, which is also centralized (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). Infrastructure shortages are reported to the Chief Planning Officer for making up for the shortages (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

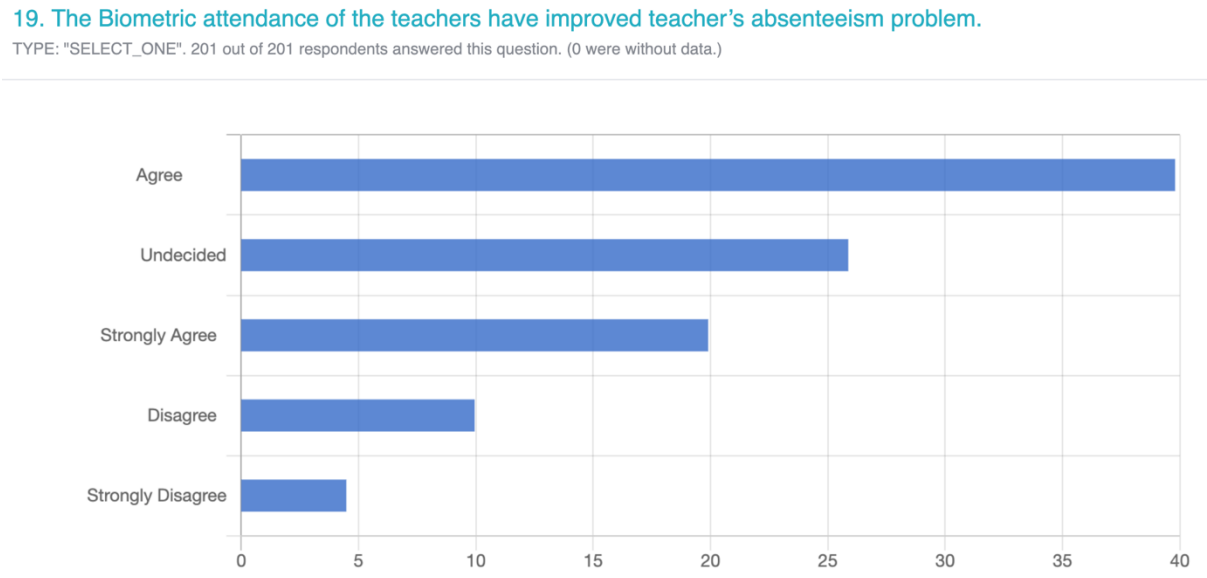
Though the Biometric attendance is praised for dealing with the issue of 'closed schools,' with much improvement in teacher's attendance (A. Khan, personal interview, July 5, 2021). But there is an assertion that **appropriate data feeding by the EMA in KPESED** and resultant action by the requisite DEO on teacher absenteeism is a must for making the system run smoothly (S. M. Khan, Personal interview, July 14, 2021). DEO's regular school visits are uploaded and ranked on **District Performance Evaluation Scorecard** monitored by respective secretary and chief secretary (K. A. Afridi, personal interview, July 30, 2021). The **'Action Management System'** to monitor teacher absenteeism, placed under the DEOs to take action against non-reported absenteeism, makes the DEO accountable for not taking action or taking only a partial action against teacher absenteeism. This system also records the visits by DEOs and SDOs to schools; and make them accountable to improve the facilities in schools where they were found lacking in boundary walls or washrooms or rooms (K. A. Afridi, personal interview, July 30, 2021). Resultantly, teachers punctuality improved as a result of **reporting of real time data to the DEOs office**. To quote him, *'there is an Action Management System' which is installed in all male and female DEOs offices…we provide them with data to take action on absenteeism…first, there is a warning, second, there is a cut from the salary…it goes from minor to major penalty'* (M. Sohail, personal interview, July 30, 2021). This whole exercise helped identify ghost teachers and ghost schools in faraway places and those which were non-functional. Interestingly, the Deputy Director EMA claimed that this exercise brought down the number of non-functional schools from 8000 (7-8 years ago) to just 100 today… *'now this this a big achievement made possible due to the real time data generation activity'* (M. Sohail, personal interview, July 30, 2021).

Another fact that came to light was **that during Covid, the Biometric attendance system had been closed temporarily**, but the HEMIS officials claimed that the manual attendances in colleges were uploaded to the software by concerned teachers and it was then made available on the dashboard (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). *'The monitoring teams ensured that a teacher absent for 2 to 3 days should get reflected on the dashboard…in case a teacher is absent for 2 to 3 months, we then write to our Directorate to take action against such teachers… such reports are made to the Directorate on monthly basis'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The HEMIS officials also reported the bio-metric attendance machines were extended to the colleges in the NMTDs (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

Though the system of biometric attendance was in vogue, it is not without mentioning that **accountability mechanism on reported absenteeism** by the teachers seems to be very slow. In the case of a teacher or principal's absence, an explanation call is sought from them and if their response is not satisfactory, a formal inquiry is conducted against him by the Secretary through a Deputy or Special Secretary nominated by him (the Secretary) (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The slow process of accountability mechanism was admitted by the HEMIS officials; as officials were bounded by set procedure for making teachers accountable for absenteeism. *'The government cannot terminate their services directly under the law… the most they can do is stop one or two increments or transfer the teachers to another college, which is a minimum punishment'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The EMIS at KPE&SED is said to have improved productivity by streamlining all activities and making monitoring of DEO offices in districts more transparent and accessible (A. A. Khan, personal interview, July 14, 2021).

The survey results show that a majority (80%) knew that their school/college had a biometric attendance system for their teachers, which was seen at the entrance of the building of each public school and college. Majority of the students (60%) confirmed that the Biometric attendance of the teachers helped solve the issue of teacher's absenteeism, however a small number of students (26%) were not sure. 14.43% of the students disagreed stating that biometric attendance did not help much with teacher's absenteeism problem and pleaded the teachers to be more regular in taking classes.

***Figure 17:*** *Students Response to Biometric Attendance of Teachers and Improvement in Teacher's Absenteeism Issue*




When students were asked about the biometric attendance system for students to have improved their regularity as claimed by some of the high officials in KP Education Department, the students disaffirm these claims as no such system existed on their campus. Attendance was taken daily on registers. According to college rules 80% attendance is mandatory for students in order to allow them to appear in annual public examination of the boards (HED website: http://www.admission.hed.gkp.pk/page.php?college_id=153&page_id=1419)

On accountability in higher education through ICTs, the Director HEMIS asserted that the ICTs were very effective as far as the question of accountability and transparency was concerned particularly '*to counter the problem of* ***Ghost employees*** *through GPS tracking system....and also about the infrastructure issues in colleges…'* (A. Q. Safi and S. I. Hussain, July 30, 2021). However, they were also certain that colleges were immune from the issue of teacher absenteeism due to the presence of a grade 20/ 21 high official Principal in these colleges, who supervise at the most around 40 teaching staff, which implied that he could effectively monitor teacher's attendance himself (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). It has however come to light that in some districts of Khyber Pakhtunkhwa, such as Shangla and in some Merged districts, such as North and South Waziristan the context of **ghost colleges** still existed, due to either parent's reluctance to send girls children to colleges, or law and order issues, or that of college buildings being occupied by the military, or the college building being destroyed in terrorism related incidents and not being built again. On the question of ghost colleges in tribal areas, the HEMIS officials conceded that still there were some very remote areas which had ghost colleges and it was in their opinion because of the fact that despite the presence of a college, the local did not enroll their girls there. Resultantly, the teachers visited the colleges once or twice a year. This was reportedly more acute a problem in North and South Waziristan Agencies, where teachers didn't go to colleges because of worsening security situation too (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). *'We are starting their monitoring and the system will get better, but for now we have given them some relaxation… there are so many issues…some colleges are in tents, others have buildings, but occupied by the military, or destroyed in militancy… so we have given them a relaxation that they may not go'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). Problem was also reported in settled district colleges, such as Shangla… *'there are two central colleges in Shangla, where there is not even a single enrolment of students since the last 4 years…now the teachers who are transferred there from remote places such as Mansehra, Battagram…we know that they visit once or twice a year… now what is the need of going to the college… they don't go and we know that… but we also know their majboori (inhibition)*' (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

*"Transparency ensures that information is available that can be used to measure the authorities' performance and to guard against any possible misuse of powers. In that sense, transparency serves to achieve accountability, which means that authorities can be held responsible for their actions. Without transparency and accountability, trust will be lacking between a government and those whom it governs"* (Carstens, January 27, 2005). The results of the survey show that when students were asked if they could register a complaint related to their school/ college, 85% of the students said 'No and majority of the students (94%) had never registered an online complaint about their educational institution. Out of the 6% who said have registered an online complaint, 46% believed that their complaint was not handled properly by the school/ college authorities. For the 94% of students who never used any form of online complaint system, 35% believed that no such system of online complaint system exists for their school/ college, 17 % said that no one takes online complaint seriously, 11 % had trust issues and believed that no feedback is provided on post complaint grievance redressal, or the school/college administration will not reply or act.

***Monitoring Student Attendance***

The **SMIS is also monitoring the attendance of students in only higher secondary schools**. An additional development was for all schools creating their websites where the parents through entering their CNIC could get information about their child syllabus, teacher, results etc. However, it was limited to higher secondary schools only because of the availability of SMIS or computer related technology/ infrastructure, etc., to put up the data by respective schools in the system. A success story mentioned on the website of KPE&SED is the better performance of government schools through improved student and teacher attendance shown as 82% and 92%, respectively. The KPE&SED website also claims that during 2016-2017, 160,411 students migrated to the government schools from private schools (KPE&SE website-https://kpese.gov.pk/view-all-gallery). It implies that the impression about government schools improving because of infrastructure provision and appointment of teachers on NTS has in turn improved the parent's trust in government schools. When asked if the trend is still there, the officials gave the answer in affirmative. It was in 2017, that the PTI MPA Ziaullah Bangash enrolled his daughter at Government Girls Primary School Muhammadzai, Kohat encouraging leaders to put their children in government schools to build public trust in government schools (Zia, A., April 9, 2017).

***The Computer Based 'NTS' Meritocracy***

The employment of schoolteachers through merit-based **computer based National Testing Service (NTS) tests for recruitment in government schools**, not only supports the use of technology for employment, by also makes the process transparent. These NTS appointments at schools and teachers training were initiated under education sector reforms by the PTI government in Khyber Pakhtunkhwa to improve the quality of education in public schools. The official respondents interviewed insist that NTS testing system has made teachers appointment transparent (S. Hussain, & W. Khan, FGD, July 14, 2021). However, this system was also criticized by some officials for direct induction of teachers who lacked CT, PTC, and B.Ed. qualifications and trainings and therefore deficient in the skill of school level teaching (S. Hussain, & W. Khan, FGD, July 14, 2021).

On the question of transparency in **appointments through NTS tests**, the deputy director KPEMA called the NTS system 100 % transparent and claimed that *'it brought down political interference to zero level'* and it was argued that the government of Khyber Pakhtunkhwa brought NTS tests to tackle the complaints from people about lack of fair recruitment process in teachers' appointment.

Fresh graduates with no B.Ed/ M.Ed qualifications were hired through NTS and were later given in-service training (Sohail, personal interview, July 30, 2021). The claim of NTS bringing 100 % transparency in teacher's appointment is also seconded by additional director KPS&SED; although there is a slight admission on the process suffering from some issues of personification only in the last year, *'the teachers appointed through the NTS are best teachers, very competent'* (A. A. Khan, personal interview, July 14, 2021). However, some reports are critical about such processes favouring candidates who randomly score high in the NTS MCQ based tests, without giving any comprehensive subjective test. There are also allegations that the system is not as transparent because cases have come to surface, where relatives were sent by the candidates for such NTS tests to score higher marks. Also, the hired teachers lacked teachers trainings such as CT, PTC, B.Ed. and M.Ed. (Rafiullah et al., 2020). Similar apprehension was expressed by the EMIS

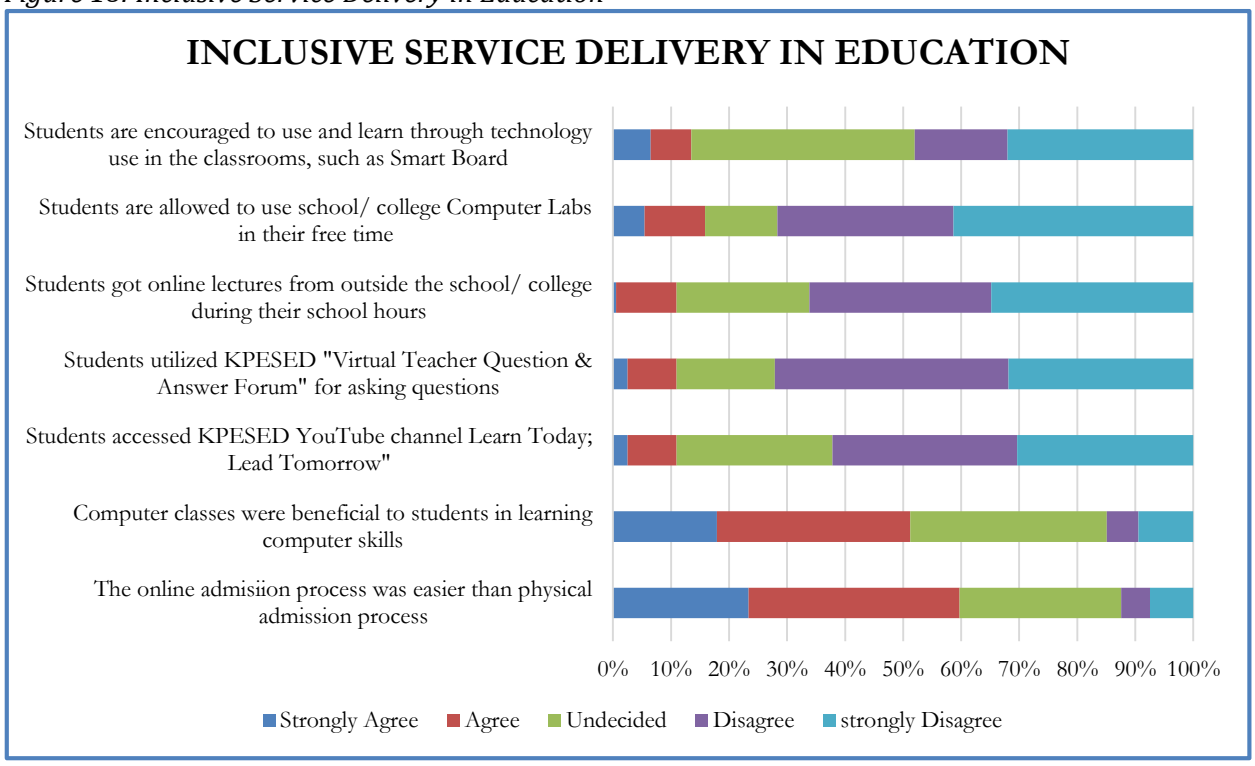
officials on NTS tests not making professional teacher training degrees compulsory for such appointments, '*…unless and until they don't have mastery over their subjects, they do not know how to control the class… will not be aware of the children psychology…they will face issues when they go to the classroom as they lag behind in teaching methodology*' (S. Hussain, & W. Khan, FGD, July 14, 2021). The system for appointments was also being made transparent in higher education through display of candidates marks online on the day of the interviews as the Public Service Commission was tasked with making appointment in colleges (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). Some officials informed even the NTS system developing issues in transparency as in some of the tests, papers had been previously known by the candidates due to some lower-level computer staff in the NTS compromising on the safety of the paper and leaking it for personal gains including an advisor to the minister involved, thus the system became corrupt within 3 to 4 years (A. Khan, personal interview, July 5, 2021). However, there is also a realization among officials interviewed that the automated system needs review and upgradation to fix the loopholes in the system (S. M. Khan, Personal interview, July 14, 2021).

The results of generated from the survey show that when they were asked if the Students are encouraged to give their feedback online on teacher's performance, majority (71.15%) reported that they were unaware of any such system through which they could evaluate teachers performance online, neither had they ever given their feedback on teachers appraisal. Similarly, students were not allowed to give their feedback on the school/ college administration performance either (83.58%). It is surprising to know that there was no system of teacher appraisal and feedback. In the west, teacher appraisal and feedback from students is the hallmark of good education. Teacher appraisal and feedback has a positive impact on teachers who consider it as fair and useful to their development as teachers (OECD, 2009). When teachers do not receive any appraisal and feedback upon their work as teachers, they fail to develop as good teachers. 'Teacher appraisal can be a key lever for increasing the focus on teaching quality' (OECD, 2013, p.9). Performance evaluation and appraisal of teachers leads to building better teaching quality (Elliot, 2015).

***Inclusivity, ICT Tools and Service Delivery***

Figure below Showing Survey Outcomes of Section C of the questionnaire - Likert scale questions to understand the public response on the use of ICT tools and service provision.

*Figure 18: Inclusive Service Delivery in Education*




**Inclusivity through e-education was linked with infrastructure facilities** available in these institutions and the financial resources available with parents. The education department officials admit that e-education programmes can improve the quality of education for all only when it is accessible to children, and such accessibility is hindered by several factors… *' in our country, there is not just a single issue (compounding accessibility)… we have electricity issues, we require net availability, then we need smart phone access, if not, then we need laptops, if no laptop, we would require a tablet…so if we combine all these issues, we realize that there are chances of not even 50% children availing it…Isn't it right?'* (S. Hussain, & W. Khan, FGD, July 14, 2021). **The issues of connectivity for students** belonging to far flung areas and **lack of affordability** of android phones made the **accessibility issues formidable** in the field of imparting online education through the LMS system in higher educational institutes (J. Iqbal and T. Khan, FGD, August 8, 2021). There is another side to inclusivity. This was the issue of mostly underprivileged children choosing to study in public sector schools, which meant that they lacked the resources to afford digital gadgets for utilizing online sources of knowledge (A. A. Khan, personal interview, July 14, 2021). The issue of e-education accessibility was also connected to contextual issues such as connectivity issues in far flung areas, missing infrastructure, and in some schools children being taught by teachers who had little or no IT training (A. A. Khan, personal interview, July 14, 2021).

The claims by education department officials about providing **books in soft form for students** to benefit from lay in contradiction to the actual access of school students to such material online. The provision of video tutorials, digital books as well as online assessments system to students to ensure accessibility through LMS system is envisioned by officials (A. Khan, personal interview, July 5, 2021) however, the EMIS official paint a rather true picture of non-availability of essential infrastructure , *'where there is electricity, internet and other things (tools) available and parent's*

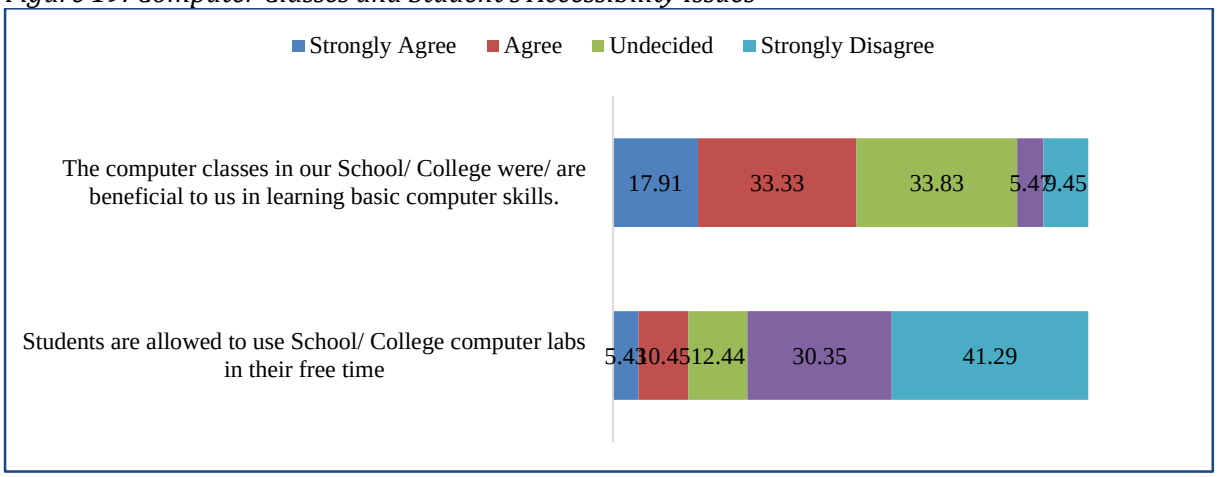
*financial resources are okay, especially they have computers, they can benefit…but in areas which have no such access, you may provide them with lab, and teachers, but a child cannot use these things when he/ she goes home…or the school doesn't have internet facility, then he (student) cannot see things…'* (S. Hussain, & W. Khan, FGD, July 14, 2021). In respect of the percentage of public schools having uninterrupted facility of electricity, no figures could be provided by the officials. In the case of teachers online training too, the KPEMA official considered physical training more preferable to online training of teachers because of internet and connectivity issues for teachers from far flung regions (K. A. Afridi, personal interview, July 30, 2021).

The **Online Admission System** for colleges is lauded as one of the best digital initiatives as it not only generates efficiency, but also ensures transparency in the admissions process in colleges. However, even here, the HEMIS officials admitted that lack of internet facility may have prevented some [very few] colleges from using the online admission portal (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

How inclusive are public schools and colleges in terms of provision of essential ICT infrastructure, such as **IT labs and smart boards** raises interesting debates. The exact numbers of schools with IT labs could not be ascertained in official interviews, except a mention of percentages; around 60-70 % of higher secondary schools had IT labs. A look at online information shows that the subject of Computer had been made compulsory for the middle schools (VI till VIII) by the previous Awami National Party (ANP) government in 2008 (Haroon, August 17, 2019). However, the situation for the middle schools is not very encouraging. A more recent 2019 Express Tribune report cites 8000 middle schools in Khyber Pakhtunkhwa not possessing an IT lab, nor IT teachers, despite computers being one of the 9 core subjects there. This meant around 100,000 students in such schools faced such shortages (Haroon, August 17, 2019); resultantly, the children in these schools used the computer class to play in the playgrounds. The report also criticizes the current PTI provincial government's policy makers for showing lack of seriousness for dealing with such shortages in the middle schools (Haroon, August 17, 2019).

So far as accessibility to computer classes was concerned, the survey results show that a majority (58%) conceded of receiving some sort of computer classes at public schools/ colleges. Among them who received some kind of computer training, a majority (51.24%) agreed that the computer classes that they received in their School/ College were/ are beneficial to them in learning basic computer skills. However, aorund 34% of the students were undecided on the benefits of computer classes and a small number (14.92%) thought computer classes to be ineffectual. An alarming revelation was that a considerable percentage of students (42%) had never received any kind of computer education at all (see Figure 19 below)

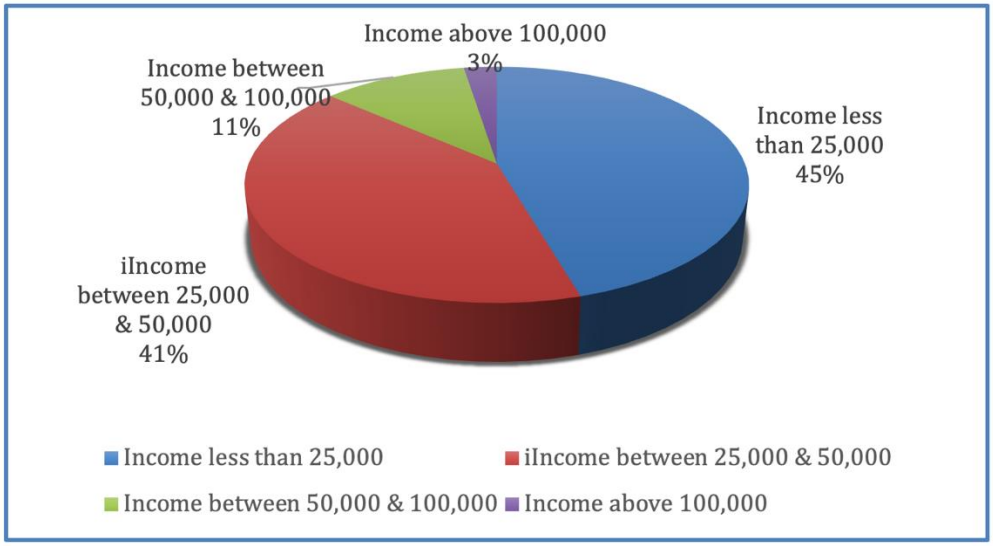
*Figure 19: Computer Classes and Student's Accessibility Issues*




Another hurdle in the way of accessibility were the undue restriction the students faced on use of IT labs. When students were asked in the survey if they were allowed to use School/ College computer labs in their free time, a majority (71.64%) reported in the negative and 12.44% were unclear as to whether their school/college will allow them to use the computer labs when they need to. This clearly shows that our schools/ colleges are not "digitally supportive" a concept introduced by Wastiau et al., (2013) who declares the state-of-the-art ICT structure along with the opportunity to access it as imperative to help improve digital competencies among students resulting in "digitally confident students". It also shows that the environment in schools/ colleges are not digitally positive, discouraging students to use computer technology to increase their knowledge or involve in self-study.

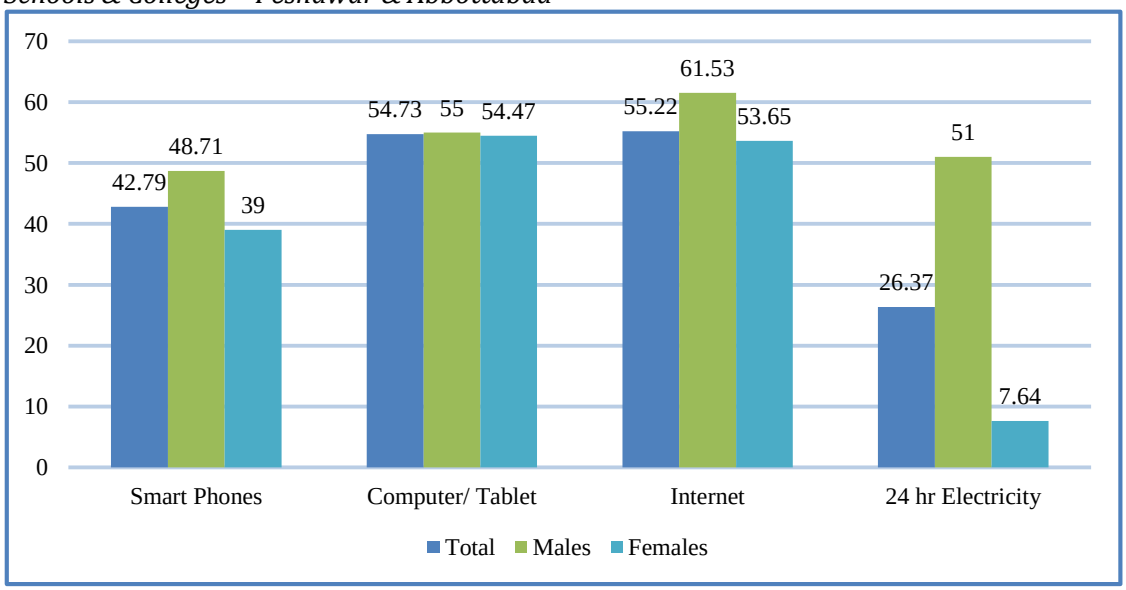
Inside the schools too, certain policies hamper **accessibility of all students to computer education**. For example, as suggested by interview respondents, students were exposed to computer literacy from Grade 6 (Middle Schooling) and onwards; on further query it was revealed that computer science was not a compulsory but an optional one left to the choice of students to choose from among Arabic, Pashto and other languages (S. Hussain, & W. Khan, FGD, July 14, 2021). Although there was also an understanding about the compulsion of making the subject of computers a compulsory one (S. Hussain, & W. Khan, FGD, July 14, 2021). To make up for such shortages, the Director EMIS reported the KPE&SED undertaking MoUs with private sector, such as Coded Minds in order to develop the skills related to ICTs in schools. He also reported on the private sector committing to provide such skills to primary and middle level schools in far flung areas of Pakistan (S. M. Khan, personal interview, July 14, 2021). 'We are trying our best to improve their skills within our limits' (S. M. Khan, personal interview, July 14, 2021). In this connection, the Additional Secretary KPE&SED reported on **several MoUs signed with the private sector**, such as Noon Academy and Coded Minds to develop **e-education in Khyber Pakhtunkhwa** for provision of human resource and other facilities (A. A. Khan, personal interview, July 14, 2021). He informed about only 15 to 20% of children in public sector schools are getting benefit from digital education initiatives. For the private sector institutions, the ratio of success in digitization was 60% and above, because of the children coming from financially well to do families, who could afford the digital gadgets for using such services (A. A. Khan, personal interview, July 14, 2021).

*Figure 20: Parent/ Guardian Income of Students in KP Higher Secondary Schools & Colleges in Peshawar & Abbottabad*




A look at the graph (**see Figure 20 & 21**), shows the income disparities of children studying in public sector schools and colleges in Peshawar and Abbottabad and how it impacts their ability to own digital tools which could enable them accessibility to online classes and other digital initiatives undertaken by the government. Around 50 percent of these students lacked access to electronic gadgets, particularly the ratio of access is further low among female students owing to the low income of their families. Majority of the students surveyed, came from either poor or lower middle-class families with mainstream coming from families with the parent / Guardian income less than PKR 25000 (45%); around 40% coming from a less than 50,000 income families. A smaller number had family income less than 100,000 (10.95%) and only 2.5% had an income of more than 100,000. While a considerable number of these students (41.29) had Pashto as their mother tongue, followed by Hindko (33.33%) and Urdu (24.38%). Other languages had a very small share (1%)**.**

*Figure 21: Access to Electronic Devices/ Internet/ Electricity (Students in KP Higher Secondary Schools & Colleges – Peshawar & Abbottabad*



In the survey results above, it is clear that less than half of the students (42.79%) owned some kind of a smart phone. The majority (57.21%) who were without a smart phone had several reasons for not possessing a phone. Majority were too poor to afford one (19.8%); others did not feel the need to use it (18.41%); and some did not understand its use (2.99%). One major issue was the permission issue with around 14% of the students not being allowed a smart phone by their parents. This shows either the inability of the parents to afford a cell phones for their children or the conservative thinking of the parents. It is worth noting that a majority of students (54.73%) spoke of having a computer at home. A slightly less number (45.25%) complained of not possessing a computer at home, majority being unable to afford one or did not feel the need to use it. A small number complained of no electricity or internet facility (3.49%). While on question of if they had internet connection, majority (55.22%) confirmed its availability and they had access to internet either at home (33.83) or mobile devices (20.4%). Those who had no internet access (43.28%) blamed it on their incapacity to own a smart phone (16.42%) or their poverty (12.44%). A whooping number (73.63%) did not have access to 24 hours electricity (see Figure 21).

Students in public schools/ colleges may have moved gradually up in the first -level of digital divide (an access divide) which can be seen by the increasing number of students having access to smart phones and internet, however the second level of digital divide (a skills divide) may still be strong. As Alexander van Deursen and Jan van Dijk (December 6, 2010) in their study of the Dutch society's internet skills, point out that "the original digital divide of physical internet access has evolved into a divide that includes differences in skills to use the internet". Some researchers believe that e-government can be either hindered by digital divide or it can contribute to digital divide (Ebbers et al., 2016). However while the issue of digital divide in the west has shifted from the inequalities in access to gadgets to the subject of use of these digital information and communication devices (Buchi et al., 2015). In the west while the social structure is there to support the digital transformation but the individual agency defines the individual preferences. As Pakistan lags behind in social structure conducive for digital transformation but also the use of the internet and information and communication technologies is somewhat abstruse. The access of majority of students in KP schools and colleges to internet (55.22%) as shown by the survey data, displays the fast diffusion of internet among the Generation Z in KP. However, this increasing internet penetration does not promise much transformation in the real sense, neither does it closes the gap of digital divide among the different social groups. Females especially have less access to the digital devices and internet connection. The access to digital device issue is directly linked with the low income of the parents of these children, a majority came from families with income less than 25,000.

The HEMIS officials rightly argued that unless the end users, i.e., the students in public sector colleges and universities are not facilitated with the provision of **cheap internet packages, mobile and laptop devices**, the students will fall behind education as compared to private colleges (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). There was also a stress on appointing a dedicated team for policy implementation through insightful study of regional developments in education, for example, as with Pakistan's neighbouring countries, such as India's example, cheap smart phones can be assembled in the country, rather than importing them from abroad (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

The fact that despite a previous policy of making computer education compulsory from middle schools in the public sector, this subject is still an optional one, can be attributed to low prioritization by the incumbent government, lack of proper IT labs, as well as IT teachers and other related infrastructure. The issue of 'student to computer ratio' in public schools where IT labs were installed was, therefore, downplayed by officials to emphasize that since computers was an optional subject, therefore not every child was supposedly using or needing an IT lab facility (S. Hussain, & W. Khan, FGD, July 14, 2021). It may be emphasized here that since students have a choice in subjects, it may create a digital divide within schools among those students who take the computer subject and those who do not. This is in addition to a clear digital divide between those schools which have IT labs and infrastructure and those which lack it. There is, however, a need to increase the number of computers and computer labs in schools, besides bridging the digital divide among schools by introducing computer and IT education at all levels of schools (primary, middle and higher secondary) from an early age. For the primary schools, there is no reported introduction of computer-based education in Khyber Pakhtunkhwa. In a digital age, such shortages and optional nature of the computer subject as well it's late addition at middle schools, rather than primary ones (Grades I-V) raises a big question over digital readiness on the part of these public schools and the department of Elementary and Secondary Education in Khyber Pakhtunkhwa. It was informed that all schools with IT labs had been provided with internet access. But it was also revealed that the teachers had access to the internet not the students and these teachers downloaded different videos and other materials related to the topic before using them in the classrooms. They did not use internet directly in classes for classroom teaching.

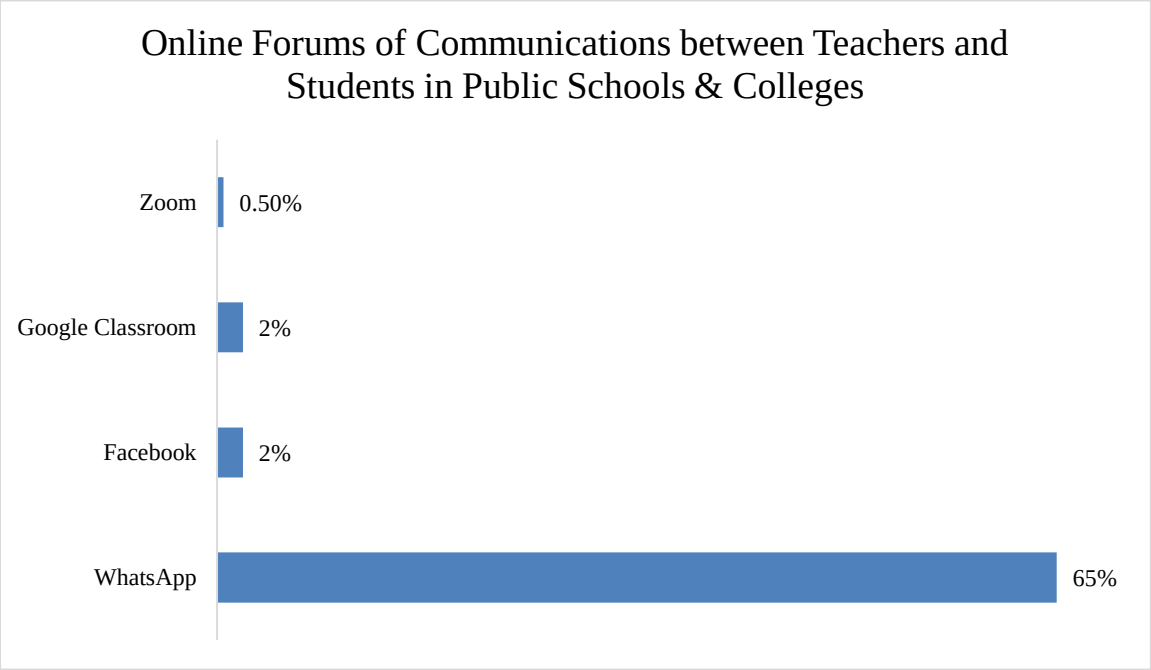
The same issues plague the attempts at teaching public school students, computer programming programmes. For example in the case of the 'Early Age computer Programming,' these are made available only to schools with IT labs and according to official accounts, only around 60-70% of the higher secondary schools have IT labs. Again 30 to 40% of schools without IT labs miss out on this important opportunity because of infrastructural shortages. Even though a considerable number of children do not get the opportunity to avail this program, the positive thing is that children who were exposed to it and provided such facilities did quite well and won awards.

Though the KPESED officials talked enthusiastically about the introduction of smart board in schools, however, the exact numbers of schools with smart boards could not be provided by the officials. The total number of Higher Secondary Schools in Khyber Pakhtunkhwa is 767; 491 of these are for boys and 276 are for girls. The officials reported around 60 to 70% of all the Higher Secondary Schools in Khyber Pakhtunkhwa possessed smart boards which were used to provide education through digital means to the students at these school (S. Hussain, & W. Khan, FGD, July 14, 2021). On looking up information about it online, one report from 2015 (Express Tribune) mentions 'interactive white boards' installed in 100 government higher secondary schools across the province (Zia, August 24, 2015). This was primarily done with the support of the NGO *Alif Ailaan*. Another 2016 report from the DAWN newspaper puts the number of such interactive smart boards introduced by the E&SED in high and higher secondary schools at 600; it gives a figure of around PKR 260 million for installation of such boards (Ashfaq, September 5, 2016).

The accessibility issue corelated to the use of online forums by students to communicate with their teachers. Majority of the students (64%) agreed to have used some form of online forum to communicate with their teachers including the most widely used was WhatsApp (65%); and

other less used forums such as Facebook (2%); Google classroom (2%); zoom (0.5%) (see Figure 22). Around 34% of the students had never used any online means to get in touch with their teachers given the fact that a number of students possessed smart phones (43%) and computers/ tablets (55%).

*Figure 22: Online Forums of Communications between Teachers and Students in Public Schools and Colleges*




If we look at the general trend in surveys in terms of the channel of interaction chosen by the teachers and students to communicate with each other, one can see the wider use of WhatsApp forum for all sorts of communications related to studies. This channel choice of heavy reliance on WhatsApp forum (65%) indicates the ease of use the app offers on smart phones to its customers that is the teachers and the students. However, less than half (42.79%) of the students were in possession of a smart phone, showing the widening digital divide and the inaccessibility of majority of the students to interact with their teachers. The overarching dependence of teachers and students on WhatsApp to deliver lectures and communicate shows the low level of teachers and students' confidence in their digital competencies and inability to use more formal means of communication and lecture delivering forums such as zoom, google classroom etc. It also indicates the incapacity of the school/ college strategies to support ICT integration in teaching and learning that was promised by the education department officials through the introduction of the LMS in schools and colleges.

## 2.4 What are the Issues in Digital Governance in Education

The official interviews posit a number of issues that hamper the smooth functioning and implementation of digital tools in education.

***Is Change Management & Organizational Culture an Issue?***

There is no doubt that bureaucracy's organizational culture in terms of its values, expectations and practices which guide the action of its officials is transforming. However, there seems to be a resistance to and skepticism on digitization's benefits and its resultant impacts on service generation among the officials. For example, there is cynicism among the education department officials on the effectivity of **online education vis a vis physical teaching.** To quote the Deputy Director Universities in the HED, *'the online education cannot be a replacement for interpersonal and face to face teaching'* (J. Iqbal and T. Khan, FGD, August 8, 2021). Though, online education is considered as the solution to current pandemic crisis and hope was expressed that as time passed the issues in online access to digital education would be resolved (J. Iqbal and T. Khan, FGD, August 8, 2021).

The various interviews also display technological shyness among the bureaucratic cadres, to quote the Special Secretary in HED, *'... personally I think people do not like the use of ICT tools'* (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). This reply came when he was asked about the organizational culture and ICT usage. He gave the example of e-office to argue that it was ineffective because of its *'complicated nature'... 'You will have to scan documents and then officials would write on them and then it would go to the other higher official in long chain but writing comments on such files is a complicated business'* (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). This is despite the acknowledgment that some systems worked better than others, such as the 'File Tracking System' and the e-summary system which was reported to be centralized and working (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). The former secretary E&SED and HED claimed that he had rejected a proposal of around PKR 55 million for provision of laptops to DEOs and ADEOs because they had sparsely used the EMIS for information seeking or had come very few times online... *'this reflected their attitude towards technological interventions'* (A. Khan, personal interview, July 5, 2021).

Somewhat similar fears were also expressed by the former Secretary HED and KPESED. To quote former secretary E&SED and HED, *'it is not an easy job...it involves many factors...it is not just technological change, but also a behavioural one...'* (A. Khan, personal interview, July 5, 2021). Sarcastically pointed out that people think of technology to be something 'holy' and therefore discouraged children from using computers in schools... *'I told them (the school administration) to allow students to use computers freely...in case it develops a fault we will repair it'*...mocking those computer operators in schools who did not allow students to operate computers in AC less rooms for fear of machines developing faults... *'I said to them there is no need for AC, just run the computers...computers don't need ACs to function...but I guess we need behavioural change for that'* (A. Khan, personal interview, July 5, 2021). There are other more practical reasons also for shying away from technology. There was an indication that the fear of losing financial incentives may make the official offer resistance to the ICTs. For example, the physical training of teachers in training institutes provides the trainers and officials financial benefits of Travel Allowance (TA) and Dearness Allowance (DA), which is denied in case trainings are made online (S. M. Khan, Personal interview, July 14, 2021).

Three additional aspects were highlighted on change management issues in bureaucracy owing to technological interventions: the mandatory nature of ICT usage by law; technical competence as well as vision of those who head the institutes; and recruitment through merit based testing

system. For example, the Director EMIS in E&SED, admitted the issue of attitude (from officials) in terms of resistance to ICTs, however he was quick to stress that when things are made mandatory, the officials then are compelled to undertake them. *'Now it is the ICTs which have made it a compulsion on the District Education Officers-DEOs- (to report) and whoever is not responding, secretary gets the reporting and then action is initiated against them… they now log in regularly…a culture is being developed'* (S. M. Khan, personal interview, July 14, 2021). He gave the example of E-Transfers to insist that since there is no alternate way of registering transfer cases in schools except online, therefore it has now become mandatory (S. M. Khan, personal interview, July 14, 2021). The use of cell phones through its concept of interactive screens is also said to remove the attitudinal barriers to smart technology among the teachers (S. M. Khan, Personal interview, July 14, 2021). The EMIS officials also admitted that the institutional head's knowledge and competence on e-education tools and its importance made a difference in better utilization or otherwise of an e-education tool, for example the smart boards in schools (S. Hussain, & W. Khan, FGD, July 14, 2021). The EMIS officials also associated the successful working of the 'e-office' with the person occupying the office, meaning departmental heads concerned and their level of commitment to its implementation (S. Hussain, & W. Khan, FGD, July 14, 2021).

There was also an acknowledgement among officials that the NTS recruited teachers were computer literate and therefore had little inhibition in the use of smart boards (S. Hussain, & W. Khan, FGD, July 14, 2021). The induction of fresh and technologically bold personnel through the NTS merit based system was considered to be a solution for the older teacher's reluctance to use ICT tools in schools as it was claimed that the new generation of these younger teachers who were appointed through the NTS were more computer savvy than the traditional teachers (K. A. Afridi, personal interview, July 30, 2021). Adaptability to technology and change management was also connected by the HED HEMIS officials to levels of higher education among the college faculty… *'we have more than 500 PhD., and more than 800 MS/ Mphil faculty and therefore, we don't have as many adaptation issues as in Elementary education… here, they (college faculty) easily understand (the ICTs)'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). Still the important context of appropriate training to engage older group of teachers cannot be downplayed.

Some officials from the education department also downplayed the change management issues from digitalization. For example, the additional director KPE&SED claimed around 90-95 % teachers to be comfortable with digital tools; only few who are at the verge of retirement do not feel the need to learn digital education tools… *'we got positive response from the teacher's representatives when we discussed the option of online classes when schools became closed due to Covid emergency'* (A. A. Khan, personal interview, July 14, 2021). Some officials even deny age to be an issue in adjusting to ICTs in offices; they identified skills shortage as more problematic.… *'the aged people now realize that they cannot live without IT; however, they lack skills…In my opinion they still think of ICTs as difficult and therefore, adaptation issues remain'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). And resistance to IT usage was also related to the nature of subjects taught, for example, Islamiyat and Urdu, whose background was not supposedly from IT (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The issue of adaptation to digital tools was also linked to the size and employee numbers in a specific department. For example, the HEMIS officials claimed that since they had less employees in the HED (10,000 teaching staff and 8-9 thousand ministerial staff in colleges) as compared to the Elementary and Secondary Education Department, therefore, it was relatively easier to manage them through digital interventions.

***How Far Regular IT Trainings and Proper Equipment Mattered?***

The education department officials at EMIS mentioned receiving trainings in 'e-office' under the project since 2018 (S. Hussain, & W. Khan, FGD, July 14, 2021). However, the EMIS is indeed a very specialist and technical oriented working and recruitment is also accordingly done from specialized fields. The EMIS officials also mentioned one section by the name of Assembly Business even implementing the 'e-office,' paper-less system and the project hiring of technical experts for that on regular basis with scanners even purchased to start the digitization of offices in the education department (S. Hussain, & W. Khan, FGD, July 14, 2021). However, there is an admission of the system not running very effectively in the education department, because of clerical staff's unfamiliarity with the system (S. Hussain, & W. Khan, FGD, July 14, 2021). This was probably because the in-service training for these clerical staff was not properly managed. The officials quoted the e-office system running well in the establishment department of the provincial government, but not in either health or education (S. Hussain, & W. Khan, FGD, July 14, 2021). The organizational culture in schools was also changing due to repeated teacher trainings imparted to teachers in schools where smart boards and computer labs were introduced. '… the teachers are no longer afraid of using ICT tools in teaching. People expertise with the software is improving…' said one official.

***How Much of an Attitude of Enthusiasm and Innovation and Technological Savviness at Policy Making Levels Help?***

On the question of enough enthusiasm and innovation at policy making levels, the former secretary E&SED and HED admitted that only senior level bureaucrats reach policy positions and their age unless they are technology literate does not allow them to understand the importance of ICTs (A. Khan, personal interview, July 5, 2021). His option was IT boards manned by technical graduates from leading universities to lead the IT based change in the province (A. Khan, personal interview, July 5, 2021). Officials also lamented the fact that mostly people who are oblivious to the potential and importance of ICTs were occupying the strategic policy making level posts inside the government (A. Khan, personal interview, July 5, 2021). *'Only those people who are experts, they have skills, they know the potential of IT…how to introduce it, how can it bring change in the system'* (A. Khan, personal interview, July 5, 2021). The EMIS officials in E&SED also talked about their department minister as well as the secretary being 'IT related' and understanding the importance of digitization of education (S. Hussain & W. Khan, FGD, July 14, 2021). To others, the personality of office bearer made sense in either slowing down the process or accelerating it, but this could not undo the process as such policies was incorporated and implemented under departmental policy, not subject to one man's wishes (A. Khan, personal interview, July 5, 2021).

**Enthusiasm** was also reported among the top officials of KPEMA and to quote KPEMA deputy director, *'so far as enthusiasm and innovation is concerned (among officials), I think all of them are interested in improving the system… within our parameters and budget, our current Secretary, Special Secretary, Director General (DG) all are very enthusiastic about new innovations…so they want digitization of all records*' (M. Sohail, personal interview, July 30, 2021). He reported on the Director General's (DG) enthusiasm about digitizing and online monitoring of student's attendance in schools, which was currently being managed through manual monitoring by the ECMA. Such enthusiasm meant that there were also plans underway for digitalization of syllabus and lessons and dissemination of the same online to all teachers. It also translated into working

underway on online training sessions for schoolteachers (M. Sohail, personal interview, July 30, 2021).

The HEMIS officials, especially the Director IT gave examples of KP Citizen's Portal, Right to Information Act (RTI) and '*Akhpal Wazir-r-Ala*' apps to highlight the aspect of **enthusiasm and awareness about the digitization of government services** (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021)… *'though there are issues because the old system cannot be overridden very easily, however, as far as this government is concerned, I don't think any previous government has done as much as this government (in ICTs)…at least they are focusing too much on it (e-governance)'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). He gave example of government's enthusiasm through the case of reopening of complaints on the Citizen's Portal by the government by advising the departments to review their replies and reconsider their mistakes.

The officials stressed on their own efforts to accelerate the process stressing on the utilitarian nature of digitization, perceiving the outcomes of digitization as benefiting more and more people. *'All of our high-up's are trying to bring state of the art projects with good initiatives for benefitting more and more people'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The HEMIS officials gave the example of the LMS system, which was accepted as soon as the HEMIS officials put it up to the Secretary Higher Education; the secretary even complementing it as one of the good projects (in ICTs) (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

There was, however, an **alternative opinion** expressed by the HEMIS officials on the question of **enough enthusiasm for ICTs and service generation** among the top officials. For example, in the focus group interview in HEMIS, the web developer as opposed to the Director IT carried a different opinion. To him it was not as much about a specific IT projects approval, but rather about issues involved in policy changes associated with frequent transfer of higher-level officials, such as Secretaries, who come for shorter period and faced issues with approval of policy changes from the Chief Secretary and the Chief Minister (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). While emphasizing personality of the higher office holder to be important, in terms of ICT centric or not, officials gave example of former Secretary Higher Education and Secretary Industries, who had transferred the working of the entire Industries department on IT. Officers linked Change management issues in education to the ICT savviness of their bosses, giving examples of how some of them through persistent direction and monitoring were adamant on making the ICT interventions a success. They also reported the older level bureaucrats and employees now accepting and getting used to the context of technological interventions in service delivery as against the manual practices. But, also stressed that the context of a uniform policy from the top bureaucracy on ICTs will help it drag down to the bottom level, however he also argued that such ICT initiative that do not involve changing a policy drastically are easily accepted and adapted to by the bureaucrats (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

***Does Resource Scarcity and Technical Issues Matter?***

Officials did mention **technical issues and glitches resulting from the first-time usage of ICTs** to conduct office business, such as meetings online during Covid 19 for compounding the issues of accessibility and usage of ICTs. The Deputy Secretary Universities in HED talked about his experiences of confronting issues while attending meetings online, *'there are different kinds of issues, sometimes the durations times out, sometimes, important things are missed out in these*

*meetings…I haven't attended even a single online meeting that did not ran into problems*' (J. Iqbal and T. Khan, FGD, August 8, 2021).

The issue also emerged from lack of expertise and training in ICT usage, especially for first timers. For example, in the context of teachers training getting online because of Covid 19, and issues therein, the trainers did concede facing certain issues when such trainings were shifted online for the first time, such as **connectivity issues and issues related to understanding** the Zoom communications system (M. I. Afridi and S. M. Ali, FGD, July 15, 2021). Despite such issues pertaining to the first batch of online teachers training, there was an optimism that such online trainings needed to continue in post pandemic period too (M. I. Afridi and S. M. Ali, FGD, July 15, 2021).

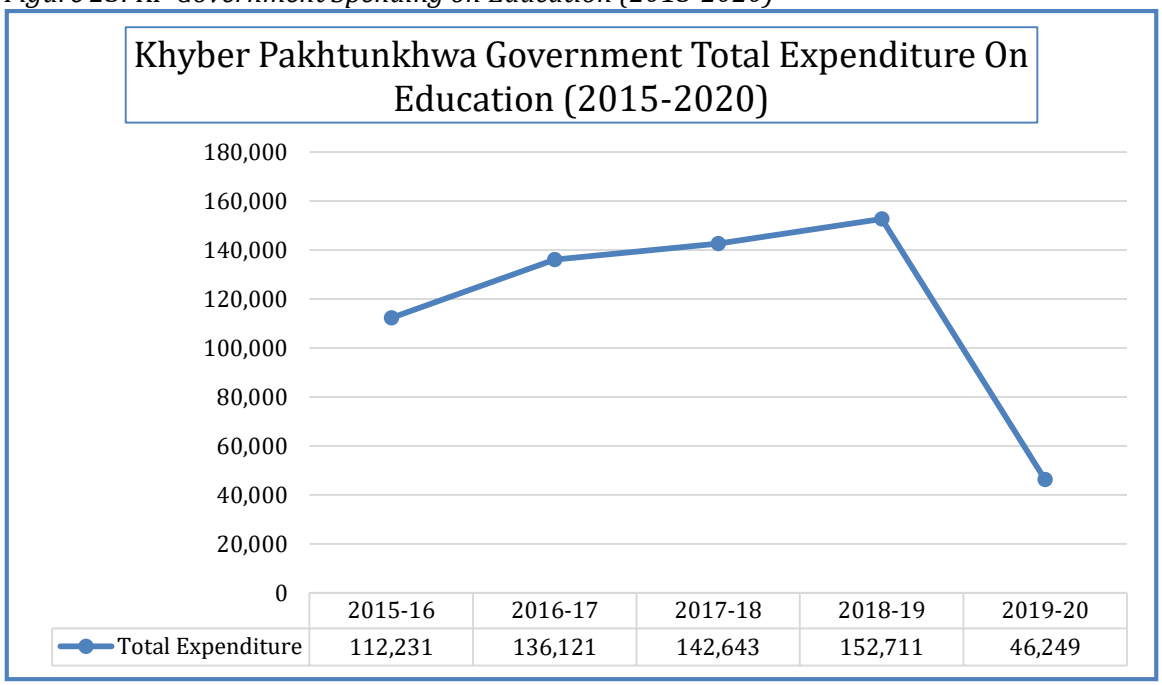
In the case of financial obstacles there was hesitation on the part of top-level bureaucrats in admitting lack of resources from the government side. However, we can assume that they did not want to annoy their political bosses by issuing such statements which could be traced back to them. In the case of a former Secretary E&SED and that of the HED, there was an admission that IT labs couldn't be introduced for all Higher Secondary schools because the creation of labs, the recruitment of teachers and their training all required allocation of additional resources (A. Khan, personal interview, July 5, 2021). Others who were serving in the middle and lower cadre of bureaucracy were more open to admitting/ accepting that if more resources were available the ICT initiatives would improve service delivery further (S. Hussain, & W. Khan, FGD, July 14, 2021). There was admission that much more in ICT and service delivery could be achieved provided more funds were made available. (see **Table 2** & **Figure 23** for KP Government Spending on Education between 2015-2020).

*Table 2: KP Government Expenditure on Education (2015-2020)*

| Years | Total Expenditure |
|---|---|
| 2015-16 | 112,231 |
| 2016-17 | 136,121 |
| 2017-18 | 142,643 |
| 2018-19 | 152,711 |
| 2019-20 | 46,249 |

Source: Pakistan Economic Survey 2020-21. Government of Pakistan, Finance Division. Page 206. Retrieved December 2021 from https://www.finance.gov.pk/survey_2021.html

*Figure 23: KP Government Spending on Education (2015-2020)*




The HED department had to temporarily outsource machinery, equipment and experts for days when-ever physical meetings could not be held due to pandemic situation as the department had no permanent set-up for digital meetings and it required finances (J. Iqbal and T. Khan, FGD, August 8, 2021).

Some officials downplayed the lack of resources aspect in favour of lack of vision of policy makers. '*Money matters, but more than money there is another thing which matters and that is vision…if you (policy makers) don't have a vision, you will waste the entire money you have*' (S. M. Khan, Personal interview, July 14, 2021), this points out to the waste of finances resulting from high official inefficiency.

For others, more than resources, the other paraphernalia associated with digitization being time consuming delayed processes, for example, trainings and personnel induction that were more time consuming and therefore took more time in implementation; procurement of digital equipment, which not being produced in Pakistan had to be imported and therefore consumed more time (A. Khan, personal interview, July 5, 2021). The deputy director KPEMA in E&SED denied the lack of funding or infrastructural problems… *'the government provides us sufficient funding.'* He only reported facing internet connectivity issue as their task was data generation in real time; for that he informed about contracting out with private cellular companies, such as the Telenor, which had wider coverage in Khyber Pakhtunkhwa's different regions (Sohail, personal interview, July 30, 2021).

The fact that elementary education had more resources to spend was stressed by several officials. On resource availability query, for example the additional director KPE&SED claimed the elementary education budget to be 205-6 million for the year 2021-22, which was around 18 % of the total budget; an amount enough to introduce digital learning in elementary education (A.

A. Khan, personal interview, July 14, 2021)5. There were also official comments that donor agencies were mostly interested in investing in elementary and secondary education and not in the higher education (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). Government of KP has kept education on top priority. In this regard the budget of KP Elementary & Secondary Education Department is increasing since 2013. (see **Table 3** and **Figure 24** KP Government Spending on Elementary and Secondary Education (2013-2018)

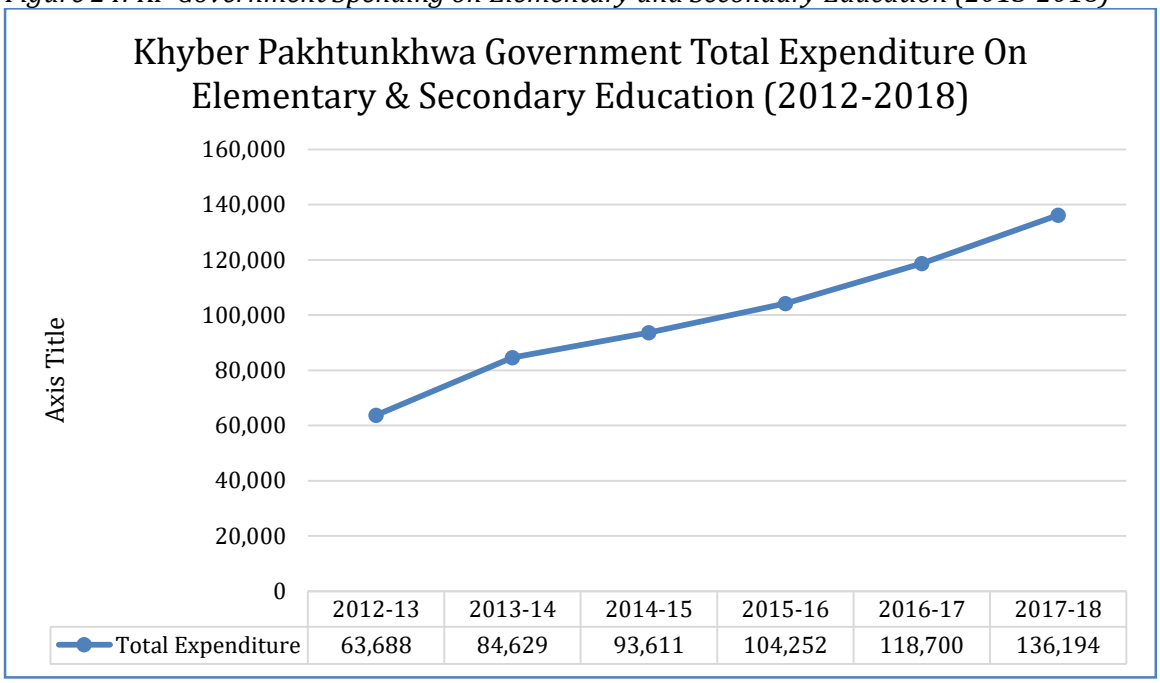
*Table 3: KP Government Expenditure on KPESED (2013-2020)*

| Years | Total Budget Allocation |
|---|---|
| 2012-13 | 63.688 Billion |
| 2013-14 | 84.629 billion. |
| 2014-15 | 93.611 billion. |
| 2015-16 | 104.252 billion. |
| 2016-17 | 118.700 billion. |
| 2017-18 | 136.194 billion. |

Source: KPESED, GoKP. (n.d). Major increase in the Educational Budget. KHYBER PAKHTUNKHWA EDUCATION REFORMS & ACHIEVEMENTS. Retrieved December 2021 from https://kpese.gov.pk/reforms/

5 Although the state of affairs in the schools visited for surveys indicated that how students were unaware of the availability of any IT lab in their schools (accessibility issue)

*Figure 24: KP Government Spending on Elementary and Secondary Education (2013-2018)*




But at the same time on further query, the official asserted that for IT labs in all high and higher secondary schools, the KPESED department certainly needed a big amount which was currently not available (A. A. Khan, personal interview, July 14, 2021). As stressed by officials, *'resources are the nucleus…the primary schools do not have IT labs, even 100% of our high schools are not covered by IT labs…we not only need IT labs, but also IT teachers and training of available teachers…we have issues on all sides, resources, funding, infrastructure all are major issues'* (A. A. Khan, personal interview, July 14, 2021). The Director EMIS also admitted that the reason for keeping computer classes optional for secondary levels schools was the shortage of resources and inadequate facilities. But also admitted that the government was looking towards the private sector and donors to fill the gaps in resource availability for ICTs in schools (S. M. Khan, personal interview, July 14, 2021).

Infrastructure and resource funding issues were downplayed with other set of reasonings. On this question, the HEMIS officials informed that they were consulted by the planners for Annual Development Plan (ADP) on higher education and were asked to furnish the list of facilities in existing colleges; the HEMIS used their MIS to prepare a proforma on college wise number of infrastructure, including matching demand with number of students and already existing infrastructure. It was also revealed that all plans for new colleges compulsorily included IT labs with system (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The financial issue was downplayed by stressing that the pandemic made officials work from home and develop notification and letters and shared them through WhatsApp, which connected the officials… *'this not only connected us to the technology, but also saved the spending… so in this case we did not face any specific financial problems'* (A. Q. Safi and S. I. Hussain, July 30, 2021).

***Is there Sharing of Inter-provincial ICT Best Practices in Education?***

The secretary level officers also clarified that there was no sharing of information on ICT based best practices in education between the education departments of various provinces (A. Khan,

personal interview, July 5, 2021; S. Hussain, & W. Khan, FGD, July 14, 2021). He even admitted of having little coordination between colleges inside the provinces to learn from each other's experiences, let alone from other provinces (A. Khan, personal interview, July 5, 2021). There was admission among officials that such a sharing of best practices and experiences could prove very beneficial, however it was very rare (S. Hussain, & W. Khan, FGD, July 14, 2021). By implication we can argue that there should be inter-provincial harmony in sharing of best practices through some inter-provincial board on e-government or through the provincial IT departments regular meet-ups under the supervision of the Federal IT department.

Though there was no sharing of best practices or consultations between provinces on successful digital interventions at higher education level, however, on Federal level it was asserted that the government supported the HED and considered the HEMIS of Khyber Pakhtunkhwa to be the best of all provinces (A. Q. Safi and S. I. Hussain, FGD, July 29, 2021). Another aspect that came to light in this connection was that there was a tutorial and video sharing between the Khyber Pakhtunkhwa government and that of Punjab. The Khyber Pakhtunkhwa government was also taking digital educational content such as videos from the Punjab govt to upload them on E&SED website. Though these YouTube videos subscription grew a lot (20 k subscriber) however there was one conflict and that was Punjab follows a different curriculum than Khyber Pakhtunkhwa one (by extension, the Federal government can also pitch in efforts in collaboration with provincial governments to create an online content with shared videos on those topics in the syllabus, which are common and separate videos on those topics that were uncommon to share with only concerned provinces.

***How Far is Data Security an Issue?***

On the issue of data security, there is a confidence among officials that the data security systems in education were quite secure; confidence was expressed in the ability of 'KP Data Centre' as state of the art data center, looked after 24 hours a day by competent staff. The officials reported on having security mechanisms in place for data security of their website and the information stored therein (K. A. Afridi, personal interview, July 30, 2021; S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). To some officials Data security was understood as not sharing of data with other persons and entities insisting , '….. official data is not shared with any one, neither we allow anyone to access it outside the organization'. To quote, *'Once a person came to us that I have written a book and kindly share with me all numbers of teachers so that I can SMS them that they should read my book… we answered him that unless he brings a written permission from the Secretary, we will not share any data'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The permission issue has chained the middle cadre managers from taking any risk.

***ICTs, Service Delivery and Citizen Trust in Government***

Almost all the official respondents in education were confident that delivery of services through ICT tools had markedly improved citizen trust on the government (A. A. Khan, personal interview, July 14, 2021; S. Hussain, & W. Khan, FGD, July 14, 2021; K. A. Afridi, personal interview, July 30, 2021), several confident using the term' absolutely' for ICTs increasing citizen's trust. *'Citizen's trust on government through ICTs is related to people understanding the importance and utility of these ICTs; resistance is usually mounted by people who are used to traditional setups and consider those to be more efficient than the new set-ups and therefore they are convinced only when they find it more beneficial than the old system'* (A. Khan, personal interview, July 5, 2021). Some gave

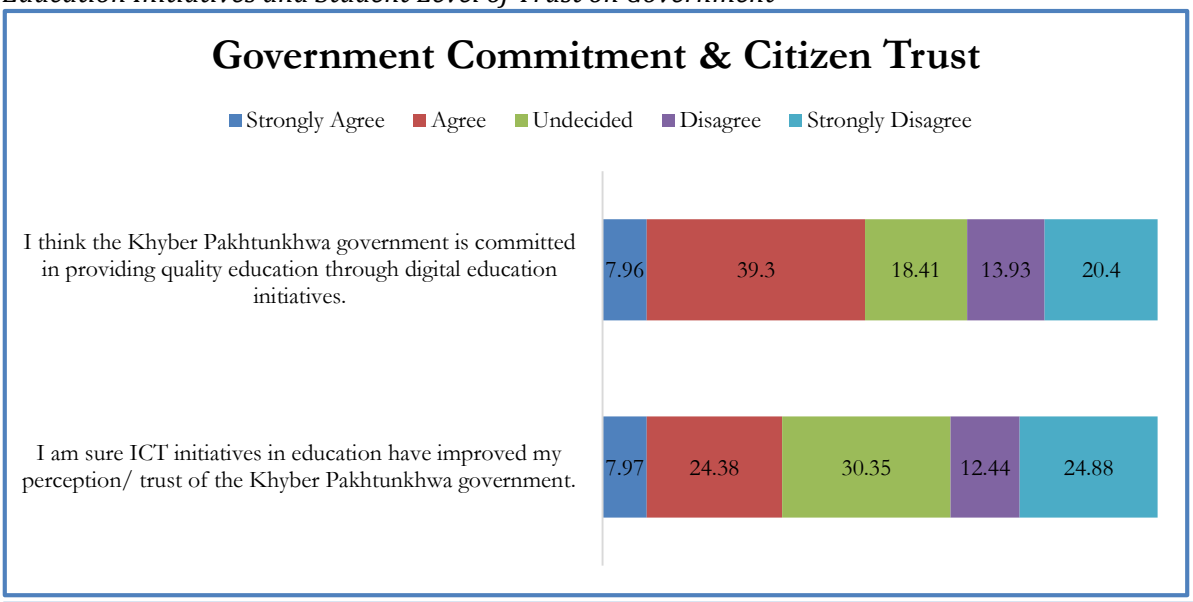
example of ICT tools such as the PM portal and institutions, such as PMRU, which made it possible to direct complaints to concerned departments in time and made them responsible to reply to complaints and redress grievances (S. M. Khan, Personal interview, July 14, 2021; J. Iqbal and T. Khan, FGD, August 8, 2021); resultantly trust on government increasing by around 50 to 60 %, depending on how many complaints were gainfully handled by different departments (S. M. Khan, Personal interview, July 14, 2021). Others stressed on the initiatives such as computer-based test for recruitment such as NTS, e-transfers for teachers, and e-procurements in government offices with open online display of bid invitations, receival, etc, ensured transparency of the entire processes, thereby gaining the confidence of all stakeholders - the youth, the teachers, the '*tekhedars*' (contractors) (A. A. Khan, personal interview, July 14, 2021). Examples other than in education sector were mentioned such as NADRA's online operational system, the current Vaccination drive, online job interviews, and online facilities as other major works of the current government that has built their trust among the common people (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021; J. Iqbal and T. Khan, FGD, August 8, 2021). 'It has facilitated the people a lot by saving their time… otherwise people have to visit offices in Peshawar for even small piece of work entailing their wastage of time' (J. Iqbal and T. Khan, FGD, August 8, 2021).

The additional director E&SED opined that ICT related reforms had improved citizen's trust in the government, '*We have introduced ICTs in test, which has increased citizen's confidence on the transparency of these tests, we have introduced e-transfers that has increased people's confidence because of no political interference, we have the e-procurement system, wherein all purchases and furniture procurement is done through it…this reflects that many apprehensions and of the people have been addressed…'* (A. A. Khan, personal interview, July 14, 2021). Ability to access essential information online such as examination results from the comfort of ones home also generates trust in the government (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). *'When it comes to technology, it wipes out any kind of trust issues….so building trust is the ultimate thing at institutional level and when everything is transparent it increases the level of trust in the institution and workforce'* (A. Q. Safi and S. I. Hussain, July 30, 2021).

The success of online admissions is said to have increased the public trust on the system. The HEMIS officials argued… '*the merit list displayed online mentions the roll number (of students), visible to all to inspect, so the trust has increased a lot and people appreciate… it is because of this reason that in the last 5 years, there is not even a single case where a complaint was registered on mistakes in the merit list or blunders or the allegation that there was a favour given…so we can see that trust level has increased a lot'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). The students can not only locate themselves on the merit list but also could see the position of other students and thereby keep a watch over second and third merit lists and their potential admission chances. This is trust building in the system (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

The system also offered an opportunity to make online complaint against their respective principals and VCs, which then shows on the dashboard and is monitored by the respective officers to see how such complaints have been answered and handled (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021). *'… so ICT tools are playing a very important role, but definitely there will not be any sudden change, it will definitely take some time for full implementation'* (S. I. Hussain, M. Nasir, & M. Ghufran, FGD, July 15, 2021).

*Figure 25: Survey Results Showing Students Perception of KP Government Commitment to Digital Education Initiatives and Student Level of Trust on Government*





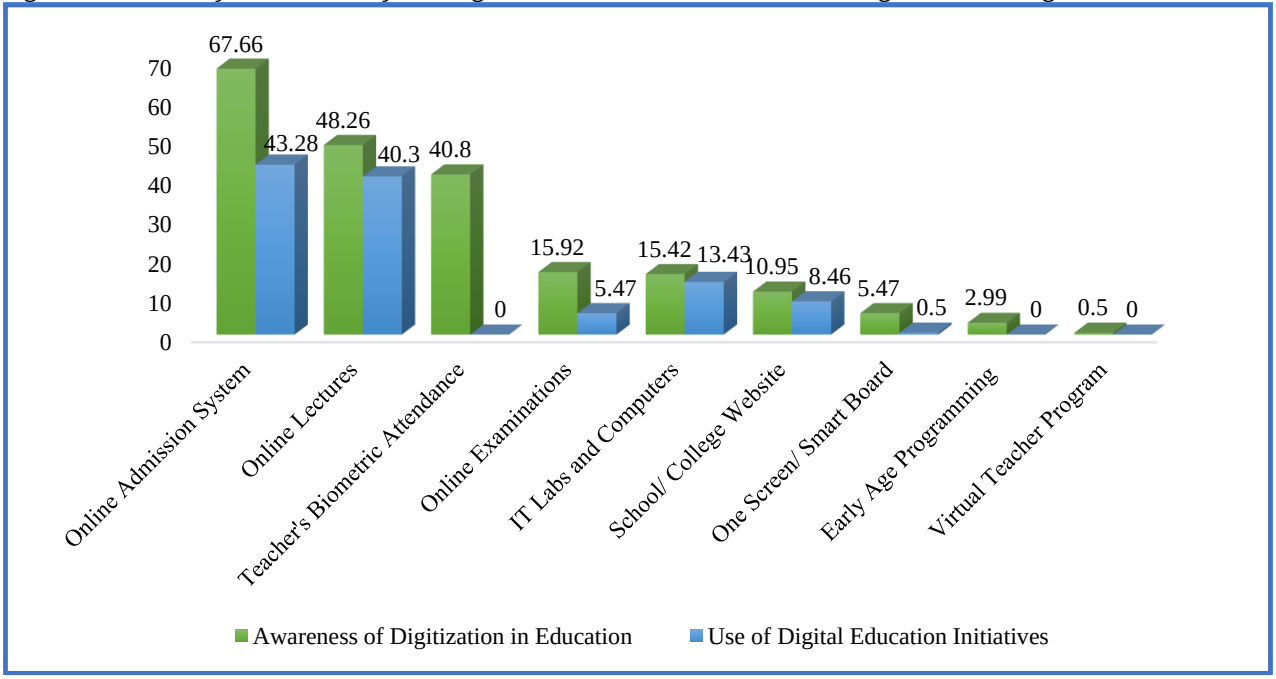
The survey results show that a majority of the students (47.26%) had no doubt in believing that the government was committed in providing quality education through digital education initiatives; although around a quarter of them (34.33%) still believe the government to be showing lack of commitment towards improving quality of education through digital initiatives in Khyber Pakhtunkhwa. 18% of these remained undecided on the ability of the government to deliver quality digital education. Whether introduction of ICT initiatives in education sector have helped build the trust of the people on the government show a mixed result. Around 37.32% did not believe so, whereas 32.35% students trusted the government digital initiatives in education, an almost equal number of students (30.35%) could not decide if these digital initiatives in education have improved the quality of education. Governments usually adopt initiatives in Bona

fide, however several hurdles demean the efforts of the government. The inaccessibility of the students to the IT labs in school and colleges is one such example. A discursive and systemic approach is needed in solving the issues related to digital education.

### *Awareness of Digital Education Policies/ Programs & Participation in Digital Education Initiatives*

The citizen's perception of their government performance is also related to their level of awareness about their government policies and actions and the resultant use of those services by the citizens. The level of awareness of the digital initiatives in education sector as well as their use has been slow and steady. The survey results show that although majority were aware of the digital initiatives of the Khyber Pakhtunkhwa government in education sector, however the use of these initiatives was not very encouraging. (See **Figure 26** below).

*Figure 26: Level of Awareness of the Digital Initiatives in Education & Highest Used Digital Tools*




As opposed to 29% of the students in the survey, a good majority (71%) were aware of the digital education program of Khyber Pakhtunkhwa Government, which included initiatives such as online admissions (68%), online lectures (48%), biometric attendance for teachers (41%), online examinations (16%), provision of IT labs and IT teachers in schools and colleges (15%) etc. Most of the respondents came to know about these initiatives through social media (44%), TV (35%), personal encounter (16%) and others. A majority of students (62%) stated that they used digital education programs, online admissions in colleges being the most popular (43%) among them; followed by online lectures (40%) and use of IT labs/ computers (13%). Here it is important to note that online admissions were restricted to college admission alone and the applicant could apply for admissions in government colleges by paying a small amount of fee (PKR 100) at a nearby Jazz Cash retailer/shop and view his name on the merit list. However, students who faced difficulty in applying online were asked to come to the facilitation desks made available at the college campus (KPHED, Archives & Library Department, n.d). Subsequently, the offline physical consultation channel runs side by side the online system in the college admission system.

Similarly, the students who affirmed to the use of online lectures were actually referring to the use of WhatsApp forum by their teachers.

## 2.6 Conclusion

This chapter attempts to explore the digital initiatives undertaken by the Khyber Pakhtunkhwa government and impacts on service delivery in the education sector. It is based on analysis of primary data from interviews of the education department officials as well as public perception on digital services generated from quantitative survey questionnaires. Secondary data sources are also utilized to plug in the gaps in primary data sources and analysis. The service providers, i.e., the officials are quite optimistic about the digital education initiatives of the Khyber Pakhtunkhwa government in bringing a transformation in elementary and secondary and higher education sectors in the province. However, from the side of the end users, i.e., the students, several problems plague the digitization of education. The citizen's lack of awareness about these initiatives, coupled with their inability to use these in the face of paucity of resources creates hurdles in the way of penetration of these digital education initiatives, thereby hampering meaningful changes associated with such transformations.

# CHANGING THE FACE OF PUBLIC SERVICE DELIVERY IN KHYBER PAKHTUNKHWA: DIGITIZATION OF HEALTH

## 3.1 Introduction

The use of Information Communication Technology (ICT) in the last two decades is credited with transforming the healthcare systems around the world. A Healthcare system is a combination of institutions, personnel, commodities, information, financing and governance strategies all aiming at disease prevention and treatment services (Durr-e-Nayab, 2009). It is understood as embodying all 'activities whose primary purpose is to promote, restore or maintain health' (WHO, n.d). A well-functioning health system responds in a balanced way to a population's needs and expectations by improving the health of communities, protecting them against the financial consequences of ill-health and providing them equitable access to people-centered care (WHO, n.d). The field of ICTs in health are known around the world by different names, including Health IT, E-Health, Health Informatic, Health Information Systems, D-Health, Health Information System, m-health and the like. Whether the introduction of ICTs in health is called a 'digital health knowledge economy' or a 'health system development,' access to safe, effective and affordable treatment of common illnesses can be made possible through ICTs. ICTs in health sector is termed as one of the fastest growing areas in healthcare. With the advancement of technology, the growth of new applications in this field have helped disseminate healthcare information to diverse audience in an engaging, easy, time saving and cost-effective way. This use of ICT is in turn making the healthcare information and services globally accessible at low cost (Srivastava et al., 2015).

## 3.2 Pakistan's Health Care System

Pakistan's health care system is characterized by inadequate access, high costs, and dubious quality of services provision (Durr-e-Nayab, 2009). As of statistics, around 50% of the total population lacks access to a doctor in their community; only 1 doctor is available for every 1200 people in a population of 200 million. In the same country, almost 70% of the medical workforce consists of female doctors, out of which only 23% ever practice (The Frontier Post, 2020). Health is already an under-resourced sector in Pakistan, which traditionally has been allocated only a small amount, usually under 1 % in our total developmental expenditure. Out of this, most of the allocation goes to secondary and tertiary care and only around 15 % is reserved for preventive and primary health care (Accelerate to the Digital State: d-Health, p. 10). A 2017 study by Pakistan Economic Survey (PES) revealed that Pakistan spent in the last one decade between 0.5 to 0.6 % of its GDP, which is dismally low to the World Health Organization's (WHO) benchmark of 6 %. This makes Pakistan's per capita health spending estimates to be around $ 36, which is again less than the benchmark by the WB for low-income countries at around $ 86 (Basharat, May 26, 2017). Another more alarming figure cites only 20 % of the population utilizing the first level care in the public sector, reflecting the poor trust in government services owing to several infrastructural and other deficiencies (Accelerate to the Digital State: d-Health, p. 10).

If we compare the health indicators of countries in the region, Pakistan ranks 7th in terms of Life Expectancy and ranks 6th in terms of Government Health expenditure, among the 8 countries in the region. The table 3.1 below shows the regional comparison of health indicators.

*Table 4: Health Indicators in the Region (2019)*

| Countries | Life Expectancy at Birth (total years) (2019) | Infant Mortality Rate (per 10,000 live births) (2019) | Infant Mortality Rate (per 1000 live births) (2019)** | Population Growth (Annual) (2019) | Government Expenditure on Health (% of GDP) (2019) (WHO)* |
|---|---|---|---|---|---|
| Maldives | *79 | - | 6 | *1.8 | 8.04 |
| Siri Lanka | 77.0 | 6.1 | 6 | 0.6 | 4.08 |
| Bangladesh | 72.6 | 25.6 | 24 | 1.0 | 2.48 |
| Bhutan | 71.8 | 23.8 | 23 | 1.1 | 3.61 |
| Nepal | 70.8 | 25.6 | 24 | 1.8 | 4.45 |
| India | 69.7 | 28.3 | 27 | 1.0 | 3.01 |
| Pakistan | 67.3 | 55.7 | 54 | 1.9 | 3.38 ***(1.1) |
| Afghanistan | 64.8 | 46.5 | 45 | 2.3 | 13.24 |

Source: Pakistan Economic Survey 2020-21. Government of Pakistan, Finance Division. Page 217, 219. Retrieved December 2021 from https://www.finance.gov.pk/survey_2021.html
Source: *World Health Organization Global Health Expenditure database ( apps.who.int/nha/database ). The data was retrieved on January 30, 20226.

Malpractice abounds at different levels of the health sector in Pakistan, from public sector hospitals to pharmaceutical sector to the field delivery of medical services. This is besides the issues of staff absenteeism, dual-job holding and theft of supplies in the public health sector (Durr-e-Nayab, 2009). Pakistan's meager allocation of under 1 % of its GDP to public health sector makes it hardly capable of dealing with multifaced health challenges generated by a huge population boom. Here, at the very basic level, the manual registry of diseases and patients often leads to most of the record lost. Resource crunch makes the e-initiatives in health a dauntingly slow process. Scholars are quick to assert that tertiary level e-health initiatives require not only huge finances, but also good infrastructure and trained health professionals. Naseem el al., are optimistic that since the E-health pre-requisites in terms of health professional's knowledge of ICTs is encouraging in Pakistan's; therefore, this shows its readiness for e-conversion of health services (Naseem et al., 2014).

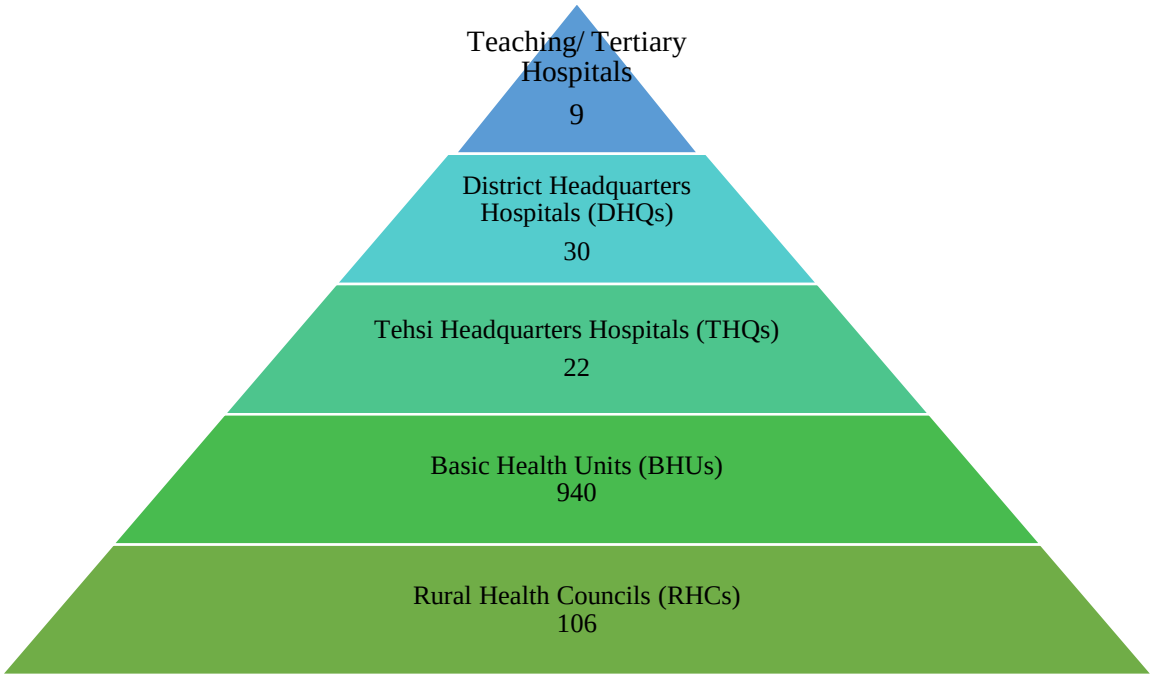
In Khyber Pakhtunkhwa, the health indicators are below the national average, especially for border regions of erstwhile FATA and Malakand Division. This is supplemented by the huge gender divide in access to health facilities. Gender inequalities and social norms restrict the mobility of women and their access to health services, education and employment. Women are not permitted to travel to health facilities or receive health services from male practitioners. The number of women who give birth with the help of a skilled birth attendant is just 48% in Khyber

6 Source: **Estimates developed by the UN Inter-agency Group for Child Mortality Estimation ( UNICEF, WHO, World Bank, UN DESA Population Division ) at childmortality.org.
*** According to Pakistan Economic Survey 2020-21. Government of Pakistan (Page 219), Pakistan's Health expenditure as % of GDP (2019) is indicated at 1.1 which was slightly increased to 1.2 in 2020.

Pakhtunkhwa and 26% in erstwhile FATA. The incidence of maternal and infant mortality ratios are quite high; 380/100,000 live births in FATA and 275/100,000 live births in Khyber Pakhtunkhwa (JSI Projects, n.d). As for the existing health units, they are not only far away but also unequipped with lack of staff and infrastructure facilities. Similarly, the availability of outreach services where health workers are mobilized to provide services to the population, away from the location of their work is unavailable.

The Khyber Pakhtunkhwa Health Network consist of Rural Health Councils (RHCs), Basic Health Units (BHUs), Hospitals at Tehsil Level (THQs), Hospitals at District levels (DHQs), and 9 Hospitals at the Tertiary level. See **Figure 27** below.

**Figure 27:** Khyber Pakhtunkhwa Health Network under Health Department of Khyber Pakhtunkhwa (including Merged Districts)




Source: Pakistan Economic Survey 2020-21. Government of Pakistan, Finance Division. Page 227. Retrieved December 2021 from https://www.finance.gov.pk/survey_2021.html

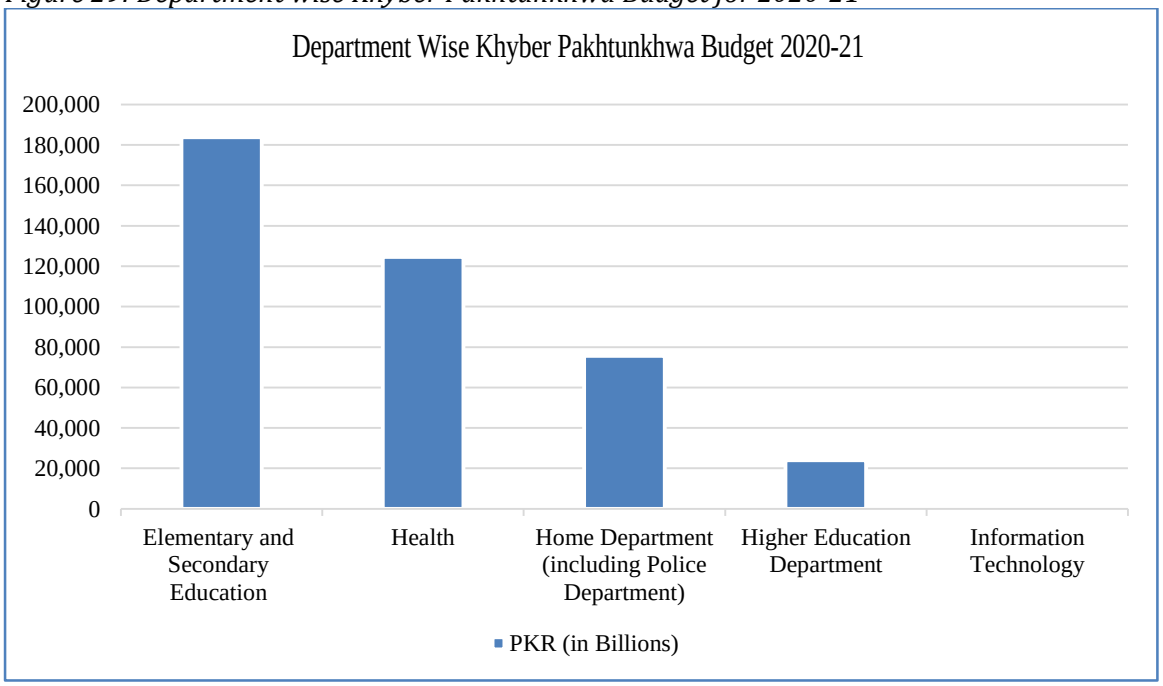
The Khyber Pakhtunkhwa government priorities towards healthcare could be understood by the province's health budget, which went up by 40 % in the year 2020-21. For the year 2021-22, the health budget is estimated Rs146 billion, arise from the Rs124 billion last year (Yousafzai, June 19, 2021). Pakistan faced total economic loss of PKR 2.5 trillion due to Covid 19 pandemic and the province also faced economic repercussion of Covid 19 outbreak. See the department wise Khyber Pakhtunkhwa Budget for 2020-21 in **Figure 28** below.

*Figure 28: Department Wise Khyber Pakhtunkhwa Budget for 2020-21*

| KP GOVERNMENT DEPARTMENTS | PKR in Billions |
|---|---|
| Elementary and Secondary Education | 183,788 |
| Health | 124,530 |
| Home Department (including Police) | 75,718 |
| Higher Education | 24,097 |
| Information Technology | 1,091 |

Source: GoKP. (2021). Rilient Khyber Pakhtunkhwa: A Citizen's guide to Budget 2020-21. Government of Khyber Pakhtunkhwa. Retrieved December 2021 from https://www.pakp.gov.pk › Citizen-Budget-2020-21

*Figure 29: Department wise Khyber Pakhtunkhwa Budget for 2020-21*




In order to address the disparities in the Merged Districts and bring them at par with the rest of the areas, the Government of Khyber Pakhtunkhwa adopted a 03 years Accelerated Implementation Programme (AIP) 2019-2022, to address the key developmental gaps in the Merged Areas. In the first phase an allocation of Rs 8.3 billion made in ADP 2020-21. Also, Sehat Sahulat Programme to be extend to 100 percent of the population of the province by June 2021 (Pakistan Economic Survey, December 2021, p 227)[7].

[7] **Note:** District Head Quarters (DHQs) are located at district level and serves 1-3 million population. DHQs provide **promotive, preventive, curative, diagnostics, inpatient and referral services**. All DHQs

## 3.3 Digitalization of Health Service Delivery in Khyber Pakhtunkhwa

Digital service delivery is indeed cost effective and therefore credited with being efficient (Orton, et al., 2018). And hence in accordance with international trends, the Pakistani government too is providing various e-services, including those related to vaccinations, to pandemic alerts, to disease tracking and controls. Added benefit of e-service delivery is that government can initiate timely feedback flows through different applications to improve the services (Husain, 2021). In the wake of spread of corona pandemic and governments around the world switching to digital public service delivery, scholars have also tried to raise the questions on what benefits digitization could bring to health services in Pakistan. In Pakistan, many pilot projects in d-Health are not carried into full term projects because of sustainability of funding issues, high risk involvement for private stakeholders, and long time-to-market for commercial solutions (Accelerate to the Digital State: d-Health, Elevating Healthcare Roadmap to Digital Health). To connect the Basic Health Units in rural areas to district hospitals, a linkage was created between local health units with specialists in District hospitals under the District Delivery Challenge Fund, which aims at improving health service delivery in the Punjab and Khyber Pakhtunkhwa (Husain, 2021).

Other tele-health initiatives private sector initiatives also started, such as the ***Marham*** **app which is developed to act as a platform for online interaction of health care professionals and patients.** Muhammad Ittefaq and Azhar Iqbal (2018) in a study on this first health start-up in Pakistan proclaim it to be a significant step in the right direction in digitizing health sector in the country. They used a mixed method of combining qualitative content analysis of social media posts of *Marham* Facebook and twitter accounts and a quantitative one of using descriptive statistics for male and female samples and conducting statistical analysis of it to highlight the percentages of health issues discussed most on *Marham* social media sites. Their findings suggest challenges to digitization of health in the shape of lack of tech savvy character of people in rural areas and those coming from low-income groups. Therefore, most areas in Khyber Pakhtunkhwa, Baluchistan and Sind were not using this app. This is in the face of many rural communities in Pakistan not even having internet access or that of regular electricity to access digital health apps. Since most health professionals prefer to run clinics in urban areas, therefore the context of booking appointments also becomes limited for rural residents. The scholars also highlight the limitation of lack of checks on fake doctors having profiles online and engaging in online patient treatment and counselling (Ittefaq & Iqbal, 2018).

Another similar story is that of the ***'Sehat Kahani E-Clinics'***, as one of the fastest growing tech companies aims to provide doctor's access to patients in remote areas. Under it, Digital Health Innovation Hubs called E-health hubs have been established throughout Pakistan. Though the numbers are small, around 19 in Pakistan and only 3 in Khyber Pakhtunkhwa, all in Mansehra district (Balakot, Chitti Gattiyan and Lahorbanda), however its impact is impressive as of now 340,000 consultants have joined it with 5000 online female doctors. There are 150 community staff and 32 e-clinics working under it throughout the country. It provides access to low-income areas via nurse assisted video consultation. It also provides a tertiary care referral system, monthly counselling sessions and health awareness compaigns, held at sehat kahani e-hub. Some

provide referral care to patients referred by BHUs, RHCs and Tehsil Head Quarters (Hassan, 2017). https://www.ijarp.org/published-research-papers/oct2017/Healthcare-System-Of-Pakistan.pdf

of the very remote areas in Pakistan have access to quality health care facilities through 15 e-hubs across Pakistan. Patients have to use telemedicine e-health app to connect with doctors in Pakistan 24/7 (Sehat Kahani, n.d). Sehat Kahani's network of E-Health clinics ensures the presence of a virtual female doctor in communities where quality healthcare was still a dream. The Sehat Kahani Digital Health Innovation Hub was created in collaboration with Frontier Medical College (FMC), to enable patients to access medical specialists online that are not physically available to patients in their communities. This Hub will also be used to create Khyber Pakhtunhkhwa's First Digital Health Incubation Center (The Frontier Post, September 30, 2020). The First Women Bank Limited (FWBL) signed an MOU with Sehat Kahani-one to provide E-Health Financing Loan to female health workers that allows them to set up their clinics, thereby connecting a doctor to patients through the Sehat Kahani application (The Frontier Post, September 30, 2020).

## 3.4 The Khyber Pakhtunkhwa Health Department (KPHD) and Directorate General of Health Service (DGHS)

***KP Health Department***

As mentioned in its website (healthkp.gov.pk), **the Khyber Pakhtunkhwa Health Department** is a three purpose institution: makes health policies; governs the health care institutions; and initiates all health related intervention (The Health Dept. KP, n.d.). It mentions digitalization as well as decentralization as essential steps in providing health care facilities to people at their doorstep (The Health Dept. KP, n.d.). In its 'statistically prioritized interventions, the Health Department also mentions besides epidemic outbreaks and precautions, the priority of 'data banked for future referrals' (The Health Dept. KP, n.d.). It outlines as its mission the improvement of health and environment for the people of Khyber Pakhtunkhwa through provision of international quality health care services (The Health Dept. KP, n.d.). The 2018 Health Policy Khyber Pakhtunkhwa outlines the provision of a 'universal,' 'equitable,' 'accountable,' 'community focused,' 'innovative,' 'responsive,' and 'transparent' universal health coverage for Khyber Pakhtunkhwa people as principles driving health policy implementation (Health Policy Khyber Pakhtunkhwa, 2018).

***Directorate of Health***

There is also an affiliate department of Health named **Directorate General Health Services (DGHS)**. Its website (dghskp.gov.pk) mentions its functions as policy making, planning and reforms, health education, community involvement and advocacy, disease prevention and control, quality assurance and control, monitoring and evaluation, knowledge management for evidence-based decision making, health human resource development and management and legal services to name a few (Directorate General Health Service, Health Department, GoKP, n.d.). Primarily this institution is the policy implementation one for Health Department and its vision is creation of an integrated and coordinated health system through Primary Health Care to District Health System for provision of universal access to health services (Directorate General Health Service, Health Department, GoKP, n.d.).

***District Health Management System***

The website of Directorate General Health Services (DGHS) augment the introduction of a **DHIS-District Health Information System** (Directorate General Health Service, Health Department, GoKP, n.d.) and several other **Health Management Information Systems (MIS)** reflected in its dashboard on website. It was in 2009 that the **DHIS** replaced the previous HMIS (Health Management Information system) in 12 districts of Khyber Pakhtunkhwa. The DHIS website (dhiskp.gov.pk) mentions this system of **MIS** as an 'open source software platform for reporting, analysis and dissemination of data' for health programmes that was in use in more than 40 countries in the world (DHIS, DGHS, GoPK, n.d.). DHIS started its website in 2017, which is also utilized by the Directorate of health. DHIS carries out evidence-based reporting from all the primary and secondary healthcare facilities across the province (DHIS Annual Report, 2017).

The HMIS dashboard also mentions the **EPI MIS** which translates into **Expanded Program on Immunization – Management Information system;** it was launched in 2017 for regular online reporting from 25 districts of Khyber Pakhtunkhwa. A total of 1088 permanent EPI technicians were recruited for this purpose (Annual Report on DHIS, 2017). Another programme, the **LHW-MIS Lady Health Workers MIS for family planning and primary care, and MNCH-MIS (Maternity Newborn and Child Health MIS** has also been configured with the DHIS server (Annual Report on DHIS, 2017). An assessment of 154 LHWs from 9 BHUs of 4 districts Jhelum and D.G. Khan (Punjab), Mardan (Khyber Pakhtunkhwa) and Sukkhar (Sindh) were carried out in 2012 to review the improvement in the district health system brought by the **LHW-MIS**. The reports suggest that data completeness on several indicators were low because of the unavailability of MIS tools to the LHWs. Another issue indicated was that the accuracy of the data was also compromised (Mahmood & Naz, 2012).

According to the 4th Quarterly Report on **DHIS** (2011), there was absence of 'evidence-based' reporting from the health facilities about the state of affairs at the primary and secondary level of health facilities. DHIS implementation objective was to provide timely, accurate and reliable data. The DHIS compiles raw data, analyze it and projects the prevalent problems within the health system in areas of disease burden and presence of adequate facilities. This in turn, enables the policy planners to manage the health care budget according to 'evidence based' health issues. The previous HMIS system was restricted to the outpatient departments of health institutions working at First layer care facility (primary healthcare) only. On the other hand, the DHIS system covers the outpatients' departments, as well as the indoor facilities of all the primary Health care centers along with all Tehsil hospitals and all District Headquarters Hospitals. The indicators of all the vertical programs in healthcare such as Expanded Program of Immunization (EPI), TB Dots Program, Maternity Newborn and Child Health (MNCH), family planning program, Centers for Disease Control and prevention (CDC) and primary health care are also covered by the DHIS system (Report on DHIS, 2011).

## 3.5. ICTs and Digital Health Vision of Khyber Pakhtunkhwa Government

All officials in the Khyber Pakhtunkhwa Health Department and its Directorate underlined the importance of ICTs in health (I. Khan, Personal Interview, July 15, 2021; M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021; B. Bashir, Personal Interview, August 11, 2021; A. Ibrahim, Personal Interview, July 30, 2021). The health officials stressed that policy should always be driven by data; that is why use of ICTs in the health sector have allowed the government to make appropriate

policies to deal with, for example the Covid emergency (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). Some emphasize it to argue that it helps the government to meet the international standards under JSI,8 which makes it compulsory to digitize health services (B. Bashir, Personal Interview, August 11, 2021). Officials in the DHIS at Health Directorate preferred ICTs for ease in accurate planning to develop health facilities by the government (A. Ibrahim, Personal Interview, July 30, 2021). The Deputy Director Public Health consider health policy to be deficient on account of not being demand driven or need driven. The policy makers are hardly aware of the situation and health professional's role in it, unless they get proper data on it. *'Policy is always driven by data… if data is not being generated, for example in Covid 19 we talk about different waves and that is possible only when data is generated from the bottom… if this had not been the case, it would have created a very different scenario'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

ICTs were also deemed essential for creating awareness about health issues and diseases among the people. The Deputy Directors Public Health argued that ICTs have helped create awareness among the people; the example of ring tones on mobile phones being replaced by awareness message by the government is one good example; *'everyone knows now how to protect from Covid 19, including wearing masks, washing hands, taking vaccines etc.'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). They also reported on opportunity provided by Covid 19 for giving a big push to ICT usage for data generation; the only disease for which health directorate was getting 'real time' data from the field through ICT tools… *'Covid 19, I must say is a big opportunity… it is the only disease for which we are getting real time data … this 'real time' data is now being shared globally'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

## 3.6 Is Technology the 'Silver Bullet' for Health Service Delivery? Findings and Discussions from the Field

The following analysis draws on findings generated from the service providers end, i.e., the education department officials, as well as the end user's perspective, i.e the public on how digital initiatives are improving efficiency, transparency and inclusivity/ accessibility in service delivery. The service provider's perspective is drawn from data generated from interviews conducted with officials from the above-mentioned Health Departments, the Directorate General Health Services (DGHS) and their affiliate institutions. The end user, i.e public perception about ICTs and impacts on services in Health is based on data from quantitative survey questionnaires collected from patients at the two leading tertiary based Teaching Hospitals in Peshawar and Abbottabad districts- the Lady Reading Hospital Medical Teaching Institute (MTI), Peshawar and the Ayub

8 JSI or John Snow Inc. (Public Health management consulting and research organization) has worked in Pakistan for more than 25 years, supporting the Government of Pakistan to strengthen the health system, improve maternal, newborn, and child health outcomes, and address the global health security agenda. The USAID-supported Integrated Health Systems Strengthening and Service Delivery (IHSS-SD) Activity is helping Pakistan implement the Global Health Security Agenda by strengthening Pakistan's health system to be able to detect, report, and respond to emerging public health threats (such as outbreaks of COVID-19, HIV, TB, typhoid and other infectious diseases) within the quickest time possible. JSI also supports the public sector health service delivery system to create and maintain accessible and equitable basic health services in Khyber Pakhtunkhwa province, along Pakistan's border with Afghanistan, serving the most remote and hard-to-reach segments of the population. See https://www.jsi.com/location/pakistan/ and https://www.jsi.com/project/integrated-health-systems-strengthening-and-service-delivery-ihss-sd/

Teaching Hospital Medical Teaching Institute (MTI), Abbottabad. Secondary data sources are utilized to complement or contest the claims generated from primary data sources.

***ICT Tools and Service Delivery in Health***

COVID emergency has provided a big push to ICTs usage in health service delivery. **Disease surveillance and data generation** have helped expedite decision making and action on health emergencies by the government, all based on generation of **real time data from the field**. The emergency in Covid had stimulated some technology related developments such as **online meetings** (A. Ibrahim, Personal Interview, July 30, 2021). The generation and sharing of real time data for Covid, for example has led to the organization of **District wise Rapid Response Teams**, for dealing with all reported Covid cases (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). For other infectious diseases, data is being collected through **'Multiple Surveillance Systems.'** The **'Vaccine Preventable Disease Surveillance'** makes available, reporting on children's immunization against 9-10 preventable diseases (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

The Khyber Pakhtunkhwa government under its **Khyber Pakhtunkhwa Public Health (Surveillance and Response) Act** (2017, pp. 5-6) has made it mandatory on the Doctors to report on 14 types of diseases within 24 hours. It also states that a Provincial Disease Surveillance Center will be established in Directorate General Health services (DGHS), headed by the Director Public Health. The goal is to collect, receive and exchange information with district disease surveillance centers in each of the Khyber Pakhtunkhwa districts, headed by the Deputy Commissioner (DC) and assisted by the District Health Officer (DHO). On **Disease Surveillance**, it was reported that essential infrastructure, for example tablets were available in BHUs. *'Every EPI (Expanded Programme on Immunization) technician is given an official android [tablet], with a monthly package, which they are using to send weekly reports on disease outbreak in districts…if clustering is formed in any districts on reporting of multiple diseases, then it is reflected in red [colour] on the dash board…which results in immediate response to disease outbreak'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). The officials mentioned the **technicians in BHUs** had been provided with android tablets for the purpose of regular surveillance update. The officials also mentioned a programme in pipeline '**DHIS 2,' to deal with the issues of disease surveillance not covered by DHIS.** This programme for which budget was already allocated was to be initiated in a few months (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). The reason why this programme is initiated despite technicians in district BHUs possessing official Android tablets for disease reporting was that this system would install **fixed android tablets** in BHUs, around a 1000 in number, in different BHUs to ease disease reporting. This programme for which budget had already been allotted was being initiated to make up for issues, such as non-reporting on days, when technicians were absent from duty along with their tablets. This also aimed at creating a unified dashboard, which will incorporate data simultaneously from the OPD in hospitals, as well as other sources, including notified diseases reporting (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). This new system will unify bits and pieces of information to create a unified dashboard for ease of use by policy makers and users alike.

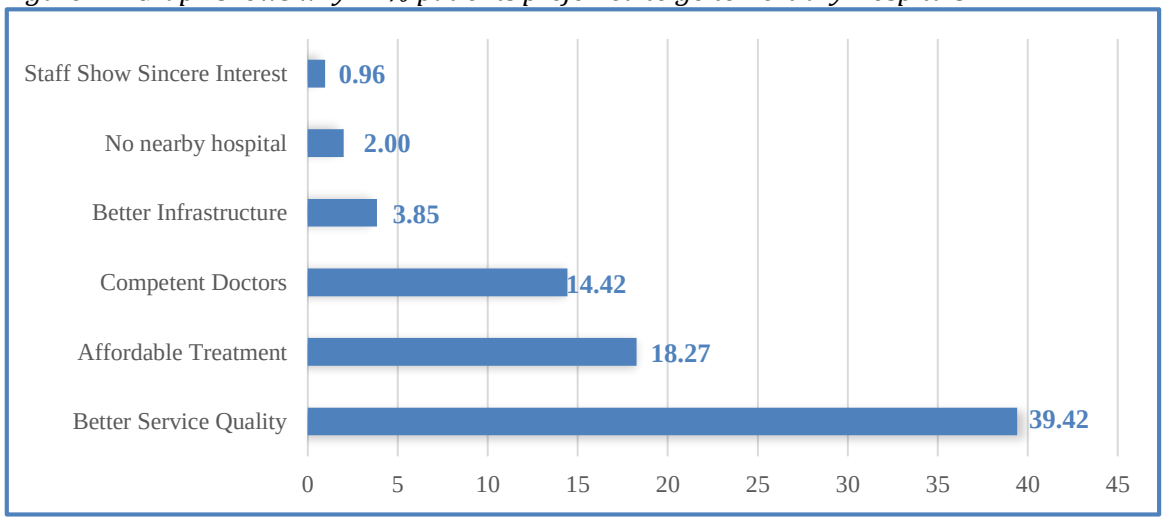
According to the DHIS 2020 report, **43 diseases have been selected as 'priority diseases**.' This will help indicate which diseases/ cases were treated at health facilities in different district. The information will help in re-distribution of resources according to disease pattern. It will also

enable the Health Department and Directorate (DGHS) to initiate specific preventive, promotive or curative services to control the spread of diseases. Tertiary hospitals are not included in the list of data provided by DHIS (DHIS 6-month Report, June-December, 2020). A thorough review of these different documents reveals that the DHIS mapping of evidence-based data is reported from around 28 districts of Khyber Pakhtunkhwa as opposed to the current 34 districts in the province. According to Pakistan Economic Survey (2020-21, p 227), the Khyber Pakhtunkhwa Health Network consists of 940 BHU's for the entire province (including Merged Districts) serving a population of 35 million. It means 1 BHU serves a population of approximately 370,000.

Surveys carried out in LRH MTI, Peshawar and ATH MTI, Abbottabad showed the hospital preference of citizens. The majority of patients (60%) reported that they would not go to big hospitals for smaller health issues. When asked about the healthcare facility they visit when they or their family member is sick, 49% stated that they would visit their local BHU; 23% would prefer to go to their District hospitals; 7% would visit private clinics. A considerably small number of citizens reported that they would use home based medications (0.96%) or would go to CMH (0.96%). Most of the patients who reported to have visited the local BHUs or hospitals said that they were compelled to visit big hospitals.

When asked if they go to big hospitals for smaller health related issues, 40% of the citizens stated that they would go directly to the big hospitals because of several reasons; such as some believed that better services were available in bigger hospitals (39%); the treatment was more affordable in bigger hospitals (18%); the doctors were more competent (14%) or because of better infrastructure (4%) (see Figure 30). A very small number stated that they come to big hospitals as the staff show sincere interest in helping the patients (0.96). Some (0.96%) said that they were forced to come to big hospitals because of the absence of any healthcare facility near their homes.

*Figure 30: Graph shows why 40% patients preferred to go to Tertiary Hospitals*




When asked about information on their local BHU, 20% were unaware of having any local BHUs; 72% said their BHU had doctors; 68% said their BHU had nurses and paramedics. None of the patients who had come to the tertiary hospital for treatment were aware of any e-health facilities at BHU level.

While conducting surveys from female (patients/ patient relatives) in LHR, Peshawar, majority were unaware of the existence of any BHU in their locality. Several females complained of

overcrowded OPDs in government hospitals. One female patient in LRH, Peshawar said, *"OPD parchi lines are overcrowded …that is why for minor health issues, people prefer to go to local nearby private doctors who charge less fee like fifty rupees …"*

During conducting surveys not much difference was seen between the level of understanding and participation level of patients at LRH Peshawar and ATH Abbottabad. However, one striking difference was that in LRH (despite the fact that it is more well equipped and well managed hospital than ATH) there were noisy fights among the patient relatives and security at the Lab section and in the main OPD. Several patients/ relatives were seen fighting and shouting in front of the doctor's offices, people complaining about the late arrival of doctors.

***Number of BHUs in Peshawar and Abbottabad***

According to the data that was acquired by Media Matters for Democracy through a Right to Information request in June 2018, there are 54 BHUs in Abbottabad which has a population of 1332912. There are 41 doctors appointed for these 54 BHUs. Peshawar with a population of 4269079 had 47 BHUs and 47 doctors appointed (Naeem, June 24, 2018) (see Table 6 below).

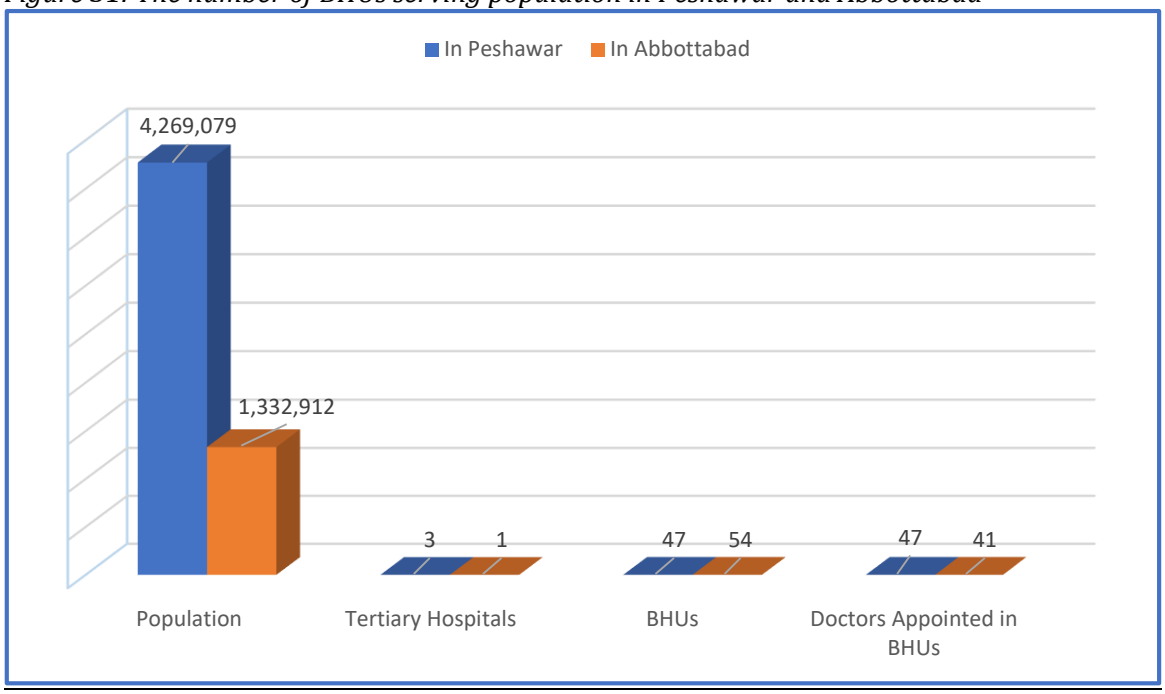
*Table 5: Number of BHUs available to the population of Peshawar & Abbottabad*

| | District | Population | Tertiary Hospitals/ MTI | BHUs | Doctors appointed in BHUs |
|---|---|---|---|---|---|
| 1 | Peshawar | 4269079 | 3 | 47 | 47 |
| 2 | Abbottabad | 1332912 | 1 | 54 | 41 |

Source: Naeem, W. (June 24, 2018). KP – Health – Financial and Human Resource Details of BHUs. Data Health. MEDIA FOR TRANSPARENCY. Retrieved January2, 2022 from http://pakrtidata.org/2018/06/24/kp-health-bhus/

According to this information, one BHU with one doctor in Peshawar District covers a population of 90,831 people. Similarly a BHU with one doctor serves a population of 24,685 people in Abbottabad. It clearly shows the why the tertiary hospital in Peshawar was brimming with patients because of the non-availability of efficient number of BHUs in Peshawar. One BHU with one doctor serving a population of 90,831 is alarming. This mounts pressure on the tertiary hospitals to treat patients even with minor health issues which could have been looked after in local BHUs. By implication there is a need to increase the number of BHUs in Peshawar so stop the influx of patients to tertiary hospitals for minor health issues. There is a need to create awareness among people that tertiary hospitals are highly specialized centers treating patients who require high level of care, providing services relating to cardiac surgery, cancer treatment and management, burn treatment, plastic surgery, neurosurgery and other complicated treatments or procedures. The need is to introduce an effective referral system and enhance the capabilities oof lower level health care facilities. Many of the high officials in the health department were unaware oof any referral system and manager in the tertiary hospitals emphasized the need to introduce an e-referral system which will eventually lower the unnecessary burden on the MTIs.

*Figure 31: The number of BHUs serving population in Peshawar and Abbottabad*




***Medical Reports/ Laboratory Tests***

The MTI hospitals in Peshawar were employing ICTs to deliver health services to patients. The Deputy Director IT in LRH talked about hospital shifting their correspondence and reports quite successfully to **paperless system** (B. Bashir, Personal Interview, August 11, 2021). He referred that **Pathology records** in the LRH hospital were completely (100%) online through 'machine interface' which directly sent results to the system (B. Bashir, Personal Interview, August 11, 2021). As claimed by IT official of LRH, the hospital was the **first in Pakistan to shift pathology results online**, since 2018 and the results could be accessed by patients online from hospital's website (B. Bashir, Personal Interview, August 11, 2021). The **patient** as reported by IT official in the LRH had **access to his pathology records**, which he could download.

It was further reported by the IT official in LRH that the hospital **Radiology was also filmless**, meaning completely digitized (B. Bashir, Personal Interview, August 11, 2021). These digital X-Rays were made available to the consultant radiologists to write a report on it, which is then shared with the concerned doctors to examine. The patients did not have direct access to these X-Rays, unless they requested for a soft copy of the film, which was provided to them on a CD, after payment of charges (B. Bashir, Personal Interview, August 11, 2021).

***SURVEY OUTCOMES: Access To Medical Test Reports (Q25, 26,27)***

An over whelming majority (86.54%) of patients who had come to LRH MTI and ATH MTI said to have no access to their medical test reports (such as CT-SCAN, MRI, Ultrasound, Mammogram, test reports) in the public service hospital. A similar number of respondents (86.54%) stated that they never received their laboratory test results online. However a relatively small number (11.54%) confirmed to have accessed their test results online, half of them (6%) reporting to have received the results in one day.

The MIS department (Management Information Department) also called the IT Department at Lady Reading Hospital MTI, Peshawar has provided the facility of accessing only pathology reports. The patients are asked to download and print the report themselves and that the support staff will not send an email. A helpline is also given for any further assistance. The reports are viewable for a period of six months. After 6 months, they cannot reach their pathology reports (http://lab.lrh.edu.pk/online/downloadreports/).

So far as ATH, MTI , Abbottabad website is concerned, the MIS system is still not working and patients are asked to visit the hospital and get the reports from the lab.

A low trust issue about availability of patients online medical test reports on was found among patients who came for treatment I these hospitals. One patient in LRH was unconvinced with online report, *"I was not satisfied from the hospital lab service, therefore I went to do my tests from laboratories outside the hospital… I am more satisfied now…". This* shows distrust of the patients on the availability of their test results online on the hospital website. According to Mr. Manzoor Ali Yousafzai (HOD of the Outpatient and Ambulatory Services Department) at LRH MTI, Peshawar, "*Shaukat khanum hospital level investigations are carried out in this hospital with the doctors sending online request to the (hospital) labs to conduct tests from patients. The next phase (of this transformation) is the OPD-Pharmacy link which is underway…".* He also complained about the attitude of the patients towards online lab test reports, *"… there is low trust among patients for the computerized system. They want their prescriptions, lab tests on papers and prefer to carry their files around in their hands…how could we change this mindset...?"*

***Electronic Record System [ERS], the Hospital Management Information System (HMIS)***

The LRH official reported the hospital having an **Electronic Record System** [**ERS**], named the **Hospital Management Information System** (HMIS)in the hospital. This record was for use inside the hospital for treatment of patients who are visiting a second or third time (B. Bashir, Personal Interview, August 11, 2021). The doctors and consultants can see the file of the patient online to determine which tests were conducted and what medicines were prescribed in patient's last visit. This also meant that a patient's all the past pathology reports could also be accessed together by the doctor to make a comparative analysis for determining the influence of different drugs. Resultantly, it makes the doctor sensitive to any drug related improvements in patient's health (B. Bashir, Personal Interview, August 11, 2021). **The LRH Hospital Management Information System (HMIS)**, not only hosts the electronic record of patients, but also the **hospital's financial record, its Human Resource and procurement information**; all of it was claimed to have been digitized, *…. 'it is a complete electronic record system .... this computerized record maintains estimates of costs per-patient, hospital bed time, mortality, cause of death, clinical audits, patient days of stay in the hospital, which are then presented before the clinical audit committee with graphics displayed'* (B. Bashir, Personal Interview, August 11, 2021). The DHIS official also reported record keeping of HR becoming better with ICTs. He claimed around **11000 files in HR being scanned and plan underway to digitize all HR files** (A. Ibrahim, Personal Interview, July 30, 2021).

Though the LRH official reported the hospital having an **Electronic Record System [ERS], named the Hospital Management Information System (HMIS) in the hospital**. However, there was no networking with other hospitals in Khyber Pakhtunkhwa to share this electronic record system with consultants in other public sector hospitals (B. Bashir, Personal Interview,

August 11, 2021). There was a bit of contradiction in this information between the LRH IT official and DHIS official in DGHS office. As reported by the DHIS official in the Health Directorate, the Hospital Management Information System was in the process of being introduced in 2 to 3 hospitals within a year's time period (A. Ibrahim, Personal Interview, July 30, 2021). He quoted it got budgeting in the Annual Development Plan and even a PC-1 was prepared, but the budget was supposedly not sufficient for IT purchase, therefore it was reviewed and revised for next year implementation (A. Ibrahim, Personal Interview, July 30, 2021). Therefore, the DHIS official in Health Directorate reported the MIS system in hospitals to run in part on manual system. He gave the example of OPD slips and the diagnosis on it to be manually recorded in registers, instead of electronically. Even the monthly report on it was generated manually, which increased the propensity of data entry mistakes (A. Ibrahim, Personal Interview, July 30, 2021). Pointing to registers in his room, the DHIS official gave the example of the banking sector's entire working through computerized system to emphasize the difference between hospitals MIS and that of fully e-solution oriented institutions (A. Ibrahim, Personal Interview, July 30, 2021).

***E-VACCS***

One of the earliest interventions in digital health care by the Khyber Pakhtunkhwa government of the **e-Vaccs, which was launched in 2016 in Khyber Pakhtunkhwa's 25 districts**; led to vaccination attendance rise to 70 % by November 2017-increase of 31 % since launch (Accelerate to the Digital State: d-Health, n.d., p. 10). E-Vaccs was launched initially in Khyber Pakhtunkhwa and Punjab provinces by Ministry of Health with the help of the World Health Organization WHO (Accelerate to the Digital State: d-Health, Elevating Healthcare Roadmap to Digital Health, n.d.). In an attempt to connect the Basic Health Units in rural areas to district hospitals, a linkage was created between local health units with specialists in District hospitals under the District Delivery Challenge Fund, which aims at improving health service delivery in the Punjab and Khyber Pakhtunkhwa (Husain, 2021). However, the officials interviewed mostly talked about e-surveillance of diseases and failed to mention the important E-Vaccs one.

The DHIS officials in Health Directorate dispelled the impression about any e-health projects failing. He insisted that some programmes, such as **E-Vacs** as a continuous and longer duration programme was running quite successfully not only in Khyber Pakhtunkhwa, but also in the Punjab. Other programmes, such as **E-Ilaj** was a timebound activity launched in pilot phase to see how these worked for far flung areas with low population awareness and hard communication and weather conditions (A. Ibrahim, Personal Interview, July 30, 2021).

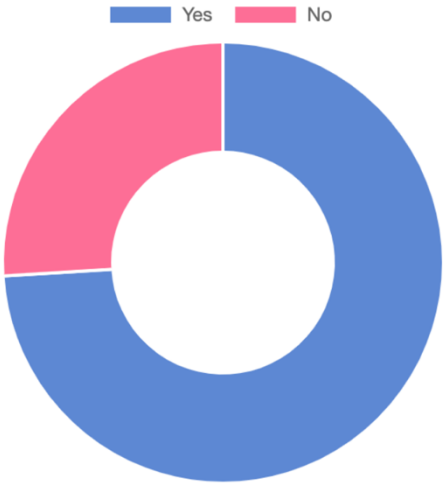
*SURVEY OUTCOMES: (Q 32,33,34,35) Corona Virus (Covid 19) Vaccinations*

While 74% of the respondents were vaccinated for corona virus, around 26% had come for treatment without taking the covid vaccine. (see Survey results below).

*Figure 32: Survey Results Showing the Percentage of Patients Taken Corona Vaccine*

32. Are you vaccinated for Corona Virus?

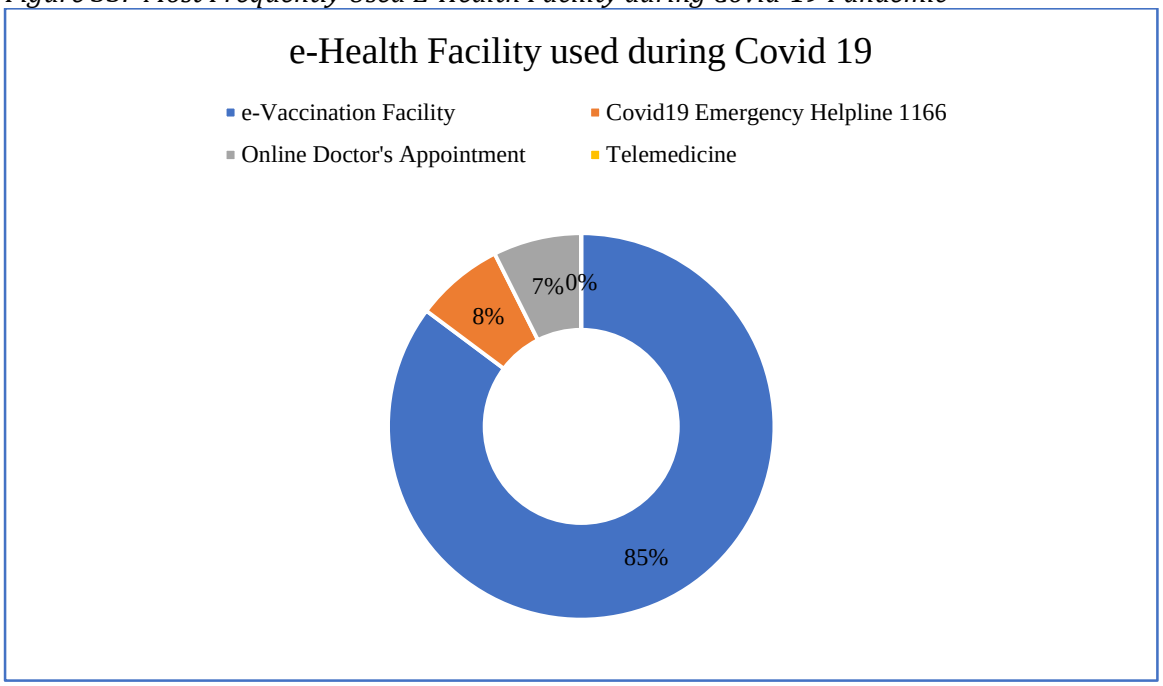
TYPE: "SELECT_ONE". 104 out of 104 respondents answered this question. (0 were without data.)




| Value | Frequency | Percentage |
|---|---|---|
| Yes | 77 | 74.04 |
| No | 27 | 25.96 |

Among those who got the vaccine, 79.81% seemed happy with the arrangements of the government and a small number (14.42%) reported facing issues while getting corona vaccine which included delays in SMS response (8.65%); non-availability of second dose (1.92%); delays in getting the vaccine (1.92%); problems in understanding the registration process (0.96%); issues in getting vaccination certificate (0.96%); wrong entry of vaccine dose (0.96%).

*Figure 33: Most Frequently Used E-Health Facility during Covid-19 Pandemic*




When the respondents were asked about the most frequently used e-Health facility during Covid-19, a considerable number (22.12%) stated that they used e-Vaccination facility. Other little used e-Healthcare facilities included Instructions/ guidelines under Covid-19 emergency helpline-1166 (1.92%); online doctor's appointment (1.92%) and no one was aware of telemedicine. (see Figure 33). The astounding finding was that approx. half of the respondents did not answer the question as they did not used any e-Health initiative during covid 19. The 24% patient who opted for the 'Any other' option either preferred to use home-based treatments or traditional medicines (5.76%), and others talked about going to nearby private clinics/ doctors (4.8%).

***Civil Registration & Vital Statistics (CRVS)***

**Death and birth certificates** were as confirmed by LRH hospital IT deputy director issued online (B. Bashir, Personal Interview, August 11, 2021). The DHIS official talked about the importance of CRVS in health as covering three indicators: birth registration, death registration and cause of death (A. Ibrahim, Personal Interview, July 30, 2021). He emphasized that the record relating to cause of death was a very vital record for the government to keep. He also outlined that health services could play a vital role in encouraging birth registrations by making health care provision in public sector hospitals conditional on possessing a form B and an ID card and waving the OPD fee for those visiting hospitals for health-related services who possess these vital documents (A. Ibrahim, Personal Interview, July 30, 2021).

***Telemedicine***

The Covid emergency (closure of OPDs) also stimulated the creation of a separate **'telemedicine' department** inside the LRH for connecting patients with specialists through video links (B. Bashir, Personal Interview, August 11, 2021). This was run on different modes: linking doctors (MDs, eye specialists, surgeons) and psychologists through video links with patients; patients were linked to emergency services and doctors through phone calls; and doctors were issuing prescriptions on WhatsApp (B. Bashir, Personal Interview, August 11, 2021). Before Covid came,

the Khyber Pakhtunkhwa government launched province's first online healthcare facility in 2017 by the name of **E-Ilaj** to dispense specialized healthcare services in far-flung areas. Aiming to lessen the burden on the tertiary care hospitals, the pilot project was launched by the Khyber Pakhtunkhwa Information Technology Board (KPITB) and the Health Department in in collaboration of COMSATS in Bilahi area of District Mansehra with the intentions of expanding to other districts. This e-Ilaj service will supposedly be extended to far flung areas of Khyber Pakhtuhkhwa (Accelerate to the Digital State: d-Health, p. 10). This initiative was launched because the government was unable to post specialist doctors at Basic Health Units (BHU) across the province. Specialized doctors were to be connected to these centers via high-speed internet connectivity as well as staff being deputed at centers directly connecting patients to doctors sitting in Peshawar to treat patients with cardiac problems, mother and child health, skin and ENT besides other issues on the spot (Farooq, Oct 16, 2017).

***International Tele Rounding***

As reported by the LRH IT official, the LRH is the first hospital in Khyber Pakhtunkhwa and Pakistan to open itself to **international 'tele rounding'**; a practice started in Covid times, where 'international intensivists' from the US did a daily tele round (online) of the patients in ICU and checked their vitals as well as their radiology and pathology reports and the notes of doctors and nurses (B. Bashir, Personal Interview, August 11, 2021). This practice was started under an MOU with American-Pakistani Association… *'internationally, our Pakistani community in the US contacted us and now this tele-rounding is done on a daily basis…they are watching our ICU patients live and taking their vitals'* (B. Bashir, Personal Interview, August 11, 2021). Such initiatives are reportedly beneficial in two contexts; first, it helps in patient care; and second this helps train the local staff of the hospital in patient care, including patient management on ventilators, etc. (B. Bashir, Personal Interview, August 11, 2021). Even the records of patients on dialysis were scanned and shared electronically with these consultants under such tele rounding interventions (B. Bashir, Personal Interview, August 11, 2021).

**E-referral though not yet introduced** was in the process of inclusion in future e-Health plans by the government in Khyber Pakhtunkhwa (B. Bashir, Personal Interview, August 11, 2021). The plan is to connect all hospitals in Khyber Pakhtunkhwa through assigning **Medical Record Numbers (MNR) to** patients for electronic sharing of a patient's treatment records, tests, etc., by these hospitals (B. Bashir, Personal Interview, August 11, 2021). It was expected to get it introduced within the next five years and this would prevent the trouble of re-investigations in a patient's case, entailing wastage of time and expenditure (B. Bashir, Personal Interview, August 11, 2021). Future plans included a Regional Health Authority (RHA) and a District Health Authority (DHA) for sharing a local patient's data online with the larger teaching hospitals (B. Bashir, Personal Interview, August 11, 2021).

***Trainings in ICT Needs***

To ease the official access of and usage of these tools, the LRH IT official reported a process of **continuous trainings** in different departments of the hospital and also claimed possessing a training centre inside the hospital to provide trainings in ICT needs (B. Bashir, Personal Interview, August 11, 2021). *'We conduct sessions [training] on a daily basis in different departments [of hospital] … 'if a department makes a special request [for training], we also accommodate that'* (B. Bashir, Personal Interview, August 11, 2021).

*Independent Monitoring Unit*

According to the DHIS official in Health Directorate, the **Health Department also carried a unit by the name of Independent Monitoring Unit (IMU),** which monitored and supervised the attendance of staff, functionality of hospital equipment, infrastructure and cleanliness, etc. (A. Ibrahim, Personal Interview, July 30, 2021). Secondary literature shows that Khyber Pakhtunkhwa became the first province in 2016 to establish an Independent Monitoring Unit (IMU) under the Health Department, to collect and share health data, monitor the performance of public sector health facilities, and share the information with the public through its website (Abbasi, The News International, May 5, 2016). It has placed all the information about closed health centres, non-availability of X-ray machines and absence of doctors at key hospitals on the website of newly established Independent Monitoring Unit (IMU). However, we could not find the website, although it carried a facebook page.

The **IMU** have **Monitoring and Data Collection Assistants**, visited district health facilities at least once a month with a printed check list and tick against the benchmarks, which are then put up in the software to be displayed on a dashboard (A. Ibrahim, Personal Interview, July 30, 2021). The benchmarks include, staff presence, functionality, cleanliness … *'under this monitoring and supervision system, the coordinators [data collection assistants] visit two or three health facilities they take a print of checklist and take information on it after monitoring the situation and submit a report…there is a proper dashboard on the basis of which there is decision making'* (A. Ibrahim, Personal Interview, July 30, 2021). However, he reported that this system was not yet fully operational for all the districts (A. Ibrahim, Personal Interview, July 30, 2021). The DHIS official also reported the IMU functioning under the DHIS authority (A. Ibrahim, Personal Interview, July 30, 2021).

***IMU Health KP App***

An app launched by KPITB on Oct 2, 2019 states that 'Independent Monitoring Unit is a specialized unit of the Health Department with core responsibilities to conduct regular monitoring of all types of government healthcare facilities under the control of KP health department & other research activities'. With only 100+ installs, the app says nothing about its use or what purpose it serves and what kind of service is provided to whom – the service providers or the end users? (https://play.google.com/store/apps/details?id=com.imu.health&hl=en&gl=US).

When patients were asked to rate the healthcare services received in the public tertiary hospital, majority of the respondents ranked reasonably high the services given to patients in government tertiary hospitals. A significant percentage of respondents rated the services either satisfactory (49%) or excellent (30.77%). 16.35% of the respondents rated the health services as unsatisfactory. A smaller percentage (1.92%) were undermined with the hospital services and some simply didn't know about the quality of services provided (1.92%).

There was also the claim by DHIS officials that there was an interest on the part of the government and the health department **to computerize OPD slips** to help record the diagnosis on computers (A. Ibrahim, Personal Interview, July 30, 2021). To address issues related to financial leakages, it is also being discussed to **place computers on all the payment counters in the hospitals**, which

further required technicians as well as constant internet connection, which were being finalized (A. Ibrahim, Personal Interview, July 30, 2021).

***Patient Privacy***

**On the question of whether patient data should be freely exchanged,** the DHIS official argued about no data was there to raise questions about sharing (A. Ibrahim, Personal Interview, July 30, 2021). Perhaps he was referring to DHIS having no patient data and only the MTIs possessing information about patient's data. He did mention the LRH maintaining the patient's data under MR numbers which is accessible through patient's CNIC number (A. Ibrahim, Personal Interview, July 30, 2021).

*SURVEY OUTCOMES: (Q 9,10)*

The survey also posit a question about the privacy of Patients electronic medical information. Majority of the respondents (61.54%) had full confidence that their electronic health data was safe with the public hospital. About one quarter of the respondents (33.65%) were not sure as to their private health data was secure. A small number of respondents (4.8%) thought that their electronic health data was insecure with the public hospital.

A majority of respondents in the public tertiary hospital (57.69%) stated that they were fine if the hospital shares their electronic medical information with other hospitals. Most believed that it was for public good and to improve healthcare services and share healthcare/ disease information. 32.69% could not decide upon and were suspicious as to whether hospitals should have the authority to share electronic medical information of the patients with other hospitals. A small percentage of the respondents (9.61%) disagreed and were against the hospital power to share electronic health data of patient without the patient permission. They wanted the hospital to protect the privacy and confidentiality of patient health data.

### 3.7 Impacts: Efficiency in Health Service Generation

***Real Time DATA = Effective Decision Making***

The **use of real time data on Covid** through the ICTs had **speeded up the process of decision making in health department**. The Deputy Directors in Public Health Khyber Pakhtunkhwa connected the speedy decisions taken by the **NCOC in Pakistan to generation of real time data.** They traced the process by explaining that as soon as the data is generated from end user, it is uploaded by district hospitals in software and reporting is instantly also visible on health department's dashboard. It is then analyzed daily, and report is shared with provincial and national authorities. It is on the basis of this data that the **NCOC** meets twice weekly to recommend effective implementation measures (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

***Quick Response to Disease Outbreak***

Efficiency is **timely and effective response to disease outbreak by the government**. Here the officials made comparisons with the previous practice of manual data entry practice and the issues in data generation. Prior to the introduction of ICT tools, the manual entry for disease reporting, for example in the case of outbreak of diarrhea, reached the decision-making circles

very late. The authorities usually got a hint about the disease outbreak from newpapers… *'but now in the age of real time data, the authorities respond even before the newspapers get to know about the pandemic break'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). This meant that previously, the information about diseases were usually taken after newspapers reported on it and therefore the response time to it would take much more time. Now the information directly reaches the concerned quarters and by the time newspapers pick it, the government initiates its response.

***Identification of Health Emergencies***

The ICTs have further helped **identify health emergencies**. Since the doctors are to mandatorily report in 24 hours different infectious disease, therefore in case of clustering of diseases at the district level, the dashboard becomes red, indicating a threshold to respond (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). There was, however, a concern shown on Khyber Pakhtunkhwa not undertaking surveillance of as many diseases as was done at the national level. The Deputy Directors Public Health reported the national level disease identification numbers had increased to 33, higher than those reported or under surveillance in Khyber Pakhtunkhwa (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). This meant that Khyber Pakhtunkhwa was for the time being lagging in surveillance of other diseases as initiated at the national level.

***Cost-Effective***

Efficiency in service delivery is further improved as digitization has **saved the costs incurred on X-RAY printing** and that of multiple visits in case of non-accurate scanning. In the LRH, ever since its radiology department embarked on a filmless system of digitization, where the digital X-Ray was now accessed by the doctors on computers, the **patients are no longer getting exposed to harmful radiation again** and again in case their initial X-Ray results were not very clear (B. Bashir, Personal Interview, August 11, 2021). This also meant that the **cost of film was saved, and the results of X-Rays are more accurate now** (B. Bashir, Personal Interview, August 11, 2021)

The IT tools were also reportedly saving costs **as systems were turning 'paperless'** (B. Bashir, Personal Interview, August 11, 2021).

This was observed during conducting survey that many patients in LRH MTI complained of congested OPDs, a female patient requested that *"…the government hospitals should lower the patient medical test fee, we cannot afford to give the test fee".*

***Time Management***

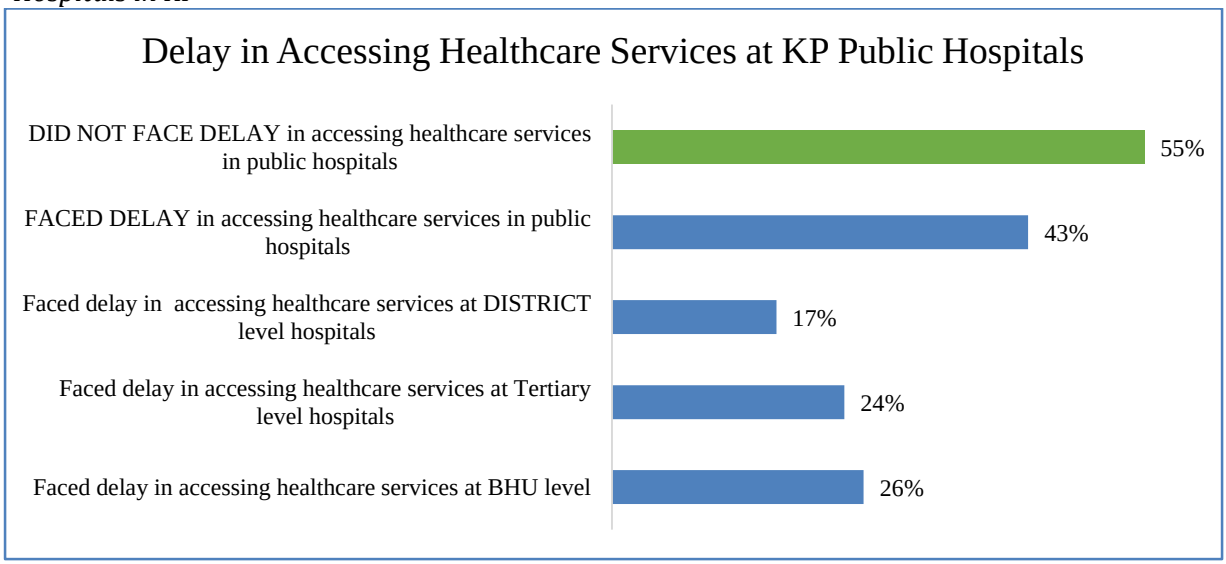
**The IT tools have made health service generation in the hospitals faster.** The IT officials in LRH gave example of the hospitals with tertiary care facilities, where different departments were located at huge distances, which entailed the wastage of time for patients to physically move around from one department to another for test results, reports and for doctor's appointment (B. Bashir, Personal Interview, August 11, 2021). He gave the example of a patients phlebotomy ordered by the doctor could be uploaded as soon as it is done and resultantly the result could be timely reviewed and any delays in result upload can be checked… *'now it is very speedy, the machine sends the results [of tests] directly…we don't need any human intervention in the server,*

*the only thing is that the doctor confirms its accuracy, when it is verified it is displayed and you can view it from anywhere in the world'* (B. Bashir, Personal Interview, August 11, 2021). Similarly, the radiology report as soon as it goes through C.T scan can be viewed by the consultants; **thus, time wastage is avoided**. Only X-Rays were not directly uploaded, only when required, which again saves time and film costs; this also ensured **the element of accuracy and digital X-Rays could also be zoomed in on screen to help reach correct diagnosis** (B. Bashir, Personal Interview, August 11, 2021).

*SURVEY OUTCOMES: (Q 18, 19)*

When patients were asked if they faced delay in accessing healthcare services in KP public hospitals, majority of the respondents (55%) stated that they did not face any delay while 43% reported that they faced delay of some sort in accessing healthcare services at different levels of government healthcare facilities. 26% of the respondents said that they had faced delays in accessing health services at the BHU level. 24% reported to have faced difficulties at the tertiary level hospitals and 17% at the District hospitals level (see Figure 34 below).

*Figure 34: Patients Response to Any Delay Faced in Accessing Healthcare Services in Public Hospitals in KP*




The DHIS official also informed about making **key performance indicators to measure the efficiency of different hospitals in the province**. He also reported these performance indicators displayed on dashboard could be monitored to understand how hospitals were performing (A. Ibrahim, Personal Interview, July 30, 2021).

***Can Technology Bring Efficiency in the Real Sense?***

There were **certain reservations expressed on ICTs generating efficiency**. The DHIS officials, for example mentioned ICTs were making the 'process culture' fast, but the culture of public dealing was more personality driven and less affected by the ICTs (A. Ibrahim, Personal Interview, July 30, 2021). For the official, even biometric attendance cannot be credited with improving health service generation improvement. To quote him, *'if a person sits in his office from 9 to 5 and if you ask him what he did the whole day, they don't have any answer, especially if you ask him to*

*reply with figures'* (A. Ibrahim, Personal Interview, July 30, 2021); implying merely long working hours do not guarantee that an official was performing qualitatively better than before the biometric system was introduced.

Some conflicting claims by the LRH hospital IT officials and those working in District Health Information Services (DHIS). LRH IT official criticized the **Electronic Monitoring System of Diseases (primarily run by the Health Department)** for not being very successful due to wastage of resources on separate reporting and indicators of different disease, which necessitated the appointment of multiple Programme coordinators (T.B control, EPI coordinator, Malaria control, HIV, etc.) at each District level to monitor and report on different diseases (B. Bashir, Personal Interview, August 11, 2021). He proposed bringing the disease monitoring system under one Health Information System (HIS), for automatic entries on all diseases at one point and appointment of one coordinator for that. This was supposedly to provide help in 'early warning systems' for epidemic control and save resources for the government… *'if it had happened this way, it would be a great success...it will provide early warning system about diseases and also buffering can be done, for example about the prevalence of a certain epidemic in a certain Union Council-UC'* (B. Bashir, Personal Interview, August 11, 2021). However, the DHIS officials in Health Directorate tried to present a different picture. To him the Electronic Monitoring System was a success story, and it was first introduced with the WHO organization's help (2010-11) as a Disease Early Warning System (DEWS), which was then owned by the Khyber Pakhtunkhwa government and launched as Integrated Disease Surveillance Response System (IDSRS), which not only includes Early Disease Warning System (EDWS), but also the DEWS (A. Ibrahim, Personal Interview, July 30, 2021). They now regularly undertake electronic monitoring of diseases and do surveillance as well as response in this connection (A. Ibrahim, Personal Interview, July 30, 2021).

Biometric attendance technology much appraised by the high level bureaucracy for solving the issue of absenteeism and was claimed to bring efficiency, however, it clearly indicates that digital technology in the shape of biometric attendance cannot bring efficiency on its own unless and until it involves the agency of the service provider. The superficial structural changes cannot change the outlook of the service providers. So where lies the solution to change that mindset? The IT officials in LRH reported **productivity of teamwork improving especially in the public sector hospitals** as a result of IT interventions. The example mentioned was that of hospital HR and families receiving pre-defined entitlements automatically, for example in terms of free of cost hospital expenses (B. Bashir, Personal Interview, August 11, 2021). So, to some efficiency was therefore essentially associated with the provision of incentives to the workforce at hospitals.

**The system of doctor's prescription electronically going to hospital pharmacy** for patient to purchase his medicines **was not yet implemented** in public sector hospitals as reported by the IT official in LRH; however, such a system was planned for the future (B. Bashir, Personal Interview, August 11, 2021).

### 3.8 Impacts: Transparency in Health Service Generation

The DHIS official reported ICTs were not only improving the quality of **health service, but also fast at catching leakages within the system** (A. Ibrahim, Personal Interview, July 30, 2021). He gave the example of fast supply of medicines and rapid response to communicable diseases on the basis of swift sharing of data to highlight efficiency. He reported an incident around 9 years ago about diarrhea outbreak reported from one of the districts of Southern Khyber Pakhtunkhwa.

Since it was reported on the system, therefore a team was swiftly sent to know the reasons. It came to light that the diarrhea incident was created through a 'dummy OPD' to get rid of the tablet flagyl stock that was about to get expired. He credited the timely response generated by the system for catching the leakages, which would otherwise have went unnoticed had manual reporting continued of diseases (A. Ibrahim, Personal Interview, July 30, 2021).

Transparency was generated through ICTs in other ways. It was claimed by Deputy Director IT in LRH that **previously in the absence of electronic reporting in pathology**, **the patient's blood sample would often get mixed up** and the patient had to resubmit blood samples. But now the system of bar-code which is machine readable, avoids such errors. LRH was claimed as the first public sector hospital in Pakistan to put up the e-health system of making pathology reports available online (since 2017/ 18). The website could provide past results to its patients as well (B. Bashir, Personal Interview, August 11, 2021). However the website states that the medical test results (only pathology) will be available and viewable for six months (http://lab.lrh.edu.pk/online/downloadreports/).

On transparency and accountability associated with ICT tools, the Deputy Directors Public Health praised the ICTs for **resolving issues of 'health data manipulation'**… *'because in online system you become time bound and filters are also there, that meams you cannot modify things [data] once it also gets shared'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). However, they also conceded that E-Systems can also cause technical flaws that hamper the timely reporting of data. *'This can then generate flaws in data, for example, if three districts are entering the data and the fourth one is not, then it takes time before the issue is resolved and missing data can be uploaded'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021), implying that technical glitches can delay, or affect decision making due to absence of combined data from all sources resulting from technical glitches.

***Biometric attendance for Doctors***

To some officials, the **bio-metric attendance of doctors and paramedics was ensuring their timely presence in hospitals** (B. Bashir, Personal Interview, August 11, 2021). Whereas, when other officials were asked the question about whether para-medical staff was becoming more accountable under the ICTs, they were skeptical as biometric attendance was to them was only one aspect of over-all performance. The DHIS official expressed his reservation by saying, *'they consider themselves accountable only as far as attendance is concerned, there is no culture of clinical audit here… it should be done'* (A. Ibrahim, Personal Interview, July 30, 2021). Survey results also show (Survey Q 23) that 48% of the patients had to wait for more than an hour to be seen by the doctor for examination and treatment (survey Q 23)

*SURVEY OUTCOMES: (Q 23)*

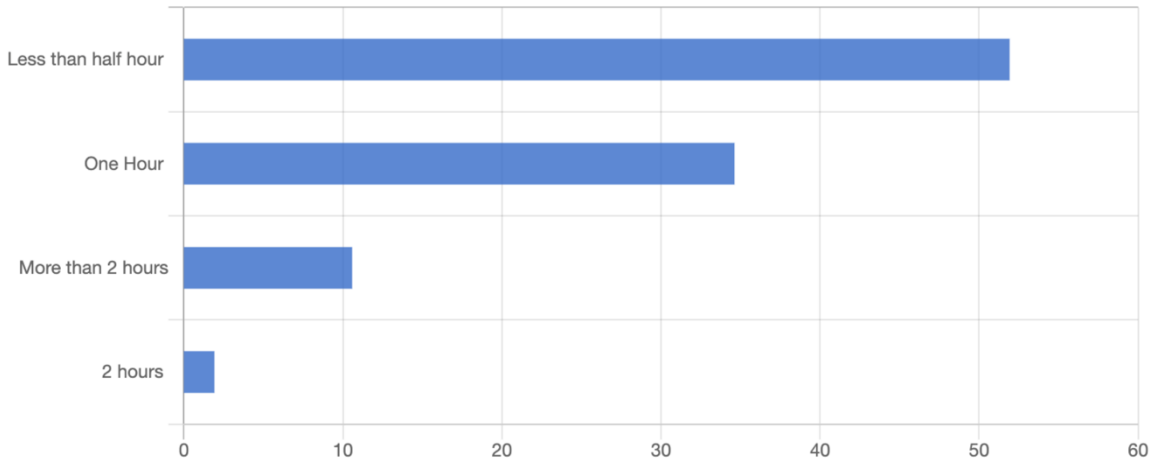
When asked about the waiting time of the patient to reach a doctor for examination and treatment, 51% of the survey respondents said that it takes less than half an hour, 35% said they have to wait for at least one hour for the doctor to examine them. While 2% said the waiting time to be 2 hours, 11% said it to be more than 2 hours (see Figure 35 below). So on the average 48% of the patients have to wait for more than an hour to be examined by the doctor. This implicates that majority of the patients go through the registration process (taking the *'parchi')* at the hospital with ease and in less time (within 30 minutes) because of the efficiency brought by technology to the OPD counter registration processes, however the patients end up waiting for

more than one hour to be seen and being treated by the doctor. Patients dissatisfaction was seen with the waiting time as it took them around 30 minutes to wait in the queue and get themselves registered at the hospital counter but for majority the average time taken to get the OPD services was at least 1 hour. It meant on the average, a 90 minutes wait time before a patient reaches a doctor for inspection.

*Figure 35: Survey Response Showing Patients Waiting Time to Be Examined By A Doctor*

23. How much time does it take for the doctor to see examine and suggest treatment after registration?

TYPE: "SELECT_ONE". 103 out of 104 respondents answered this question. (1 were without data.)




| Value | Frequency | Percentage |
|---|---|---|
| Less than half hour | 54 | 51.92 |
| One Hour | 36 | 34.62 |
| More than 2 hours | 11 | 10.58 |
| 2 hours | 2 | 1.92 |

The digitization of patient record will also help the government to **hold the local BHU responsible** for not treating the local patients for simple ailments and forwarding them to big hospitals in cities (B. Bashir, Personal Interview, August 11, 2021). The officials reported that currently, there is no system of making the local BHUs accountable when their patients are referred to the LRH or city hospitals, instead of being treated in the BHU for simple ailments, such as the tonsilitis, etc (B. Bashir, Personal Interview, August 11, 2021).

There was the added interesting aspect to service generation **in health becoming more transparent and accountable in hospitals.** The IT director of LRH reported that the **patients test result as well as treatment is now time-bound electronically (**B. Bashir, Personal Interview, August 11, 2021). This is possible now because the machine directly sends the results to the doctor without human intervention and when as the doctor verifies its accuracy, the time and the report is displayed electronically, which then by extension be viewed from anywhere in the world. Similarly, in radiology, the CT scan is at display to the consultant to generate a prompt diagnosis (B. Bashir, Personal Interview, August 11, 2021).

Now, not only the system was becoming **more accessible digitally, but also more accurate**. The aspect of one X-ray getting mixed up with another (this happened in manual system) was also put to rest with the digital X-ray machine. The diagnosis also being more accurate as digital X-rays could now be evaluated from close angles through the facility of zooming in (B. Bashir, Personal Interview, August 11, 2021).

The IT official in LRH reported on displaying the **'Right to Service' charter to the patients for them to know their rights**. He also mentioned on the hospital **running an online complaint system for patients to record their grievances.** The grievances as reported by him were handled carefully by the hospital administration (B. Bashir, Personal Interview, August 11, 2021). *'Actually, people mostly complain about their patients not being properly looked after…they don't understand that once a doctor sees a patient and prescribes treatment, it is for the nurse to administer the treatment, not the doctor…but the people end up thinking that their patient was not properly cared for'* (B. Bashir, Personal Interview, August 11, 2021).

*SURVEY OUTCOMES: (Q8)*

While about 43.27% of the respondents were unaware of their rights as patients who would access hospital services through ICTs, on the contrary, one half of the respondents (50%) stated that they would like to know about their rights, while they access the public hospital services through the ICTs. A very small percentage of respondents (5.77%) showed their disinterest in knowing about their rights as healthcare consumers.

***No Online Feedback about Quality of Services Received***

*SURVEY OUTCMES: (Q 28, 29)*

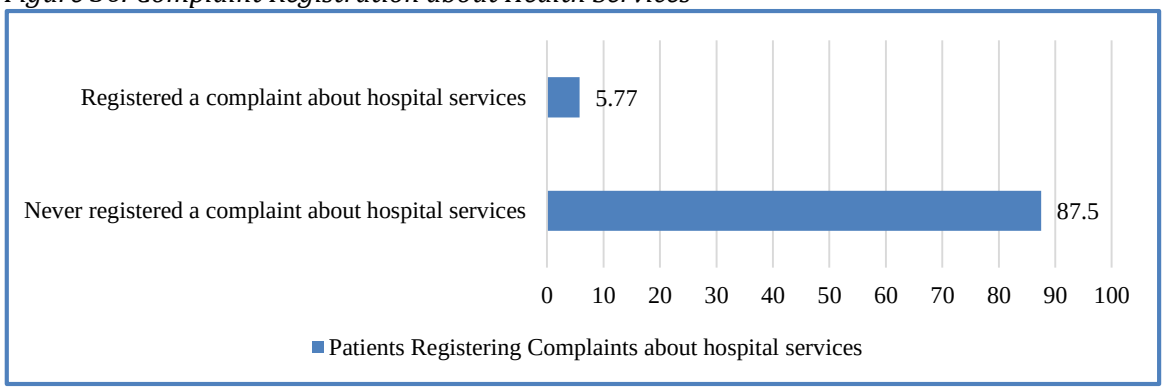
When patients at the hospitals were asked if they had ever been asked by the Hospital to give their feedback online on the quality of healthcare received in the public sector hospital, a large number of the respondents showed lack of awareness about any feedback mechanism available to patients who could give their opinion on the healthcare services provided to them in the hospital. 87.5% reported that the hospital never asked for any feedback on the quality of healthcare received in the public hospital as some of the private hospitals in Peshawar get a feedback from their customers on the quality of healthcare services provided to them through phone calls and SMS. The 8% who confirmed to have given some kind of feedback to the hospital about their healthcare services said they either gave feedback online (5%) or used SMS (1.92%).

***Complaint Registration***

*SURVEY OUTCOMES: (Q30,31)*

87% of the respondents stated that they never had lodged a complaint about the hospital services. The 5.77% who had registered their complaints had done so with either by writing a complaint to the hospital administration (1.92%) or through Khyber Pakhtunkhwa Citizen Portal (0.96%) or just voicing their complaint verbally to the hospital administration (0.96%).

*Figure 36: Complaint Registration about Health Services*




At LRH MTI, Peshawar while patients were asked about complaint redressal, people would be reluctant to give any information or even express themselves, some would say, *"There is no need, nothing changes even if we file a complaint".*

While this survey question was being asked, several respondents showed their surprise as to why would they register a complaint and many were unaware of their healthcare right to complaint about any wrongdoing that either denied them access to healthcare facility or deprived them of quality healthcare. According to WHO (n.d) quality healthcare should be "Effective (evidence-based healthcare services), Safe (not harm people) and People-centered (people's needs)." It also reiterates that health services must be Timely (less waiting time and harmful delays); Equitable (providing care regardless of gender, ethnicity, geographic location and socio-economic status); Integrated (make available full range of health services); Efficient (maximizing the benefit of available resources and avoiding waste).

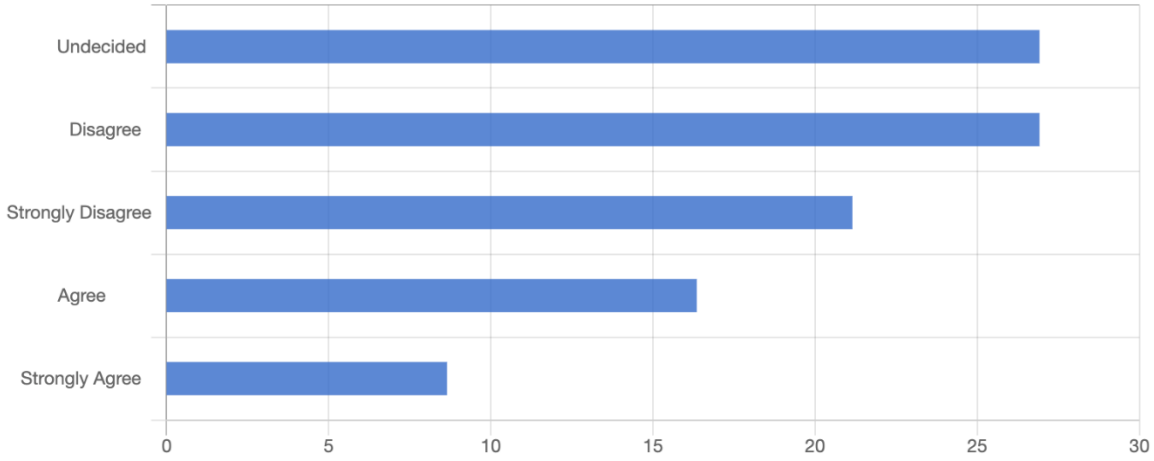
*SURVEY RESULTS: (Q 4) Web Presence of Hospitals*

Despite the fact that both the tertiary hospitals had adequate website presence, providing ample information about the hospital services, the doctors available in each ward, number of departments, staff, beds; the OPD timings, *Sehat* Card Plus services, online Doctor's appointment (only in LRH MTI, Peshawar), information about different lab tests and reports available etc., still 48% of the respondents had never visited the hospital website for any sort of information. While 25% reported using the hospital website frequently, an equal number (26.92%) remained undecided saying they did not know about the existence of any hospital website (see Figure 37 below).

*Figure 37: Survey Results Showing Percentage of Patients Visiting the Hospital Website*

4. I have visited the Hospital website for information frequently.

TYPE: "SELECT_ONE". 104 out of 104 respondents answered this question. (0 were without data.)




| Value | Frequency | Percentage |
|---|---|---|
| Undecided | 28 | 26.92 |
| Disagree | 28 | 26.92 |
| Strongly Disagree | 22 | 21.15 |
| Agree | 17 | 16.35 |
| Strongly Agree | 9 | 8.65 |

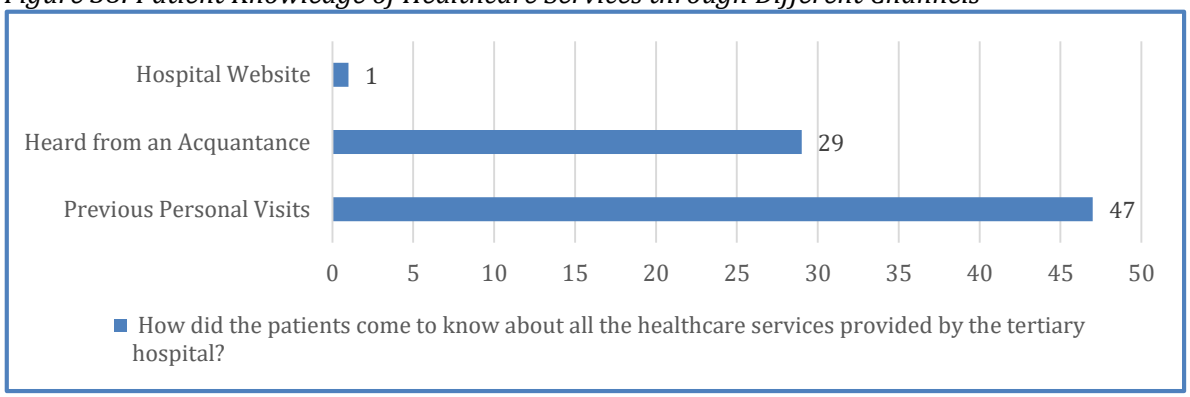
While the LRH MTI, Peshawar had a working user-friendly website (https://www.lrh.edu.pk/) and a Facebook page (https://www.facebook.com/LRHMTI/); the ATH, Abbottabad had only a Facebook page (https://www.facebook.com/athabbottabad/) and the hospital website was unsecure and unapproachable (https://ath.gov.pk/) since the year 2022 started. LRH MTI, Peshawar website also provided for Online Lab Reports, however, only pathology reports were accessible online. For all the other reports such as Radiology reports: ECG, Echo, X-Ray, Ultrasound, MRI, CT Scan, patients are requested to visit the hospital.

The results of one study which reviewed a sample of 100 premier hospital websites, showed that very little progress was made to make hospital website a fully functional unit for the health professionals and the patients (customers) (Randeree & Rao, 2004). A good website should be able to provide valuable information to the user, both patient and healthcare professional. Ease of use and website design will determine whether the visitor will return to the website. It is also important that the content of the website should be relevant and accurate. Another important thing is the security of the website both for the user and the site (Randeree & Rao, 2004, p 37,38). One of the barrier in the use of internet technology is that the healthcare professionals, patients (consumers) and even hospital administrators are reluctant to use internet technology because of their concern for privacy and confidentiality (Kerwin & Madison, 2002). However that did not seem the case with patients surveyed in the two government tertiary hospitals.

*SURVEY RESPONSE (Q24)*

Low use of the hospital website could be seen in the survey results (see Figure 38 below). A considerable number of respondents (47%) stated that they came to know about the healthcare services provided by this hospital through their previous personal visits to the hospital. 29% came to know about these services from an acquaintance. 1% visited the hospital website to know about the healthcare services being provided by that hospital.

*Figure 38: Patient Knowledge of Healthcare Services through Different Channels*




## 3.9 Impacts: Inclusivity in Health Service Generation

The very fact that government charged just Rs. 20 as token money for appointment slip in public sector hospitals and that was supposedly a pro-poor policy and increased poor patient's accessibility to these hospitals. On the question of how this was compatible with the concept under 'Business Process Re-engineering' that government departments were supposed to generate their own revenues, the IT official in LRH argued about health and education to be the responsibility of the government and for this reason the pathology and radiology test charges in public sector hospitals were much lower than the market rate (B. Bashir, Personal Interview, August 11, 2021). It was claimed by the IT official in LRH that **with digitization the cost of films in radiology were getting lower** and therefore **less expensive and more accessible** (in terms of expenses) to even poor patients visiting public hospitals. This was observed during conducting survey that many patients in LRH MTI complained of besides congested OPDs, but also high test fee *"…the government hospitals should lower the patient medical test fee, we cannot afford to give the test fee".*

***Sehat Sahulat Card'***

Public private partnership in running some initiatives, such as the President Primary Health Initiative, which was launched under President Musharraf then became the People's Primary Health Initiative was meant to outsource hospital services to some private companies. The health official reported that the performance indicator of PPHI lead by private ones to perform better than those run by the government (A. Ibrahim, Personal Interview, July 30, 2021).

**The inclusivity issue was somewhat addressed through the government's 'Sehat Sahulat Card'** that made health care affordable for patients by providing support to health care expenses of patients in hospitals that were near to their places, which will prevent the rush in main hospitals in cities (B. Bashir, Personal Interview, August 11, 2021). The eligibility for this programme could be checked online through registration of ID number and the card could be

generated by calling (pmhealthprogram.gov.pk). Khyber Pakhtunkhwa has also become the first province to have universal coverage of health insurance for 100 percent of its population. The entire population of the province has been extended free healthcare facility with extension of ***Sehat* Card Plus scheme**. Being executed through the Health Department in the province, the *Sehat* Card Plus scheme would supposedly benefit over 6.5 million families and 40 million citizens of Khyber Pakhtunkhwa as these can get free health facilities up to Rs1 million (The News, Feb 1, 2021).

Despite the fact that Sehat Insaf Card was mainly available for certain drugs but according to several patients not for all kinds of expenses. Many patients in ATH MTI, Abbottabad explicitly stated that they have been paying for costly drugs from outside the government hospital and Sehat Insaf Card did not provide any relief. Another person showed his distrust in the government initiative, *"… what if the government is providing health allowances through such measures (Sehat Insaf Card), they have been slicing our bread and butter in other places".* Several patients were seen complaining about the technicalities of using the Sehat Insaf Card, *'… our Sehat Insaf Card is not working because there are issues … our child's Form B is not recognised by NADRA … there are unnecessary and unimportant technicalities in everything'.* A patient relative lamented, '… *all facilities should be provided inside the hospital such as x-ray, tests, etc. Sehat Insaaf Card usage should be made easy. All tests, xray facilities should be provided free of cost to the poor people'.*

***The Traditonal Ways Prevail: Going Paperless – Not Easy As It Seems***

The patient's use of ICT tools for health service utilization was hampered by **traditional ways of accessing health care service.** The patients as argued by DHIS official still preferred to access health care in public sector hospitals physically, because of the existing culture of in-person visits to offices and their low educational levels, which hampered knowledge about and usage of ICT tools (A. Ibrahim, Personal Interview, July 30, 2021). He gave the example of a patient visiting OPD, when issued a computerized slip will surely forget it on his follow-up visit and end up getting another one on next visit; the reason being, either he will not remember bringing the first one, or he would not know to bring the same slip again for a follow-up. It is therefore, to prevent duplication that the health department is thinking of initiating a system whereby the OPD slips would have three print: one copy for the finance department; one for the medicine store and the third for the patient's own record. It was also under consideration to ask the patients to bring the same OPD slip for follow-up visit to prevent duplication and wastage (A. Ibrahim, Personal Interview, July 30, 2021). Here it seem the hospital to be trapped again with keeping OPD print copies, and that also not one but three, opposed to the vision of KP Government 'going paperless' in the offices.

***Online Doctors Appointment***

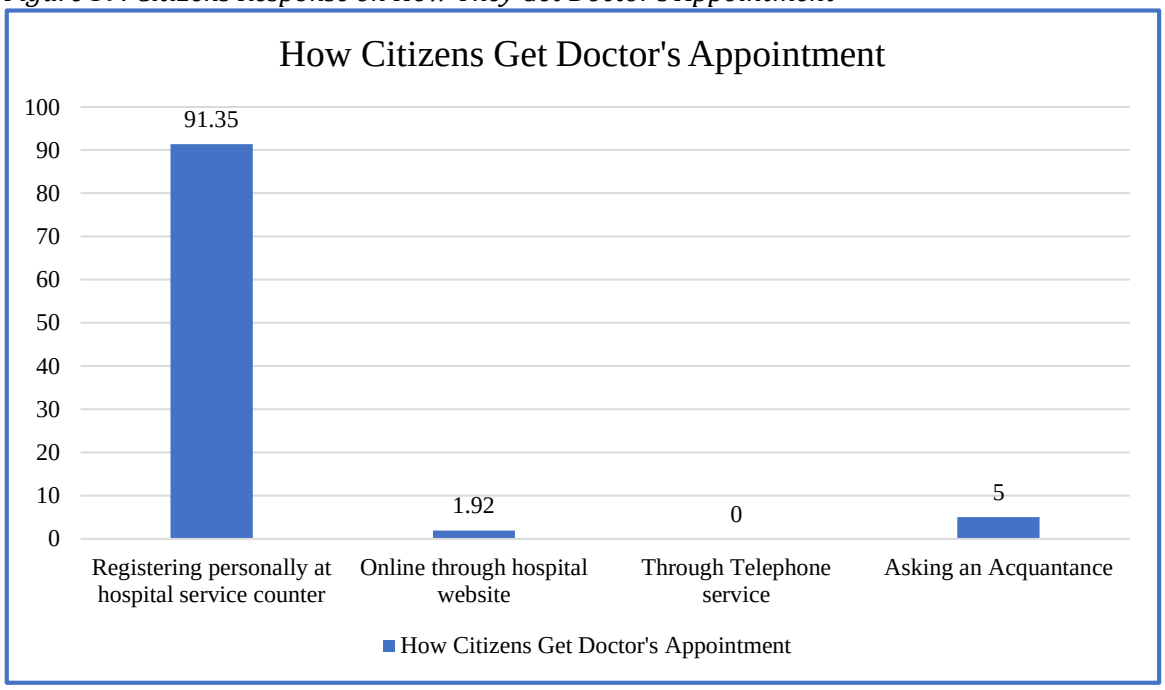
The LRH website offers **online appointment booking from doctors**, which is supposedly making the health care more inclusive and accessible through online services. On the question of how many patients accessed **the online doctor's appointments option in LRH**, it was revealed that the online doctor's appointment option given on the LRH website was **meant for indoor-patient or IDPs**; it was in the process of being extended to OPD in future (B. Bashir, Personal Interview, August 11, 2021). The online doctor's appointment option was supposedly limited to a certain number of patients daily on account of slots meant for follow-up as well as walk-in patients (B. Bashir, Personal Interview, August 11, 2021). The DHIS officials mentioned

**telemedicine** as one of the IT related health services launched initially for two years for dealing with the issues of accessibility to far flung areas; however, it was for now in limited use with the prospects of extending it to where technology had its access (A. Ibrahim, Personal Interview, July 30, 2021).

*SURVEY OUTCOMES: (Q21) Accessing the Doctors*

When asked about citizens mode of getting doctor's appointment, a considerably high majority (91.35%) stated that they do not get doctor's appointment either online or through telephone service, instead they would prefer to go to the hospital and register personally through '*parchi*' in the hospital.

*Figure 39: Citizens Response on How They Get Doctor's Appointment*




Several other patients reported to be either unaware of the system or did not trust the system.

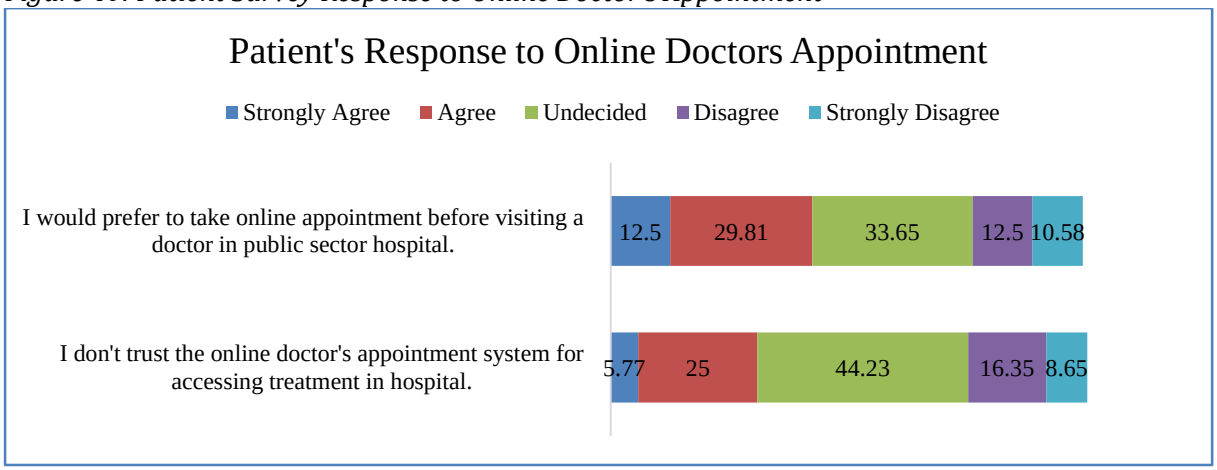
The LRH MTI, Peshawar had an online doctor's appointment facility which according an official at the hospital was not functioning for OPDs conducted in the morning. The online appointment system is available only for Institutional Based Practice (IBP) of doctors under the KP Government Medical Teaching Institutions (MTI) Reforms Act 2015. Under this system doctors of medical teaching institutions do their private practice in the same hospital in the evening on cost-sharing basis (The Express Tribune, Feb 18, 2018). Patients waiting to be seen by doctors at LRH MTI, Peshawar in the evening said that the OPD charges were PKR 1500. The *parchi*/ slip for the same hospital OPD in the morning would cost PKR 20.

The ATH, MTI, Abbottabad has also a "Book an appointment" on its Facebook page showing doctors charges as PKR 1300 per doctors visit ( https://www.facebook.com/athabbottabad/services/?ref=page_internal)

*SURVEY OUTCOMES (Q5, 6) Online Doctor Appointments*

Along with the hospital online presence comes the issue of doctors online appointment. When the respondents were asked if they would prefer to take online appointment before visiting a doctor in public sector hospital, 42.31% stated that they would avail the facility, however, more than half of the respondents either were not aware or undecided (33.65%) or did not feel comfortable with the process of online doctor's appointment facility (23%). So 56.65% were reluctant to use the online doctor's appointment system. 30.77% stated that they did not trust the online doctor's appointment system for accessing treatment in hospital, and a majority of respondents (44.23%) were undecided and could not make up their minds as to trust the system of online appointment or not. 25% of the respondents showed their trust on the online doctor's appointment system. (see Figure 40 below).

*Figure 40: Patient Survey Response to Online Doctor's Appointment*




According to one of the studies (Zhao et al., 2017), healthcare is becoming patient-centered and online doctor's appointment schedules give freedom to patients to make decisions at their convenience and preference thereby allowing improved access. The growing trend in the web-based appointment system has many benefits such as there has been less no-show rate and patients rarely misses an appointment, decreased staff labor, decreased waiting time, and improved satisfaction etc. (Zhao et al., 2017). However, in Pakistan specially Khyber Pakhtunkhwa, there is a very low trend of online doctor's appointment. It maybe because patients have their own communication preference, they are reluctant to use the web-based appointment system because of lack of trust, lack of awareness or simply inability to use the system as most of the websites are in English language. Several patients prefer to use telephone to schedule an appointment. Age and gender can be among other factors that restrict the patients not adopting online doctor's appointment. Other factors can include lack of accessibility to smart-phones, computers, tablets, and internet service. In the west researchers observed that there was a 300% increase in self-scheduled appointments within months owing to the Covid 19 pandemic (Woodcock, 2022). However, in Pakistan, especially KP the trend did show some progress but not much. The limited or restricted uptake of online doctor's appointment means the patient will face waits and delays in the OPDs. Improving quality service also means the timeliness of such services which is least understood aspect of healthcare service delivery in Pakistan.

***Access to Medical Test Reports:***

In terms of **patient's access to his medical data online,** it was revealed that the patient had only access to his pathology reports which he could download at his convenience in his home. One hitch was that the request to make available a patient's pathology report online for access to the patient was made by the Doctor to the technician and then the technician then would acknowledge the request by calling the patient (B. Bashir, Personal Interview, August 11, 2021).

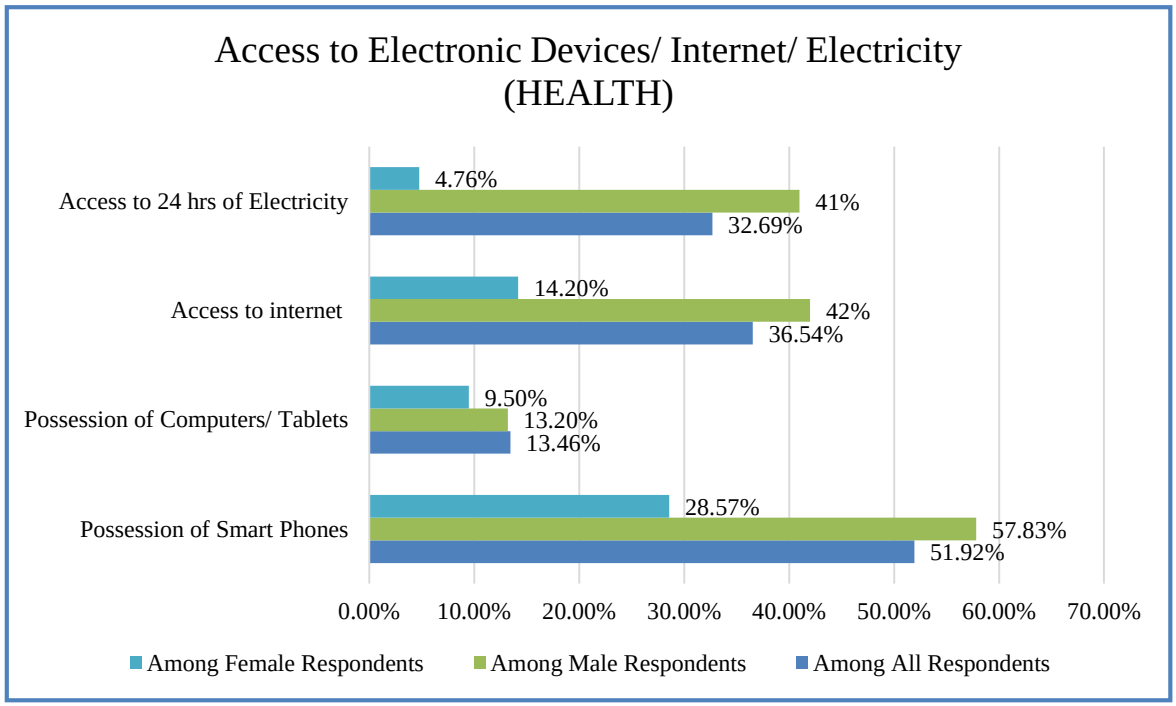
*SURVEY OUTCOMES: Online Access To Medical Reports: (Q 7,)*

A majority of the respondents (46.15%) were undecided on whether the public hospital should provide them online access to their medical records, including test reports. 44.23% of the respondents reported that they would like the hospital to provide them online access to their medical records and test reports. A small number of these respondents (9.62%) were not bothered or did not concern themselves about even if the hospital does not give them access to their medical records and tests. Basically, they were unaware of such a system.

During the survey in ATH MTI, Abbottabad, it was reported that a large number of patients and relatives had come from far flung areas such as Kohistan, Azad Kashmir, Batgram and also from proximity such as Abbottabad, Havelian, Mansehra. Similarly the survey revealed people coming to LRH MTI, Peshawar from the distant small cities such as Karak, Nowshehra, Swabi, swat, Dir, Shangla, many form the Merged Districts and even Abbottabad. Online access to medical test report will give these patients some relief from coming back to the tertiary hospitals from far flung areas. However, this accessibility is associated with the ability of the patients to own an electronic device to access their tests online. As could be seen from the survey results that only half of these people surveyed possessed cell phones(51% ), had a computer or tablet (13%) , had internet facility (36% ) or even had access to 24 hour of electricity(32%). The access issue was more grave among the females **(**see **figure 41**).

*Survey Outcomes: (Q 1-9)*

*Figure 41: Patient Access Level to Electronic Devices, Internet and Electricity Necessary for Use of Digital Initiatives in the Health Sector*




More than half of the respondents (52%) in the hospitals reported to possess a smart phone, however on the contrary the possession of computers/ tablets among them was very low (13%). The possession of smart phones among females was much lower as compare to males. Only 28.57% of the females surveyed had a cell/smart phone due to cultural restraints as one woman from Karak district who had come to LRH for treatment said, " It is a cultural thing … we are Pashtuns … we don't keep cell phones", neither had they television at their home. It was also difficult for some females to answer many questions, as one woman at LRH from Nowshera would repeatedly say "I don't know,… ask my husband, … my husband knows everything…". This inconsistency in the possession of electronic gadget among women shows the disparity in their access to communication and information as compare to males.

48% of respondents who did not possess a smart phone attributed it on their inability to buy one. The 87% of the respondents who did not possess a computer / tablet also stated that they were too poor to afford such gadgets. Some did not feel the need to have a smart phone (6%) or a computer/ tablet (17%).

While 37% of the respondents reported that they had the internet facility, a considerable majority (63.46%) reported to have no access to internet at all; more than one third (36.54%) of the respondents who said to have access to internet had it on their smart phones; a small number had internet at their homes (3.85%); and only 0.95% had access to internet at their offices/ work places. Those who did not have access to internet related it to their poverty and inability to own a smart phone (47.11%); a small number of respondents (4.81%) stated that they could not use internet or understand it; a very small number (1.92%) did not feel the need to use it. Religious concern (0.96%) was another reason for not using the internet.

Thirty three percent of the respondents stated that they had access to electricity for 24 hours; while 15% had access to electricity but only for 6 hours in a day and five percent had no electricity at all. Thirty percent of the respondents reported that they had access to 24 hours of electricity as against sixty six percent who had access to less than 24 hours in a day. 87% had access to less than 18 hours of electricity and around five percent reporting that they had no electricity at all.

**For inclusivity and marginalized population coverage in health**, there was optimism that ICTs can achieve these goals provided the local BHUs are equipped with proper infrastructure and internet availability was ensured to connect patients with hospital consultants. To quote the IT director of LRH, *'Look a few years back we went to Kumrat…on my way back from Kumrat I saw a pickup in between the hills which had a patient on a 'charpoy' behind being carried to some hospital. It is such a remote area… the family must have treated the patient at home and when he was no longer treatable, were shifting him to a hospital in the city…Now such cases can be facilitated in local BHUs, when these are connected with the LRH, where consultant doctors could see him online and treat him from there…females can also be treated in the same manner'* (B. Bashir, Personal Interview, August 11, 2021). Implying that each one of the local BHUs needed to be connected digitally with the tertiary hospital to help facilitate the patient in their local regions and save them the trouble of shifting to long distance city hospitals, even in critical conditions and through difficult journeys. For that to work, it was important to install the MRI, C.T Scan and Xray machines in local BHUs in remote areas and make these generate electronically reports for sharing with consultants in tertiary level hospitals in cities (B. Bashir, Personal Interview, August 11, 2021).

The IT official in LRH talked about **running a 'tele-medicine' campaign during Covid emergency** and receiving a very good response from people. He talked about the high level of awareness among both literate as well as illiterate 'new generation' people, who could be guided to use their phones to stay connected with the hospital services. To quote him, *'in Covid we got connected with mostly illiterate remote area people, who used android phones to get in touch with us conveniently…we also told them that they can use any medium, whether WhatsApp, IMO, Google Meet to connect with us… this shows that people can adapt technological interventions'* (B. Bashir, Personal Interview, August 11, 2021). However the survey results were quite discouraging so far as the use of tele-medicine was concerned (see Figure AB). Only a negligible percentage of people (0.96%) in the tertiary hospitals were had ever heard of it and none (0.0%) having used it.

The IT official in LRH also argued about **female doctors' appointments in far flung areas,** especially those who enter medical colleges on reserved seats to serve their areas. And for this to happen, the female doctors needed to be fully facilitated (B. Bashir, Personal Interview, August 11, 2021). Tele medicine more in vogue in developed world is regarded as an effective instrument for helping female doctors in countries like Pakistan to do practice from their homes, as figures cite only around a 30 % of females from medical colleges to practice medicine when they leave their institutions (Husain, 2021). In this connection, female doctors using telemedicine to treat patients in far flung areas could be another option. However, the perception about female doctors being physically available and treating patients in local BHUs is also very strong among the health officials, *'When females become a doctor, they need to give services in their districts, otherwise they should be made to pay for the expenses that the government incurred to educate them in medicine'* (B. Bashir, Personal Interview, August 11, 2021).

On questions of accessibility through ICT tools, the Deputy Directors Public Health argued that service delivery in **'preventive services' could be effectively handled through ICTs.** They argued that the 'curative services' could only be generated through patient checkup physically at centres (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). They further argued that ICTs in this case could be used to create awareness among the people so that demand for service utilization is increased (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

***Awareness & Use of e-Health Initiatives***

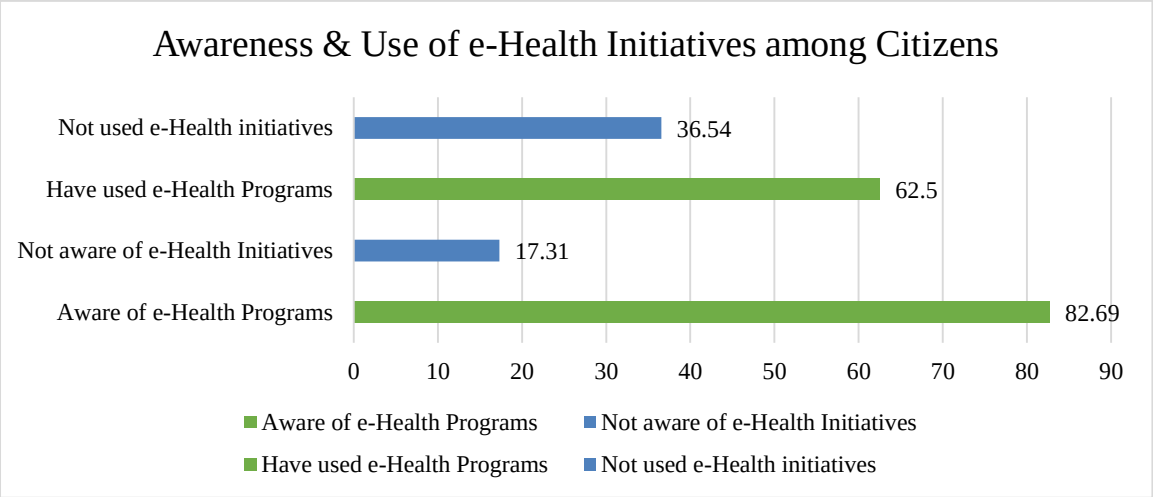
The level of ICT usage among people varied from region to region depending on the level of **awareness among the people** (A. Ibrahim, Personal Interview, July 30, 2021). **The DHIS didn't run any campaigns for raising awareness among the people** for using ICTs (A. Ibrahim, Personal Interview, July 30, 2021). Similarly, the Deputy Directors Public Health also attributed the people's low level of access to health service through ICTs **to a lack of awareness among the people**… *'look, our issue is that there are many interventions happening, but do the public know about these activities as to why we are doing it… the letter or notification that we issue has the words, in the best interest of public, but the public for whose interest are we doing, do they know about it?'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). They further contended, *'the services which we can provide to the people through ICTs, for example the data that we are collecting in Covid is just the tip of the iceberg… we are not satisfied'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021), implying that the government could do much more to increase awareness levels of public towards service utilization through ICT tools.

The Deputy Directors Public Health talked about **misconceptions among the people** on using health care facilities through ICTs (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). They attributed it to the lack of awareness and government's inability to properly educate the public; People's mistrust on Polio vaccination campaign cited as one example and that of lack of knowledge about the Covid vaccine utility and advantages as other examples (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). *'There is no probing in the community, the people are not aware, and this is because of public lethargy and official lethargy… you see for the last 20 years we are telling the public about polio, but still there is misconception among them about polio and now there are rumours about vaccines, so this lack of knowledge is either because of knowledge bombardment or knowledge restriction'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

*SURVEY RESPONSE : (10-12) Awareness of e-Health Initiatives*

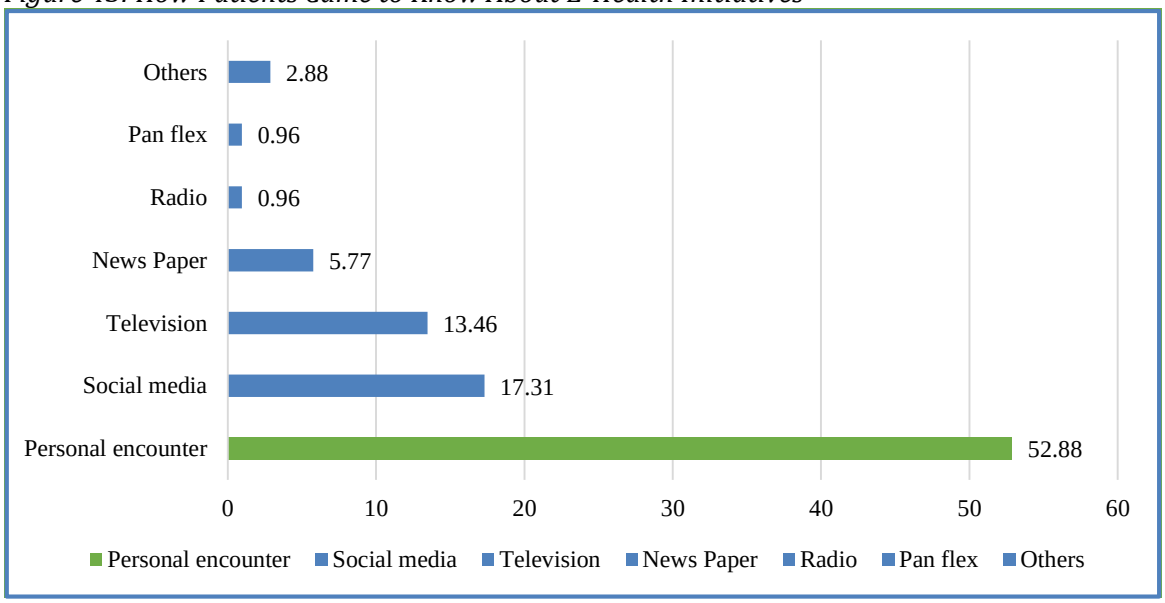
Majority of the respondents (83%) were one way or another aware of the e-Health initiatives introduced by the government of Khyber Pakhtunkhwa (see Figure 42)- with Sehat Insaaf Card (76%) topping the rest of the initiatives and awareness about other e-Health initiatives included e-Vaccinations (40%); Ambulance system 1122 (20%); Health Complaint registration and Redressal through Pakistan Citizen Portal or Khyber Pakhtunkhwa Citizen's Portal (6%); online doctor's appointment (3%); Hospital websites (online access to reports, prescriptions ..)(2%); e-ilaj/ tele-medicine (0.98%).

*Figure 42: Survey Results Showing Awareness Level and Use of E-Health Initiatives among Patients Visiting Tertiary Hospitals*




Half of these respondents (83%) who had some knowledge of e-Health initiatives, came to know about them through personal encounter; 17% through social media and 13% through TV. Other medium through which people became aware of these initiatives included newspapers (6%); radio (0.96); pan flex (0.96%). A majority of approx. 52% found out about these initiatives when they actually used them (see Figure 43).

*Figure 43: How Patients Came to Know About E-Health Initiatives*

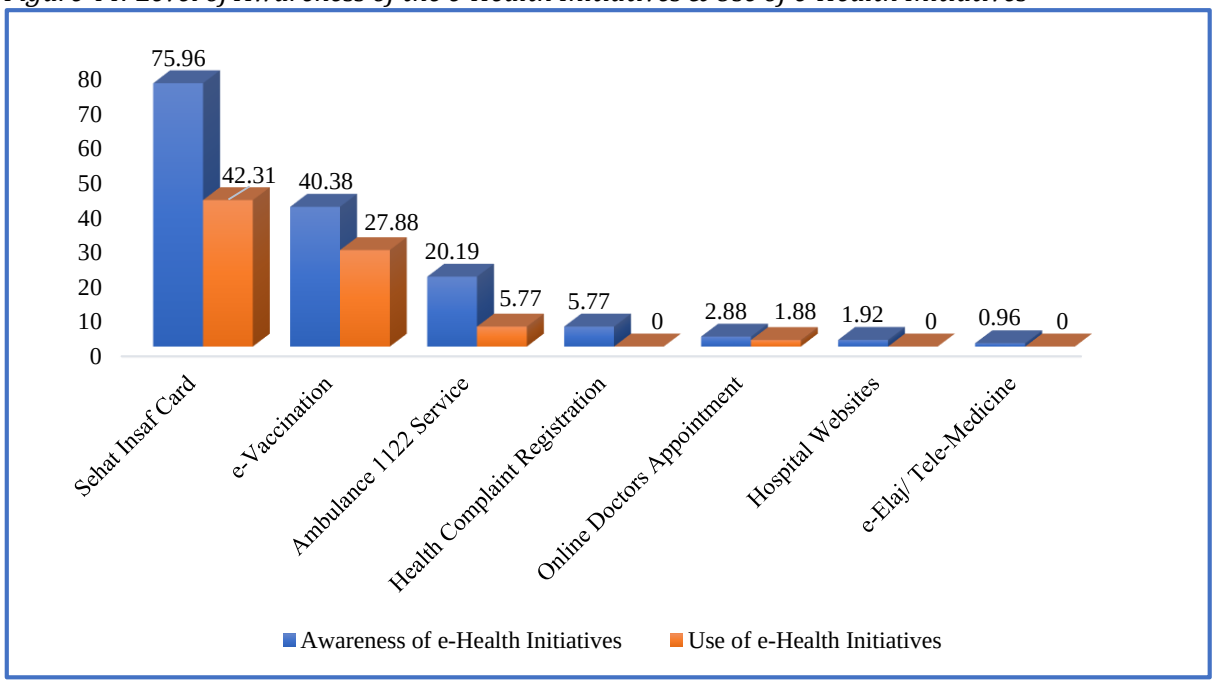



*SURVEY OUTCOMES (Q 13, 14) Participation in E-Health Initiatives/ Use of E-Health Tools*

While 63% acknowledged using the e-Health tools, 37% reported to have never used these tools (see Figure 42). Largest number of respondents had used Sehat Insaaf Card (42%). Other tools used by the citizens included e-Vaccinations (28%); Ambulance -1122 (6%), online doctor's appointment (3%), restricted to LRH MTI Peshawar, as it provides for an Online Doctor's Appointment facility (see Figure 44)

Despite the fact that Sehat Insaf Card topped the e-Government initiatives for the provision of affordable healthcare facility, however majority complained. Sehat Insaf Card was mainly available for certain drugs but according to patients not for all kinds of expenses. In ATH MTI, Abbottabad, many patients explicitly stated that they have been paying for costly drugs from the outside (the hospital) and Sehat Insaf Card did not provide any relief. One person said, *"what if the government is providing health allowances through such measures (Sehat Insaf Card), they have been slicing our bread and butter in other places".* Similarly several patients at LRH MTI, Peshawar, that were surveyed complained about the health expenses, upon asking they would say, *"we have card but the hospital is not providing any important and costly medicine, we still go out to the market and buy expensive medicine".*

*Figure 44: Level of Awareness of the e-Health Initiatives & Use of e-Health Initiatives*




The IT official in LRH also argued about **female doctors' appointments in far flung areas,** especially those who enter medical colleges on reserved seats to serve their areas. And for this to happen, the female doctors needed to be fully facilitated (B. Bashir, Personal Interview, August 11, 2021). Tele medicine more in vogue in developed world is regarded as an effective instrument for helping female doctors in countries like Pakistan to do practice from their homes, as figures cite only around a 30 % of females from medical colleges to practice medicine when they leave their institutions (Husain, 2021). In this connection, female doctors using telemedicine to treat patients in far flung areas could be another option. However, the perception about female doctors being physically available and treating patients in local BHUs is also very strong among the health officials, *'When females become a doctor, they need to give services in their districts, otherwise they should be made to pay for the expenses that the government incurred to educate them in medicine'* (B. Bashir, Personal Interview, August 11, 2021).

## 3.10 Is Change Management an issue in ICTs and Health Service Delivery?

On the one hand, the hospital IT officials reported a **high level of enthusiasm and innovativeness among the LRH staff and especially the IT head of the hospital** for introducing innovative ICTs in improving public service delivery… *'here the greatest role is that of the IT head [in hospital], if you want to do something only then you undertake the work [in ICTs]…it is our responsibility to place something in front of them because as head IT we have the greatest responsibilities'* (B. Bashir, Personal Interview, August 11, 2021). He mentioned the innovation of Covid Dashboard (the first of its kind), which was created even before the IPMS (Institute of Para Medical Sciences, KMU offers BS in paramedical sciences) and ensuring the transfer of internal BoGs to it… *'we created the dash board in Covid and placed it before them [hospital staff] to undertake decisions… it is sill running'* (B. Bashir, Personal Interview, August 11, 2021).

Others also argue about the **eagerness at the higher level of policy planners to get transparent data** for understanding the trends; therefore, not many change management issues prevailed (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). And at lower levels of data entry points, issues emerged, not as much due to organizational culture, but due to either internet connectivity issues or delays caused by overburdened technicians in some BHUs, who were supposedly multitasking by looking after the patients, providing them medicines, and simultaneously engaged in manual entry of record, to compile it for further report generation (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

The LRH IT official noted **a hesitancy on the part of hospital staff in using computers**, which he argued was often considered 'burdensome.' But there is also an assertion that such hesitancy is being overcome through regular IT trainings and gradual introduction of computerization. *'We gave them trainings and Alhamdullilah this finished the culture of computer operators…the technicians, doctors and nurses are entering [data] on their own'* (B. Bashir, Personal Interview, August 11, 2021). The IT official in LRH pointed out **two issues in organizational reluctance to adopt ICT changes**: the inability or unwillingness to use ICT tools in service delivery due primarily to age related issues among the employees; or reluctancy owing to ICTs ensuring transparency (B. Bashir, Personal Interview, August 11, 2021). He gave the example of employee initial resistance to bio-metric attendance system, which ensured that those who came late should come on time always (B. Bashir, Personal Interview, August 11, 2021).

In order to deal with change management issues among employees, **the e-surveillance Apps for diseases (made for android software) was disseminated along with tutorial videos and user guide manuals** (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). This was besides appointment of a focal person for resolving any related issues to guide the technicians. On job zoom trainings were also provided to the personnel using the ICTs (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). The DHIS official termed organizational hesitancy a result of **lack of on-job training of para medical staff and the frequent transfer of officials from field to desk jobs**, which created issues for officials to settle down and adopt the work practice related to different nature of these jobs. He though conceded promotion related training taking place regularly (A. Ibrahim, Personal Interview, July 30, 2021). He recommended the newly transferred officials at highest positions to be trained by those who were leaving offices, so that the new official develops an understanding about the working of the new hospital doesn't have to waste months in the process (A. Ibrahim, Personal Interview, July 30, 2021).

On the part of the **patients too**, it was reported by IT officials in LRH that they **preferred to access health service through the traditional method of physically visiting hospitals**, especially public hospitals in big cities, such as the LRH; the reason being people from remote areas first visit the quacks, instead of going to the local BHUs and when their cases are spoiled, they then dash to the LRH, again preferring to avoid the local BHUs (B. Bashir, Personal Interview, August 11, 2021).

**For ownership by high officials of ICT initiatives, there were differences of opinion among officials.** The LRH IT official talked about the importance of ownership of digital initiatives by higher officials. *'Our DG Health had introduced Biometric attendance system even in BHUs at district level…he even had Ufone sim installed for that so that if someone does biometric, it was automatically reported in the main server, however, it could not run'* (B. Bashir, Personal Interview, August 11, 2021). **Issues of ownership** were also pointed out, especially in the context of failure of motivation because of lack of system of 'punishments and rewards.' *'Ownership is an issue because the department does not have punishment and reward mechanism, which can motivate someone… and where ever the concept of jaza aur saza (reward and punishment) becomes weak, things start to deteriorate'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). Political interference was also quoted as one of the factors where people who were not performing their duties could not be punished (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

## 3.11 Are Resource Scarcity and Technical Glitches Issues in ICTs and Service Generation in Health?

**Lack of finances was argued as a long-standing issue** which meant government always providing finances less than demanded (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). One of the Deputy Directors Public Health in the Health Directorate himself a doctor, who had served in the field recalled a survey conducted by their colleagues to understand how much of finances were reserved by the government per patient per BHU in Khyber Pakhtunkhwa, which was a dismal amount of PKR 11 per patient per BHU… *'we went to the district government with the summary, we told them this is our analysis, you people have released this much funds, we have this much OPDs, these many BHUs, these many weeks and days in a year, you can do the division and you will understand if you are giving us Rs 11 for one patient, then which diseases medicine do you expect us to provide them [patients]'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). As insisted by him, it was quite unrealistic to expect any BHU to provide medicines, doctor consultation and tests to patients on such a meagre amount of resources provided. The official sarcastically commenting, *'You cannot even get a panadol strip for 11 Rs, let alone talk about providing health care… and since you have resource scarcity then you have to prioritize'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

The Deputy Directors Public Health narrated the presence of trained personnel in HR and logistics availability, such as tablets, smart phones, very important for overcoming problems in collection of real time data on diseases (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). They also talked about health and education sector **always facing shortage of funds,** which makes the government take a recourse to donor funding for different programmes. Such programmes once initiated by the government and run by the donors initially for 5 to 6 years are reverted back to the government and get 'political ownership,' once it generates a demand among the people (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). The DHIS official brushed aside the issue of funding

by government. He blamed the organizational culture for slow progress on ICTs in service generation (A. Ibrahim, Personal Interview, July 30, 2021).

However, some officials **brushed aside technical glitches or infrastructure shortages**, by arguing, *'no, we don't have (infrastructure shortages) in LRH…there is huge investment in it…the phones you see are also digital phones'* (B. Bashir, Personal Interview, August 11, 2021). He also dismissed the issue of lack of funds. He took a credit for preparing a detailed presentation and convincing the management on digitizing hospital services in accordance with international practice and standards (B. Bashir, Personal Interview, August 11, 2021).

**Issues of sustainability of health care services in the face of scarcity of resources by the government led to the involvement of donor agencies,** who often take the initiative too. However, as the service generated by the donor becomes a demand in a few years' time, it gets political ownership by the government and is run by the government then. The Deputy Directors in Public Health also argued that once a system is in place with donor help, the running cost of the system is not as expensive. They gave the **example of e-surveillance of diseases,** which since had started, could now be expanded to include more disease surveillance, without incurring additional expenses as the same tablets can be used to add two more diseases surveillance in the system (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). **The IT official in LRH reported no donor assistance** to the setting up and running of IT system in their hospital (B. Bashir, Personal Interview, August 11, 2021).

**Technological glitches** were reported to be impacting at times the systematic entering and use of data in some cases (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). Issues of internet connectivity at local levels also delayed the process (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). The context of outdated machines which did not support ICT initiatives in Health were also pointed out as one aspect of the problem by LRH deputy director of IT (B. Bashir, Personal Interview, August 11, 2021).

The Deputy Director Public Health reported **deficiency of technical staff, especially 'Data Entry Operators (DEOs)' at district level BHUs**. The government, therefore, got in touch with donor agencies who promised to make up for the shortage in 10 districts of Khyber Pakhtunkhwa (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). The government was also hiring additional 25 operators on daily wages to remove the issues of backlogging in high-risk areas; such backlog at times reaches the figure of around 80,000… *'the issue of shortage is here [of DEOs], however, the government is taking steps to resolve the issue'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). On the issue of **data security,** the IT official in LRH dismissed it by saying that there were proper firewalls that ensured security of data (B. Bashir, Personal Interview, August 11, 2021).

## 3.12 ICT Tools, Service Delivery in Health and People's Trust on Government

The Deputy Directors Public Health connected **citizen's trust to accessibility and awareness** levels among them for demand generation and service utilization (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). It was also argued that lack of monitoring of specific ICT tools in terms of its efficacy and efficiency in the health sector (among the public) made it difficult to understand how these were developing public trust. *'We don't have any direct mechanism to measure it [public trust], because when you float a system, you also make an M&E to understand its efficacy'* (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021). Although, some feedback from the public was

undertaken by the Independent Monitoring Unit and the PMRU website, which were quoted as better sources to understand this feedback on public perceptions and trust on the system (M. S. Farooqi and A. A. Feroz, FGD, July 26, 2021).

The IT official in LRH responded positively in the context of **people's trust improving in government under the ICTs.** He gave the example of patients in LRH were now supposed to pay any charges, not at the time of admission, but that of discharge. Prior to that the patient attendants were charged every time a new payment was supposed to be handled. The current bill which is generated electronically only at the time of discharge shows in detail the expenditure incurred by the hospital under different heads…; therefore, referring to such transparency, *'so definitely the patient trust and confidence has increased'* (B. Bashir, Personal Interview, August 11, 2021). The DHIS official reported **people's perception of the government improving, but rather slowly**. He also mentioned trust increasing because ICTs were improving response mechanisms of the government, which were missing in the manual systems (A. Ibrahim, Personal Interview, July 30, 2021).

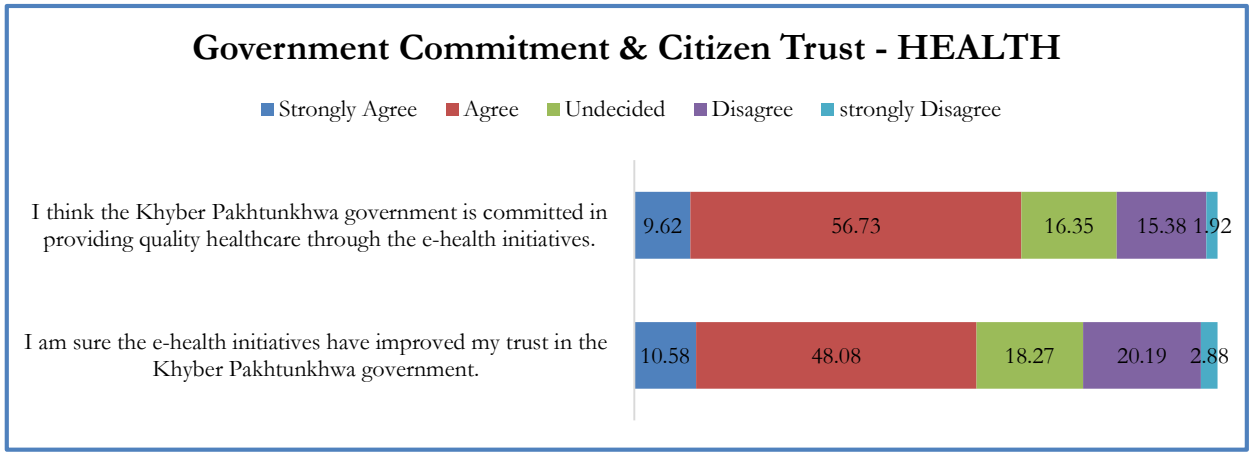
On the improvements in e-health, the suggestion was IT experts should make multiple presentations to the government on how under current resources, the system could be improved based on a comparative analysis with other countries (B. Bashir, Personal Interview, August 11, 2021). Additionally, **new purchases of equipment should be in line with digital requirements.** He narrated the case of Peshawar Institute of Cardiology that wanted to institute a paperless electronic system to function in the hospital. However, the servers that were purchased before such proposals, could not support the system. This resulted in ordering new purchases which could not be delivered in time due to Covid. The IT official reported that the institution in this case was facilitated by the LRH server for around 6 months till they switched to their own server (B. Bashir, Personal Interview, August 11, 2021). He, therefore, talked about the importance of pre-planning for next five years keeping in mind the government resources and investment in ICT tools (B. Bashir, Personal Interview, August 11, 2021). The DHIS official proposed the concept of **'One Health' initiation,** which not only focused on health service delivery, but also improving road conditions, sanitation, traffic control, basic education having information on communicable diseases and personal hygiene to kids in schools (A. Ibrahim, Personal Interview, July 30, 2021).

*SURVEY OUTCOMES: (Q 11,12): Government Commitment to Healthcare and Citizens Trust*

Majority of the respondents (66.35%) in Lady Reading Hospital, Peshawar and Ayub Teaching Hospital, Abbottabad who had come for their own treatment or had brought their relative for treatment confirmed their belief on the commitment of the KP Government to provide quality healthcare through e-health initiatives. On the contrary a smaller percentage of respondents (17.3%) doubted the commitment of the KP Government in improving the healthcare facilities for the general public. A similar number of respondents (16.35%) remained undecided on the government commitment issue.


A majority of respondents (58.66%) were certain that e-initiatives improved their trust in the KP Government. 23.07% did not agree and stated that e-health initiatives introduced by the KP Government did not improve their trust on the government. 18.27% were undecisive whether the government digital health initiatives were worthy of their trust and that whether the government was doing the right thing (see Figure 45 below).

*Figure 45: Survey Results Showing Citizens Response to KP Government Commitment to E-Health & Increase in Citizen Trust*




On the average, to a large extent the people did not seem critical of how the government was handling the health sector. By and large they believed in the commitment of the KP Government to improve the healthcare facilities for the citizens. A substantial majority of respondents believed that the government is doing well in dealing with several issues relating to the healthcare sector such as provision of affordable healthcare facilities (72.12%); quality healthcare facility in tertiary hospital OPDs (86.54%); quality healthcare facility in hospital Inpatient Departments (86.54%); and trust with patient electronic health data safety (61.54%).

## 3.13 Conclusions

The health department digital initiatives reveal several interesting findings. Health officials argued efficiency in government/ department's response to disease control improving as a result of speedy generation of data from the end user, which is entered on software in district hospitals, and which is then displayed constantly on a dashboard for monitoring, analysis and decision making by the provincial and central government on a daily basis. There is a strong perception that the public sector hospitals should provide free health care to the people as mostly the very poor utilized its health services, dispelling the 'business process re-engineering' culture of making government organizations generate resources through raising revenues internally. Though many digital initiatives are there, however, more needs to be done to engage citizen's more meaningfully in the art of seeking health services digitally.

# RECOMMENDATIONS AND POLICY IMPLICATIONS

The recent introduction of Information and Communication Technology (ICT) tools in governance of Khyber Pakhtunkhwa has been a unique experience with policy making in this otherwise economically and socially under-developed province. These changes in governance, often known as e-governance are aimed at improving service delivery through cost efficiency, transparency and accountability. Since 2013, the province of Khyber Pakhtunkhwa is leading this race by introducing innovative e-governance reforms in various departments, such as health, revenue, education, and district administration. This study explores the use of ICT tools for achieving efficiency, transparency and inclusiveness in public service delivery through provincial bureaucracy and in return gaining the citizen's trust. It also analyzed the cultural and organizational changes in the provincial bureaucracy under such changes.

Pakistan is relatively slow in adoption of e-governance practices as its position on the **UN 2018 e-Government Index ranked at 148 out of a total** of 193 countries (The World Bank, March 18, 2019, 75-78). Whereas the Global Information Technology Report 2016 in its Networked Readiness Index cited Pakistan's position at 110 with a 3.4 score (Maximum is 6) among a total of 139 countries in terms of adoption of factors, policies and institutions for ICT adoption and usage in increasing economic competitiveness and well-being. It was up from last year by two positions (World Economic Forum, July 2016; Bellar, Dutta and Lanvin, 2016, p. 16; Zeb, 2015).9

The following policy implications and recommendations are suggested:

- In Khyber Pakhtunkhwa, much needs to be done in order to involve citizens in the participatory practices of e-governance, where the citizens are not just involved in utilizing digital governance steps for citizen complaints and redressal, but also play their roles in policy formulation and direction. For this to be practical, it is important that the IT wings (HEMIS, EMIS and HMIS) of both education and health departments must engage citizens in the process of online consultations before an app or digital service is launched. It is important to mention here that such online consultations may be popularized through social media projection. The only recent attempt at engaging citizens is on the KPESED website, which opens a window inviting citizens to pen their suggestions on school syllabus changes. Such steps are noteworthy because citizen participation will further boost their trust in government's service delivery undertaking through ICTs.
- It is not without saying transparency's starting point is availability of open sources of information, easily accessible to the public on their websites. Open sources of information

9 The UN assesses and releases every two years the E-Government Development Index (EGDI) to ascertain the level of e-government readiness across different countries. This is done through an in-depth analysis of survey data across different ministries and levels of government in three components: scope and quality of online public services (OSI); the development of telecommunication Infrastructure (TII); and that of the Human Capital (HCI). Pakistan ranks among the 66 middle E-Government Development Index countries (Middle EGDI group), which are ranked at a score of around 0.25 to 0.50 in terms of e-preparedness. The scores for the very high and high groups in e-preparedness ranges from more than 0.75 to more than 0.50 respectively (UN E-Government Survey 2018, 85-86). It mentions Pakistan among the 6 Asian countries to have improved its e-presence in terms of service provision (Online Service Index- OSI) online from 2016 rankings (UN E-Government Survey 2018, 94).

generation from the government also increases the trust of Therefore, there is an urgent need to update the websites of both Health, as well as Education Departments. This is highly essential because both the websites include mostly outdated information, or some very basic set of information. Within Health Department, the Directorate General of Public Health (DGPH), which is a very critical policy implementation as well as monitoring and evaluation institution has a website that only contains some very fundamental and rudimentary information. Similarly, several affiliate institutions of both the KPESED and HED do not even possess their own websites. A click takes us to messages about URL not functioning. That needs a thorough and in-depth revamping. Here, the responsibility of updating can be tasked to the department's respective IT wings. For this purpose, data administrators specifically tasked with uploading current set of information on government websites can be hired.

- The interviews and survey questionnaire and informal chat with public also raised the important issue of digital apps non-awareness among the public. This led to under-utilization of service generation apps. At times, the public was even unaware of what ICT service generation constituted and how to access the same. Therefore, it is the recommendation that the government should seriously project its new as well as older ICT initiatives on social and print media platforms and educate public on how such apps may be optimally utilized. This implies that all such digital programs for learning should be exposed to proper media coverage campaigns, so that the people have awareness about these initiatives.

- It is also recommended that the concerned departments can hold small seminars and workshop in educational institutions, especially higher secondary schools and colleges to train and educate the students and teachers about the potential usage and benefits of such apps. Awareness campaigns can also be generated through primary school teachers who are in a better position to motivate and educate their communities on specific benefits to achieve from accessing service generation through such apps.

- This brings us to our next policy recommendation of how to bridge the digital divide. The quantitative survey analysis brings home the point that a large majority of public schools are populated by children who come from very low-income groups; similarly, mostly very poor patients access public hospitals. There is therefore a serious problem of affordability on account of differences in socio-economic backgrounds. It is absolutely essential that students be provided with very subsidized micro credits for purchase of computers and tablets. The Pakistani companies can assemble or make basic tablets with low prices for consumption by low-income households. For this the government of Pakistan may provide such companies with different tax concessions for inducing them to produce cheap tablets in bulks for consumption in public schools.

- The NGOs and donor agencies can be approached for help in bridging the lack of essential IT infrastructure as well as training of teachers in IT skills. It is important to warn about the digital divide emerging within public sector schools between those schools that were exposed to IT labs and computer labs (60 %) and those that were not (around 40%). Unless infrastructure is not provided, other related changes in syllabus, etc., will not help the cause of ICTs.

- It is important also that computer subject should be introduced in primary and middle schools as a compulsory subject, and not as an optional one as the current study suggests. Only by introducing children at a very early age to computer programming and coding, we can expect to produce a generation of IT experts. The very fact that computer was an optional subject and taught only in higher secondary level can directly be related to lack of essential infrastructure. We should not forget that in specific schemes where children of early age were introduced to computer programming and coding, they ended up winning international prizes. The KP Information Technology Board (KPITB), which is a specialized IT department of the Khyber Pakhtunkhwa government should be tasked with developing and implementing more of such computer programming and coding programmes.

- Agreements with cell phone companies for student packages or teaching packages for school and college teachers is also a desirable step; this has been attempted by government of Pakistan in the case of successfully running the online admissions system for colleges, the service was generated with the help of a renowned cell phone company.

- One suggestion is for the Khyber Pakhtunkhwa government to combine its various IT focused departments into one large umbrella institutions and task the same with developing ICT tools for different services by different specialized sections. In its current form, the Khyber Pakhtunkhwa Information Technology Board (KPITB), the Science and Technology & Information Technology department (ST&IT); and the Directorate of Information Technology (DoIT) all perform very overlapping set of functions. The over all performance monitoring of departments on ICT tools can then be managed solely by the Performance Management and Reforms Unit (PMRU).

- An essential aspect to overcome resistance to ICT usage among the officials is consistent on-job IT trainings. The fact of the matter is that the e-filling system failed take-off in many government departments because of clerical staff and officers' unfamiliarity with it. Let's admit it that ICTs are technical domain and need to be continuously reinforced through regular in-service trainings. Such trainings can be managed by those specialized cells which either are taking care of LMS and EMIS systems or by affiliate institutes that have specific mandates on trainings, for example the Directorate of Professional Development in Education Department. In big MIT hospitals, there are already IT sections functioning and reported on providing regular IT trainings to hospital staff.

- Another policy recommendation is that there must be inter-provincial sharing of best practices in ICTs. During field work, it came to light that there was no co-ordination between the IT departments of different provinces; resultantly all were working in silos, duplicating resources and infrastructure. The coordination between these IT departments will also help them learn from shared experiences and avoid failures from any new experimentations in service generation through ICTs.

- In the field of education, since remoteness and accessibility issues hinder student's access to tele-education apps, it is suggested that since the PTV has wide access across all regions of Khyber Pakhtunkhwa; therefore, by way of extension, the PTV services could be utilized by the KPE&SED as well as the HED for coordinated efforts at televising quality course

contents for school and college students to follow. This is absolutely essential especially in pandemics times, as Corona emergency and resultant school and college closures wasted precious educational time of those majority students who had little access to online education system. The PTV has its own tele-education programme, but it was in no way connected with the education departments of Khyber Pakhtunkhwa.

- In the realm of digital health, one important aspect missing is e-referrals in hospitals. If the MIT hospitals in major cities want patients to access their local BHUs and district hospitals first especially in the case of small time diseases, it is absolutely essential that the patients and doctors be connected digitally with specialists in big hospitals. Since already the government has provided technicians in BHUs with tablets, and there was also the planning underway for installing fixed tablets for disease monitoring, the same can be utilized to connecting district hospital and BHU patients electronically with the tertiary hospital doctors and services. This will lessen the burden on major hospitals and encourage people to access basic health services in their hometowns.

- The ICT interventions in Khyber Pakhtunkhwa government needs a better understanding of privacy and security issues on the government's side and those of the citizens. None of the hospitals in Khyber Pakhtunkhwa have 'Citizen Charter,' which is a booklet that explains to patients their rights about their data usage. In the absence of such a charter, the propensity to misuse patient data remains a very valid concern. Therefore, the health department immediately draft such a charter and make it mandatory to publicly display it for patients to read and understand their data protection rights.

- The World Bank's report, 'Pakistan@100: Shaping the Future' recommends within governance domain essential transparency and accountability reforms, which comprise provision of 'transparent and accessible information' on reforms and service delivery to citizens, including budget documentation transparency. Pakistan had by 2016 declared its intention to join the Open Government Initiative and undertake fiscal transparency, however, no major plan has been initiated so far (The World Bank, March 18, 2019, 79).10 Therefore, another policy recommendation is that the government, including the Khyber Pakhtunkhwa one must ensure online access to public about government's financial statements relating to various expenditures and on various projects.

10 The report emphasizes that there is lack of access to centralized and digitized staff records creating inefficiencies and lack of transparency as well as lack of coordination and collaboration within and across departments. Among its recommendations, it places increasing transparency in public financial management (Right to Information Act on financial information; timey disclosure of budget documentation and execution; publicizing audited financial statements of SOE; e-procurement for transparency, competition and reduced corruption), and strengthening citizen's voices in holding public officials accountable and expansion of monitoring efforts at the state level. For this, Technology holds the key.

# CONCLUSIONS

ICT interventions and the concomitant publicity carried out by governments around the globe are shaped by the cultural, social, and economic conditions. The cultural restraints, mostly in the developing countries, limit sections of population from the use of technology; for example, a considerable number of women in Khyber Pakhtunkhwa do not have access to electronic devices, indicating cultural limitations. The socio-economic constraints come in the shape of digital divide between the haves and the have-nots, and the digital skill divide among people. Digital divide denies access to some particularly, those who are poor, the digital-skill divide refers to differentiation in the possession of digital skills. Citizens in KP not only suffer from the binary taxonomy of digital-access issue between haves and haves-not but also had inequalities of digital skills. Economic deprivation coupled with skill deprivation creates a much wider gap than is often conceptualized. Closely connected with the deprivation problem is the issue of lack of awareness among citizens of their right to demand equal services, quality services and timely services through the ICTs.

Although political policy decisions aim to transform structures, mechanisms and processes within government agencies, the real transformation can be seen by the observable measures caused by these initiatives whether digitization or not. The transformation that digitization brought can be observed by the changes the organizational culture of government departments had undergone and it can be seen in the improvement of service delivery. However, equally important is the keenness of the citizens to use these initiatives to avail the services of the government. The low trust on the digital processes seen in Khyber Pakhtunkhwa, inhibits people from using ICT tools effectively. Citizens would choose to physically visit the government offices and have their work done; patients would prefer to physically go to the hospital and take doctor's appointment or want their test results on paper and would like to carry those files with them every time they visit the doctor for example several patients unsatisfied with the availability of their medical test results online, had their medical tests conducted in private labs outside the tertiary hospital to get their tests results on paper.

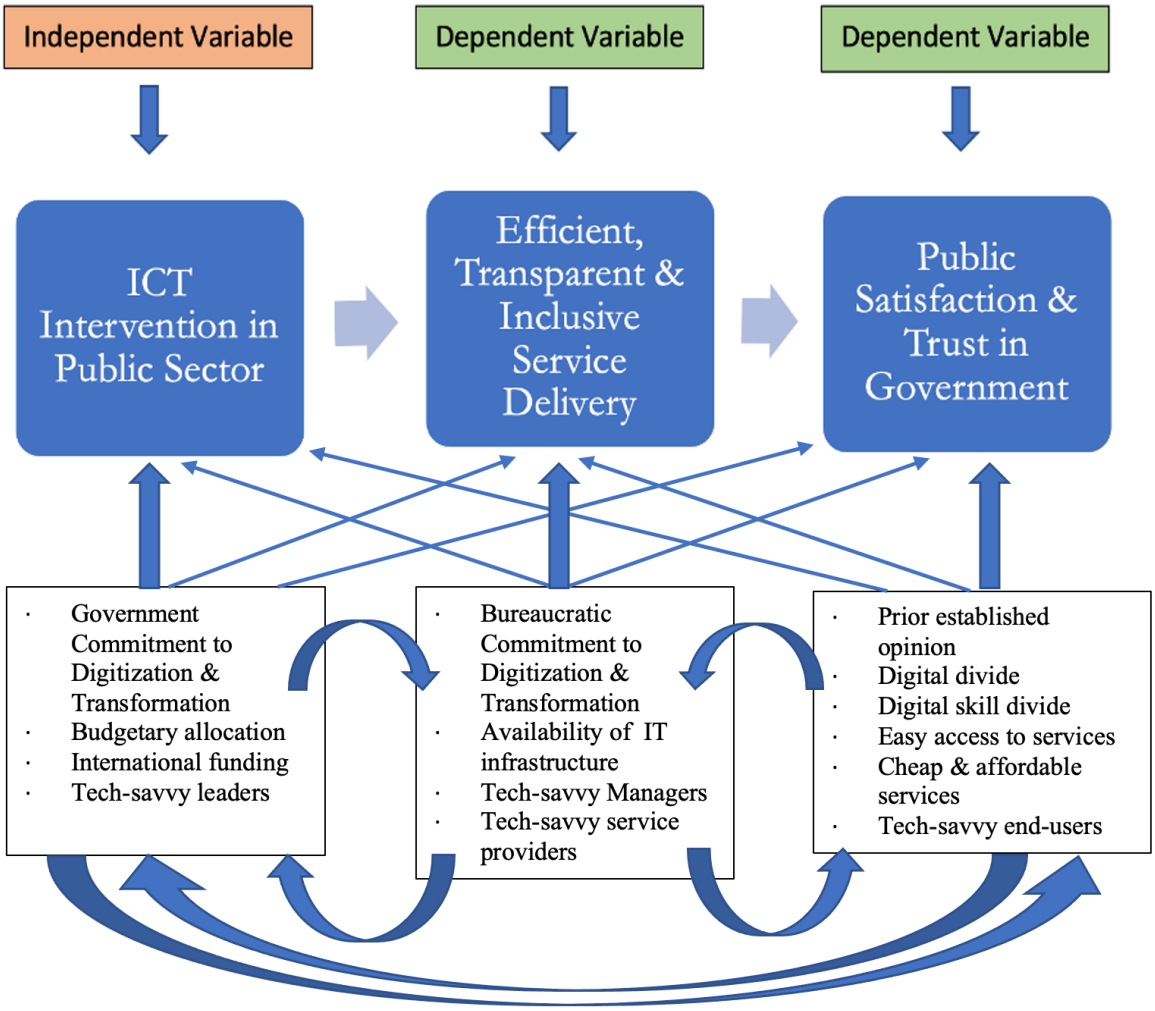
The civil servants are also a reflection of the society where they work and whom they serve. The resultant behaviour of the civil servant also replicates the societal behaviour towards digitization. The file tracking system which was developed by the PMRU and implemented in 2800 units/ sections, promises to accelerate the office work and improve efficiency in terms of effective disposal of files and minimize any delay caused by the manual diary section. However, the manual diary sections still flourish in the government departments. Even where e-office has been introduced, the file-tracking system works side by side with the manual paper-based diary/ file system, which is still widely used in government offices. The vision of paperless offices might take time to culminate. The digital morphogenesis promises the optimization of work processes, change in the organizational culture, and the resultant improvement in public service delivery, which however, will require some 'time' and some 'will' both on the part of the civil servants and citizens alike, to accomplish.

Although government commitment to digitization and transformation, tech-savvy political leaders and reasonable budgetary allocation coupled with international funding are the conditions to introduce ICT interventions in the public sector, however, it is also affected by the guarantee of the civil service to commit themselves to digitization success and deliver services in

an efficient, transparent and equitable manner. Political commitment has to be supported by the zeal and innovativeness of the public managers and the availability of appropriate resources for the execution of digital transformation. Though it is assumed that what the civil service adopts, the common man follows; on the contrary civil servants have to surrender to the demands of a common man by contriving and making service delivery possible by re-arranging technology such as the manual systems running side by side the ICT systems. For example, it all comes to the choice of the citizens, their preference to choose the medium of communication with their public servants, a considerable number of whom because of digital mistrust, like to physically interact with them and receive the service. The digital divide along with the digital skill divide discourages citizens to utilize the benefits of digitization. To reap the profits of digitization, citizens also require a mindset conversion from traditional attitude which is conservative to a more modern approach which is progressive. The citizens ability to use and seek benefit from the digital processes involves a high level of awareness campaign, as a majority were not aware of the tools which they could use to get easy access to services but also many did not know in what ways they could use them.

## 5.1 Post-Empirical Conceptual Framework

*Figure 46: Post-Empirical Conceptual Framework*



Citizens confidence level and trust on their government is not determined by the ICT interventions or e-Governance initiatives introduced by the government. People have their pre-conceived beliefs and opinion about the government. This predetermined view is hardly affected by the digitization processes of government services. However, if they have easy, affordable and equitable access to services, citizens develop confidence in their government. Digitization if aimed at creating transparency, efficiency and inclusiveness in the real sense can improve citizens trust on their governments.

The adoption of technology can revamp the way government functions and deliver services. ICT interventions in the public sector can transform services making them efficient, transparent and inclusive service delivery provided the commitment of the managers and service providers to accept the changes and use them innovatively to provide services to people. This in turn can restore the trust of the people in their governments. These principles of service delivery can be attainable through technology but technology is just the means if used properly by the service providers and the end users can maximize benefits to the people.

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# APPENDICES

## Appendix A: Interview Questions - Education Departments

- Khyber Pakhtunkhwa Elementary and Secondary Education Department (KPESED)
- The Department of Higher Education, Archives and Library Khyber Pakhtunkhwa (HED)

***Interview Themes***

A. ICT in Education: Programmes
B. Impact on Service Delivery
    1. Digital Education Programmes: Efficiency and Effectivity
    2. Education for All: Accessibility and Inclusivity
    3. Accountability/ Transparency and Digital Assessments
C. ICT in Education: Issues and Problems
    1. Change Management Issues/ Organizational culture
    2. ICTs in Education: Teachers Appointments and Trainings
    3. Technological Infrastructure Shortages, Technical Glitches, Financial Issues
D. ICT in Education: Future Prospects

***Interview Questions***

- Please introduce yourself (name, designation, years of service, responsibilities) and your department's responsibility.
- For how long have you been serving in this department?

*A. ICT in Education: Programmes*

- What is Digital-education and why investment in it is important for the Khyber Pakhtunkhwa government?
- Does the current educational policy 'Education Blueprint 2018-2023' of Khyber Pakhtunkhwa government support ICTs in education?
- Which digital-education programs have been introduced by Khyber Pakhtunkhwa government at primary, elementary and higher secondary level/ or college level?
- Which of these ICT programs in education are functioning most effectively and why?
- Which programs have not been very effective and why?
- Are officials in-charge of formulation of policies for school education and literacy and developmental projects in the Secretariat of Elementary and Secondary Education conversant with the concept and importance of ICTs in education? How enthusiastic are they in innovating education through ICTs in Khyber Pakhtunkhwa?[11]

*B. Impact on Service Delivery*

*1. Digital Education Programmes: Efficiency and Effectivity*

- At what level of education are children exposed to ICTs in public schools?

[11] Secretriat of E&SE Address: 2nd & 3rd Floor, Block A, Civil Secretariat, Peshawar.
**Phone:** 091-9223477
**Web :** https://www.kpese.gov.pk
**Open :** Monday – Friday 09:00 AM– 05:00 PM

- Do you agree that introduction of ICTs enhanced the quality of teaching/ education in government schools? How?
- Do you think ICTs have enhanced and facilitated student learning? If yes, How?
- What technological facilities are provided to public school children, for example, smart boards, computers, internet access etc? What is your source of information?
- What is the student to computer ratio in government schools? What is your source of information?
- How many % age of government schools have access to regular electricity? (Source of information?)
- How many % age of government schools have internet access? (Source of information?)
- How many % age of students use the internet in schools? (Source of information?)
- Tell us something about the digital schooling programme, 'KP Learning Portal.'[12] Is it being effectively utilized by students at public schools? How? What is the source of your information? Have you any measure to determine the number of students making use of this app? What is your source of information?
- Tell us about the video lectures in the 'KP E&SE You Tube Channel: Learn Today, Lead Tomorrow', which seems to have been taken down by You Tube on account of probably violating the policy of content ownership?
- There is another digital schooling programme mentioned on KPESED website 'Virtual Teacher Question/Answer Forum' on Google Play Store. How effectively is the being utilized by the students and teachers for questions and answers? A visit to its website reveals very few questions asked and answered.[13]
- Tell us something about the Tele-education or 'Teletaleem'[14] project introduced in 14 districts of Khyber Pakhtunkhwa (2019), where thousands of children were supposed to be provided online lectures by teachers in Islamabad.[15] How far it progressed?
- Kindly shed light on the 2020 pilot project of KPESED for integrating the provincial educational system with 'Google G Suite for Education' with help from Tech Valley Pakistan. This was to digitally train the teachers and digitally equip institutions for e-learning. What is the progress in this programme?
- Please tell us about the Khyber Pakhtunkhwa Information and Technology Board (KPITB), and the Khyber-Pakhtunkhwa Elementary and Secondary Education Department's (KPESED) 'Early age Programming and IT Essentials Initiative' training program (2020) for teaching children pf public schools computer programming and coding, etc? How far it progressed and what was the outcome?
- The students (Grade 1-8) have been given access to digital contents of cable TV 'Taleem Ghar,' initially developed by Schools Education Department of Government of Punjab for providing

[12] The around 287 animated videos dubbed in Urdu and 217 in Pashto for students of Grade 1-10 mostly cover topics related to Math, General Knowledge and Sciences (KPE&SE Department GoKP, n.d).

[13] An observation of the Q/A session on this site shows fewer interactions of around 59 questions posed with the first of the questions asked in August, 2020 and the last one in January 30, 2021.

[14] It is based on blended learning, which is an approach to education that combines online education materials and opportunities for interaction online with traditional place-based classrooms methods to educate millions of children around Pakistan.

[15] Tele-Education in Khyber Pakhtunkhwa was launched in 14 districts of Peshawar, Charsadda, Swabi, Nowshera, Mardan, Mansehra, Abbottabad, Swat, Dir, Chitral, Bannu, Dera Ismail Khan and Lakki Marwat. Under this program, grade 4 and 5 students are taught English, Mathematics and Science subjects online. For the purpose, 150 schools have been selected where 16,000 students would be imparted online education. The programme has been jointly launched by ESEF, DFID, Pakistan Poverty Alleviation Fund (PPAF) and Tele-education Organisation. Computer labs are to be established in the schools, where the online classes would be arranged with teachers sitting in Islamabad delivering online lectures (The News, January 2, 2019)

digital lessons.[16] How far is this made progress? How many numbers of children are accessing this particular Cable TV for learning and tuition? (Source of information?)

- Please tell us about the web portal 'Learn Smart Pakistan,' which is classified as Pakistan's biggest gamified cloud learning platform, where more than 2 lac students from Grade 6-10 are supposedly learning English, Sciences and Mathematics through animated video lessons, tests/ assessments and learning games. This has been partnered with Jazz, the website claims to provide high speed internet bundle at affordable prices. What is the progress here and do you think the private sector can be engaged in similar such programmes to help provide internet access to underprivileged schools and colleges for e-learning? How far such a partnership has been successful?
- The Directorate of Professional Development (DPDKP), working under the KPESED has been tasked with managing online homework for students on English, Math, Urdu and General Science and instructions to teachers to encourage students under this app for timely completion of homework and keeping in touch with parents. How far is this programme a success? And what issues are faced by the DPDKP in smooth running of the programme?
- Do you think such measures can help e-learning while schools and regions may be lacking in technological infrastructures?
- How have ICTs enhanced the effectiveness and efficiency of administrative activities and processes?
- Is there any inter-provincial exchange of information on the effective use of different digital education programs and best practices?

*2. Education for All: Accessibility and Inclusivity*

- The KPESED logo, *Ta'aleem- sab key leay* meaning, 'Education for all' seems to represent government's priorities for inclusive approach to extend education to all groups and regions in the province. Do you think ICTs have the potential to extend not just education to all, but quality education to all? How?
- To what extent current ICT programmes in education have been able to gain the objectives of inclusivity across gender, class, ethnicity, region and religion?
- Do you think children coming from poor, uneducated and rural households can afford to gain access to digital venues of education?
- How can ICTs in education be made more accessible to all children irrespective of differences?
- Does the KP ICT policy meets the Education for All (EFA) and Millennium Development Goals (MDG), especially MDG 2 on universal primary education and MDG 3 on gender equality in education. AND the Sustainable Development Goal relating to education especially the SDG 4 is to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'?

- Do you think the current syllabus taught at schools and colleges requires modifications to emphasize both theoretical and practical uses of ICTs?

*3. Accountability/ Transparency and Digital Assessments*

- How teacher and student absenteeism can be tackled through ICTs in education?
- Has bio-metric system introduced in schools to ensure regularity and punctuality of the teachers? If yes, how far school absenteeism has been tackled?
- How can ICTs help in improving the examinations systems in government schools and colleges?
- Are the District Education Offices working monitored through ICTs? How?

16

- Does the KPESED have any plans for online admission? When?
- How does the Khyber Pakhtunkhwa the Education Monitoring Authority (KPEMA) assess performance of government schools across the province?
- Does it also assess schools on ICT usage in education? Is there a process in place to hold accountable when a school is failing or performing below expectations?
- Has such regular assessment improved the performance of schools in terms of teacher and student attendance and improved results?
- Another issue is political interference in recruitment, transfers, and postings of teachers with scholars arguing that the whole system has become hostage to corrupt officials and their patrons leading to poor education service delivery. The Khyber Pakhtunkhwa government has recently introduced the E-Transfer system with the claim that it will 'revolutionize teachers' transfer and pave the way for quality learning.' How will this system bring transparency to teachers' transfers?
- The app also mentions a grievance redressal mechanism for teachers to submit their grievances online. How does this feature function in making the system transparent?

*C. ICT in Education: Issues and Problems*

*1. Change Management Issues/ Organizational culture*

- How many % age of teachers in primary and secondary schools are ICT qualified or trained to handle ICTs in education? (Source of information?)
- Are teachers afraid to use technology in their class rooms? How far change management acts as a barrier to digital learning?
- What is the function of the Education Sector Reforms Unit (ESRU), working under the KPESED? The website mentions it is mandated to 'plan, coordinate, monitor and evaluate' the ongoing reforms activities/programs' and provision of stipends to students. Does it have any role in ICTs and education?
- The KPESED website also shows 'School Management Information System (SMIS) directing to another login portal? What sort of data repository is it and is it accessible to common public? Has it been developed with help from donor partners?
- Since the SMIS or EMIS[17] is an effective planning and management tool which coordinates data collection from multiple organizations generally involved in provision of education. So when EMIS was planned, do the needs of the different stakeholders (central ministry planners, officials of other ministries especially finance department, regional/ district education officers, donors, NGOs) who rely on this data has been met?
- What is the impact of EMIS on administration?

***2. ICTs in Education: Teachers Appointments and Trainings***

- Tell us about the government experience of recruiting schoolteachers through MCQ based NTS tests. How far are such tests transparent? And what about the allegation that teachers who were not appropriately trained under CT (certify teachers), PTC (primary teaching certificate) or B.Ed (Bachelor of Education) certifications were appointed under NTS tests.
- The NTS and better pay packages tests are credited with appointment of qualified teachers, which led to the shift of around 34,000 former private school students to government schools (The

[17] Governments across the globe are the biggest uses the EMIS to streamline the operations of all schools and gather live data from schools for decision making (Fedena, July 20, 2020). Experts believe that MIS can provide administrators and teachers with the information required for informed planning, decision making, staff workload management, human resource management, communication, staff performance, and student evaluation (Fedena, Feb 24, 2021).

Express Tribune, 2016). Do you think the trend is still there as most parents can hardly afford private education?

- Does professional training of teachers also involves ICT based trainings? Who undertakes the trainings? How regularly?
- How effective is the 'Online Teachers Training Program'[18] in providing online Teacher training certification for government schoolteachers? How many have been trained under this online training programme? The web site provides online registration for schoolteachers to get enrolled in this online training programme.
- Is the Department of Professional Development Khyber Pakhtunkhwa (DPDKP) under KPESED also involved in teacher training? The website mentions an online LMS system in use for training of schoolteachers via curating and sharing of subject wise videos and its scheme of studies is developed by the DPDKP. How far are such initiatives progressing effective for imparting teachers training?
- Were teacher trainings conducted online during Covid 19 emergency? Which ones and How effective were such online teacher training programmes? Do you think teachers can be effectively trained through online training programmes?

*3. Technological Infrastructure Shortages, Technical Glitches, Financial Issues*

- How far do you think technological and infrastructural issues are hampering ICTs in education?
- Do you think there have been systematic generation of finances to support ICTs in education in Khyber Pakhtunkhwa? Has resource deficiency been an issue in the way of ICTs in education?

*D. ICT in Education: Future Prospects*

- Do you think the government has been able to undertake a robust, effective and target oriented ICT policy in education?
- What policy changes or recommendations do you suggest for imparting quality digital education to children in government schools?
- Do you think the digital education measures have improved Khyber Pakhtunkhwa government's service delivery and increased citizen's trust on the government?

[18] The website of KPESED mentions this programme undertaken with American Board Teaching Certification (American Board, 2019, www.americanboard.org).

## Appendix B: Interview Questions - Health Department

### *E. Introductory Questions*

- Please introduce yourself (name, designation, years of service, responsibilities).
- What is your department's responsibility and role in service delivery?

### *F. E-Health programmes & Importance*

- What is Health IT? Do you believe investment in Health ICTs is important? And why?
- Which particular programs have been introduced in Health ICTs by government of Pakistan? And the government of Khyber Pakhtunkhwa?
- Which of these ICT programs are functioning most efficiently and productively? And why?
- Which programs in Health IT have not been very successful and why?
- Are there any disease early warning systems in this hospital which could detect and signal a public health emergency, such as detect communicable disease through surveillance and response?
- Has the government have provided any Electronic Health Records (HER) systems to the hospitals?
- Do Pakistan/ Khyber Pakhtunkhwa health systems have an e- referral system? "Referral is a process in which a health worker at one level of the health system, having insufficient resources (drugs, equipment, skills) to manage a clinical condition, seeks the help of a better or differently resourced facility at the same or higher level to assist in' (Gupta et al., 2017). [[Does any written policy for the referral system exists in KP, or in the absence of such a policy, anyone can go to any level of hospital for treatment irrespective of the seriousness of the illness.]]
- Since health is a devolved subject, do you think such devolution has helped in achieving or improving the prospects for e-health in Khyber Pakhtunkhwa?

### *G. Impact on Service Delivery*

*1. Improvement in Health Service Delivery: Efficiency, reachability, accountability*

- Do you have an estimate of how many percentage of patients visiting government hospitals make use of ICT tools for service generation?
- Has ICTs in health led to better provision of health services to the people in Khyber Pakhtunkhwa and Pakistan? If yes, how can you measure such improvements?
- Have these ICT in health helped reduce health expenditures by the government of Pakistan and Khyber Pakhtunkhwa on the health sector?
- Have ICTs helped in providing quick, cheap, cost effective and quality services to the people in Khyber Pakhtunkhwa? (efficiency)
- How effective are these ICTs in providing health services access to people in far flung/ rural areas, to women and children? (Reachability or accessibility by public)
- Do you think ICTs in health have made these services more transparent and accountable? (transparency and accountability)
- Do you think ICTs have impacted traditional practices of medicine?
- Is there any mechanism to evaluate performance and quality of service of health care professionals under ICTs?
- Do healthcare providers encourage their patients to use web-based facilities. Which group is less likely to use these ICT related health services? (such as women, any ethnic group, less-educated, poor etc). Can they learn and be comfortable with using Health IT or e-health facilities? How?

*2. Productivity of Health Care Workers and Work Practices/ processes*

- How far the working and management of public sector hospitals in Pakistan and Khyber Pakhtunkhwa have changed with ICT usage? Kindly elaborate.
- Have ICT in health care led to improvements in productivity, work practices and ethics in hospitals? Or How ICT in health has changed the work practices of paramedical staff in hospitals?
- Has the introduction of ICTs in the health sector improved communications and teamwork inside hospitals? How?
- Is health ICT, such as the HIS (civil registration and vital statistics (CRVS) registration, nationally notifiable diseases, private sector data including insurance, and confidentiality and other official statistics) covered by legal framework of the government. Usually in the absence of legal coverage, officials, staff and other related personnel drag their feet in the implementation of HIS system believing that they are not legally bind to carry out the task.
- Do the HIS assessment system focus on the inputs of all stakeholders such as health care providers (doctors, physicians, nurses), the clients (patients/citizens), donors, policy makers etc. Does the health department develop a standard questionnaire to be filled by all the HIS stakeholders to help diagnose the gaps between inputs and outputs/ impact in e-health service provision?

***H. Issues/ Problems of ICTs in Health Care Provision***

1. *Change Management Issues/ organizational culture*
    - Do you think bureaucracy resistance is an issue in the adoption of ICT? Do hospital doctors and paramedical staff readily adopt it?
    - Do you think the officials/ administrators feel threatened by the use of technology?
    - Are customers/ patients willing to embrace them happily? If yes, why?
    - How far organizational culture is responsible for the success or failures of ICT interventions in Health? Such as lack of communications and poor teamwork?

2. *Capacity building/ Trainings of staff to handle ICTs*

- What problems are faced by health professionals in the use of ICT in hospitals? Do you think there is hesitancy to use ICT tools by health care professionals due to lack of training and understanding?
- Do you think hospitals have the required trained workforce for health informatics to successfully use the ICT tools in hospitals?
- At the subnational level (province, districts) are there designated full-time health information officer positions and they are duly filled?
- Does the health department/ hospital provide any trainings to healthcare providers in ICTs? How many capacity-building activities have been conducted place over the past few years for HIS staff and health facility staff?
- Do such trainings focus on management, analysis and use of data?
- Is the Health Informatics System user friendly? Did the vendors give any training relating to the use of this system?
- Are there any written guidelines for the processes of HIS data collection, management and analysis?
- Do you plan on training them further and how?

3. *Issues faced by patients in ICT usage*

- What are the problems faced by the patients while accessing ICTs and Health services in the hospitals?
- Are patients aware of such ICT tools in health service?
- How are citizens informed/ made aware of the provision of specific e-health services by the government?

- Are patients aware of their rights under Citizen's Charter or Health care information? These charters inform the citizens of their rights and the provision of specific services by a public agency. Do hospitals have any Citizen's Charter which patients can read and understand their rights?

4. *Technical Glitches/ infrastructure problems*
   - What are the technical glitches (delays, interruptions) of IT?
   - Are Computers and other basic communications technology infrastructure (internet access, telephones, e-mail) available at provincial and district level for the rapid compilation of subnational data?

5. *Health Information System Monitoring (HIS) and administration*
   - Is there any HIS administrative unit in the ministry of health to design, develop and support health information collection, management, analysis, dissemination and use for planning and management.
   - Is there a system to monitor the HIS and its various subsystems such as telemedicine? Or Is there a Health Metrics (system of measurement) to assess the Health Information system in Khyber Pakhtunkhwa, which could identify the strengths and weaknesses of the provincial health information system? Assessing the HIS will help identify the issues and challenges faced by the system or/and the usefulness/ strength and cost effectiveness of the system and sharing this information with partners, general public and the potential donors and recipients.
   - Is there any official policy to conduct regular meetings at facility, district and rural levels to review HIS information and take action based on that information?

6. *The issue of health inequalities: accessibility and inclusiveness; Digital divide*
   - Do you think patients prefer the traditional way of treatment in hospitals?
   - Do you think ICTs in health accentuates the health inequality in the country? Do you think poor and uneducated can access e-health facilities in public sector hospitals?

7. *Security of Patient Data*
   - How far is the health data secure? Do you think privacy of data and especially its security is difficult in our hospitals and IT systems?
   - Do you think patient's data should be freely exchanged between hospitals and health professional? How sensitive is this topic of privacy and consent of the user?
   - Should patients be given the right to obtain and use their own health data and collaborate with the clinicians?

8. *Performance Evaluation of ICTs*

   - Does the HIS system help districts and provinces compare their performance against objective standards of health care? Health Technology Assessment (HTA) is a systematic evaluation of properties, effects and/or impacts of health technologies and interventions, which started in high-income countries in the 1980s and moved to middle-income countries since 2000; they have established specialist units, committees or programmes in order to evaluate health technology initiatives and provide recommendations to decision-makers.

9. *Government Commitment to e-health; allocation of funds*
   - How do you see the government's commitment in providing e-initiatives/ ICT tools in the public health sector? Are you satisfied with the measures?
   - Have there been delays in implementation of e-projects by the government and why?
   - Did resource issues or lack of finances create problems? How much of resource commitment is required from the government for the adequate functioning of the HIS?

## *I. Future Prospects of ICTs in Health*

- Do you think ICT in health has a future in Pakistan and Khyber Pakhtunkhwa?
- What are the policy prescriptions/ recommendations to improve e-health usage and practice in Khyber Pakhtunkhwa?

## Appendix C: Interview Consent Form

Department of Political Science
University of Peshawar

Project/ Research Title

***Transforming Public Service through Digital Governance Initiatives in Khyber Pakhtunkhwa: Bureaucratic Conduct, Transparency in Service Delivery and Citizen Centric E-Governance* Project**

I Ms. Shagufta Aman, PhD., Research Scholar and faculty (visiting) at the Department of Political Science, University of Peshawar am conducting a research project on E-governance in Khyber Pakhtunkhwa. This project, which is funded by PIDE aims at exploring how the use of Information and Communication Tools (ICT) is affecting efficiency, transparency and inclusiveness in service delivery by the provincial bureaucracy in Khyber Pakhtunkhwa and how digitalization affects citizen's trust on government's service delivery in the province. The case study is three governments departments of Health, Education and Police. This is a purely academic and policy-oriented research and the information collected through interviews shall be treated as confidential and used entirely for academic purposes.

- I ……..working as ……..

  in
  ……
  ……. volunteer to participate in this research project conducted by PI Ms. Shagufta Aman from University of Peshawar. I understand that the project is designed to gather information about e-government initiatives undertaken by the Khyber-Pakhtunkhwa government in service providing departments.

- I confirm that my participation in this research project is voluntary.
- I understand that I will not receive any payments for participating in this research interview.
- I understand that I have the right to decline to answer any question or to end the interview at any time I deem fit.
- The interview will be recorded (audio-taped) and a transcript will be produced.
- I understand that I can communicate to the researcher for not mentioning my name in the research drafts, if I want so.
- I understand that my confidentiality as a participant in this study will remian secure.
- I have read and understood the explanation provided to me by the interviewer.
- I know that If I wish to review the notes, transcript, or other data collected during my interview, I cannot be denied.
- I agree that the researcher may publish documents that contain quotations by me and If I don't wish to be named with these quotations, I will communicate to the interviewer during or soon after the interview.

By signing this form, I agree to the terms indicated above.

_____ _____
Signature of participant Signature of researcher

Dated: _____

## Appendix D: Education Survey Questionnaire

Education Survey Questionnaire



# PIDE- RASTA RESEARCH PROJECT - EDUCATION

**DEMOGRAPHICS - SECTION A: Instruction: Please tick the relevant option or write the answer.**
*Govt. Higher Secondary Schools and Govt. Colleges in Abbottabad and Peshawar*

---

**Name of School / College:**
*Peshawar / Abbottabad*

- ◯ Government College Peshawar for boys, Peshawar
- ◯ Government Frontier College for Women, Peshawar
- ◯ Government Post-Graduate College No. 1 for boys, Abbottabad
- ◯ Government Girls Degree College for Women, Abbottabad
- ◯ Government Shaheed Osama Zafar Centennial Model Higher Secondary School No. 2 Peshawar
- ◯ Government Lady Griffith Higher Secondary School, Peshawar
- ◯ Government Higher Secondary School No. 1 Abbottabad
- ◯ Government Comprehensive Girls High School, Abbottabad

**Name**

---

**Grade :**

- ◯ Grade 9
- ◯ Grade 10
- ◯ Grade 11
- ◯ Grade 12

## Appendix E: Health Survey Questionnaire



# Updated Version of PIDE- RASTA RESEARCH PROJECT - HEALTH

**DEMOGRAPHICS - SECTION A: Instruction: Please tick the relevant option or write the answer.**
*Tertiary Hospitals in Abbottabad and Peshawar*

---

**Name of Tertiary Hospital:**

- ◯ Lady Reading Hospital MTI, Peshawar
- ◯ Ayub Teaching Hospital MTI, Abbottabad

**Name**

_____

**Are you the patient or patient relative?**

- ◯ Patient
- ◯ Patient relative

**Age**

- ◯ 14 - 25
- ◯ 25 - 35
- ◯ 35 and above

**Gender**

- ◯ Male
- ◯ Female
- ◯ Other

## Appendix F: Health and Education Sector – Survey Sites in Peshawar and Abbottabad

**Khyber Pakhtunkhwa Leading Public Colleges**

| | Government College | Location | Number of respondents |
|---|---|---|---|
| | **Boys** | | |
| 1 | Government College Peshawar | Adjacent to Shahi Bagh, Peshawar | 25 |
| 2 | Government Post-Graduate College No. 1 Abbottabad | Near FBR Regional Tax Office, College Rd, Abbottabad | 25 |
| | **Women** | | |
| 1 | Government Frontier College for Women, Peshawar | | 26 |
| 2 | Government Girls Degree College for Women, Abbottabad | | 25 |
| | | Grand Total | 101 |

**Khyber Pakhtunkhwa Leading Higher Secondary Schools**

| | Government Higher Secondary School | Location | Number of respondents |
|---|---|---|---|
| | **Boys** | | |
| 1 | Government Shaheed Osama Zafar Centennial Model Higher Secondary School No. 2 Peshawar | Opposite Sarhad Chamber of Commerce, GT Rd, Peshawar City | 25 |
| 2 | Government Higher Secondary School No. 1 Abbottabad | Opposite Peshawar High Court, Abbottabad City | 25 |
| | **Girls** | | |
| 1 | Government Lady Griffith Higher Secondary School, Peshawar | | 25 |
| 2 | Government Comprehensive Girls High School, Abbottabad | | 25 |
| | | Grand Total | 100 |

Health Sector: Survey Sites in Peshawar and Abbottabad

## Khyber Pakhtunkhwa Leading Public Hospitals

| | Hospital Name | Location | Number of Respondents |
|---|---|---|---|
| 1 | Lady Reading Hospital MTI | Peshawar | 52 |
| 2 | Ayub Teaching Hospital MTI | Abbottabad | 52 |
| | | Grand Total | 104 |

| | |
|---|---|
| Total Number of Survey Sites | 10 |
| Total Number of Survey Questionnaires administered | 305 |
| Number of Cities | 2 |

## Appendix G: The KP Government ICT policy 2015-16; KP Digital Policy 2018-2023; and Good Governance Strategy (PMRU 2019)

The KP Government ICT policy 2015-16; KP Digital Policy 2018-2023; and Good Governance Strategy (PMRU 2019) also stressed upon good governance through legislative vigour. KP became the first province to enact landmark laws, notable among these are the Right to Information and Right to Services (RTS) laws. The government policy emphasis is on using ICT technologies to increase public sector productivity, response delivery of citizens services, improved collection of revenues, development of a well-trained workforce, improvement in quality of education, the growth of local ICT companies and purpose-oriented research in leading academic institutions (KP ICT Policy 2015-16). There is also promise of good governance through the utilization of ICTs to involve active citizen participation, to increase its own efficiency, transparency and accountability and provide citizen-centric services. The 4 target groups of this ICT policy included the government, citizens, businesses and the academia. The aim of the ICT policy being 'to reduce duplication and complexities to achieve cost effectiveness, improved business continuity, optimum utilization of government resources, enhanced information security and protection of intellectual rights (KP ICT Policy 2015-16). A Digital transformation of KP is promised 'by leveraging Information and Communication Technologies (ICTs) for job creation, connectivity, empowerment and inclusive economic growth' (KP Digital Policy 2018-2023. P. 10). There is also the promise of improving government service delivery through digital interventions with emphasis on digital workforce, digital literacy, digital skills at all levels of education and ensuring inclusion of women, youth and marginalized groups. The digital transformation can enable true democratic form of governance based on data driven decisions, efficient and transparent government dervices, ensuring the privacy of citizens, and improving digital literacy levels; maximizing the use of technology in primary, secondary and tertiary education (KP Digital Policy 2018-2023). Technology driven and efficient service delivery paradigm for public accessibility and eradicating obstacles are the conveniences offered by the KP Government Good Government Strategy. There is also the promise to ensure public service delivery through improved performance of smart management. "Efficient public service delivery paradigm" indicates a number of performance indicators with general public as beneficiaries of such acts which include among others the online admission system (HED); medicine availability and doctor's presence at the BHU and RHC (IMU, Health Dept); teachers presence in all schools and schools with missing facilities (IMU, Education, E&SE); health related and education related complaints resolved through Pakistan Citizen Portal (Pakistan &KP Citizen portal, PMRU); satisfactory feedback on resolved complaints related to health and education sector (Pakistan & KP Citizen Portal, PMRU); healthcare establishment penalized for non-compliance of healthcare provisions. (IPMS-GGF, PMRU) etc. (p 22-24). Open government refers to transparent and accountable process of services; Efficiency refers to smart management of service delivery through technology driven improved performance; and Inclusivity refers to accessibility of the common man to information and public offices and lending an active voice in decision making.

## Appendix H: Information about Government Colleges Surveyed

>Postgraduate College No 1 (GPGC), Abbottabad;
>Government Girls Degree College for Women (GGDC), Abbottabad;
>Government College for Boys (GC), Peshawar
>Government Frontier College for Girls (GFC), Peshawar

| | | **GPGC Abbottabad** | **GGDC No.1 Abbottabad (Girls)** | **GC Peshawar** | **GFC Women Peshawar** |
|---|---|---|---|---|---|
| 1 | Total number of students in grade 11 & 12 | 2263 | 1193 | 3189 | 1650 |
| 2 | Total number of teachers | 61 | 70 | 113 | 111 |
| 3 | IT Labs | Yes | Yes | Yes | Yes |
| 4 | Who built the computer labs in your college? (Ownership) | KP Government | KP Government | KP Government | KP Government |
| 5 | How many computers in the computer lab? | 61 | 53 | 18 | 25 |
| 6 | How many permanent IT staff? | 4 | 5 | 7 | 7 |
| 7 | Do teachers have access to computer? | Yes | Yes | Yes | Yes |
| 8 | How many smart boards/ one screen in the college? | None | None | None | None |
| 9 | Is internet facility available? | Yes | Yes | Yes | Yes |
| 10 | working website? | https://gpgc-atd.edu.pk/ | No | https://gcp.kp.gov.pk/ | No |
| 11 | Facebook page? | No official Facebook page | No official Facebook page | No official Facebook page | No official Facebook page |

## College Finances (per year)

| **Sr.No** | **College Name** | **2019-20** | **2020-21** | **2021-22** |
|---|---|---|---|---|
| 1 | GPGC Abbottabad | 182.3m | 184.75m | 195.39m |
| 2 | GGDC No.1 Abbottabad (Girls) | 95.6m | 99.5m | 105.5m |
| 3 | GC Peshawar | 166.2m | 192.4m | 190.5m |
| 4 | GFC Women Peshawar | 151.1m | 157.9m | 173.9 m |

**Source: Mr. xyz, HEMIS CELL**
Higher Education Archives & Libraries Department
Government of Khyber Pakhtunkhwa

## Appendix I: Information about Government Schools Surveyed

> Government Higher Secondary School No. 1 Abbottabad
> Government Comprehensive Girls High School (GCGHSS), Abbottabad. Code: 36718

> Government Shaheed Osama Zafar Centennial Model Higher Secondary School No. 2 Peshawar (GHSS No. 2)
> Government Girls Lady Griffith Higher Secondary School (GGHSS), Peshawar. Code: 36729

| | | **GHSS No. 1 for Boys Abbottabad** | **GCGHS, Abbottabad (Girls)** | **GHSS No. 2 for Boys, Peshawar** | **GGHSS Lady Griffith, Peshawar** |
|---|---|---|---|---|---|
| 1 | Total number of students/ total enrolment | - | 1171 | - | 800 |
| 2 | Total number of teachers | - | 73 | - | 46 |
| 3 | Who built the computer labs in your college? (Ownership) | - | - | - | - |
| 4 | IT Lab | - | Yes | - | yes |
| 5 | How many computers in the computer lab? | - | 16 | | 16 |
| 6 | How many permanent IT staff? | - | 2 | - | 2 |
| 7 | Do teachers have access to computer? | - | - | - | - |
| 8 | How many smart boards/ one screen in the college? | - | One available and fully operational | - | One available and fully operational |
| 9 | Is internet facility available? | - | - | - | - |
| 10 | working website? | - | - | - | - |
| 11 | Facebook page? | - | No official Facebook page | - | No official Facebook page |

**Source: Mr. xyz,** Reform and Initiative section, EMIS
Government of Khyber Pakhtunkhwa

**Notes:** No information was available with the computer operator about the above mentioned 2 boys schools and he asked for the Code number for these schools. On telling him that how would they know as these codes were assigned by his own department, he was clueless and couldn't find the names of these boy schools on the dash board although he was in-charge to maintain the latest data for KP schools.

**About school budget:**
The Section Officer Budget (SO Budget) EMIS informed the research team EMIS or Education Department do not allocate budget to any schools. He said, "we do not release budget to schools, there are two kinds of educational institutions namely; 1. Autonomous bodies such as Cadet Schools and Colleges (for which we do not provide any budget) 2. The one that are being run under annual grant but these are a few schools, such as Fazl I Haq School and College Mardan, UPS (University Public School), APS (Agricultural Public School). But these grants are provided through ETEA, not through Education Department."
Moreover, he said that currently, DEOs are given 449,000 conditional grant which they use on the direction of DC. Beside, 2.99 m rupees are given to the Directorate but the money is being issued on demand from the Directorate. The concerned Head/ principal of the school writes to the Directorate for funds. And in the year 2020-2021, 88,000,00 Rs were allocated to the DEO Offices to be utilized for the IT related purposes.
However, there is no such thing as per-school budget or release of money from the Education Department! Everything is on demand directed to the directorate and DEOs office. The section officer budget EMIS told the research team to contact DEOs office in every district for more information.

## Appendix J: A Comparison of Education Indicators in the Region (South Asia)

If we compare the government expenditure on education (%of GDP) (2013-2018) of countries in the region, Pakistan spends 2.9% of the GDP on education and ranks 7th among the 8 countries in the region. The table 1.1 below shows the regional comparison of education indicators:

**Table: 1.1: Education Indicators**

| Countries | Literacy rate adult (15 years and above) (2008-2018) | Male Literacy rate | Female Literacy rate | Government Expenditure on Education (% of GDP) (2013-2018) |
|---|---|---|---|---|
| Maldives | 97.70% | 98.40% | 99.10% | 4.10% |
| Siri Lanka | 91.70% | 98.50% | 99% | 2.10% |
| India | 74.40% | 93% | 90.20% | 3.80% |
| Bangladesh | 73.90% | 91.80% | 94.90% | 2% |
| Nepal | 67.90% | 94% | 90.90% | 5.20% |
| Bhutan | 66.60% | 93.30% | 92.90% | 6.60% |
| Pakistan | 60% | 81.30% | 67.50% | 2.90% |
| Afghanistan | 43% | 74.10% | 56.30% | 4.10% |

Source: Pakistan Economic Survey 2020-21. Government of Pakistan, Finance Division. Page 199. Retrieved December 2021 from https://www.finance.gov.pk/survey_2021.html

## Appendix K: Web Presence of KP Schools/ Colleges

| | School/ college | Website | Facebook page |
|---|---|---|---|
| 1 | Government College for boys, Peshawar | https://gcp.kp.gov.pk/ | https://www.facebook.com/pages/category/Education/Government-College-Peshawar-HED-KPK-156866728316121/ |
| 2 | Government Lady Griffith Higher Secondary School, Peshawar | http://schools.kpese.gov.pk/webportal/cms/content/186/36729) | https://www.facebook.com/pages/category/Education/G-G-H-S-S-Lady-Griffith-Peshawar-342590795764504/ |
| 3 | Government Shaheed Osama Zafar Centennial Model Higher Secondary School No. 2 | No Website Available | https://www.facebook.com/pages/category/Elementary-School/Government-Shaheed-Osama-Zafar-Centennial-Model-Higher-Secondary-School-157406384796042/ |
| 4 | Government Higher Secondary School No. 1 Abbottabad | No Website Available | https://www.facebook.com/pages/category/School/Govt-High-School-NO-1-Abbottabad-695646837272121/ |
| 5 | Government Comprehensive Girls High School, Abbottabad | No Website Available | No Facebook Page |
| 6 | Government Frontier College for Women, Peshawar | https://admission.hed.gkp.pk/college.php?college_id=4 | https://www.facebook.com/pg/Govt-Frontier-College-For-Women-Peshawar-645781155791863/posts/) |
| 7 | Government Post-Graduate College No. 1 for boys and girls, Abbottabad | https://www.gpgc-atd.edu.pk) | https://www.facebook.com/gpgc1abbottabad). |
| 8 | Government Girls Degree College for Women, Abbottabad | http://www.admission.hed.gkp.pk/college.php?college_id=153 | https://www.facebook.com/ggpgcno.1abbottabad/ |

## Appendix L: Lady Reading Hospital MTI, Peshawar & Ayub Teaching Hospital MTI, Abbottabad

| | | Lady Reading Hospital, Medical Teaching Institute, Peshawar | Ayub Teaching Hospital, Medical Teaching Institute, Abbottabad |
|---|---|---|---|
| 1 | Established in | 1924 | 1998 |
| 2 | Number of Departments | 33 | - |
| 3 | Hospital Beds | 1691 | 1460 |
| 4 | Doctors | 1350 | 500 |
| 5 | Staff | 4500 | 60 residents & fellows + 200 nurses |
| 6 | OPD Patients in 2021 | 1169497 | - |
| 7 | Emergency Patients in 2021 | 852998 | - |
| 8 | Admit Patients in 2021 | 105041 | - |

Source: Lady Reading Hospital, MTI, Peshawar website. Retrieved January 2, 2022 from LRH website https://www.lrh.edu.pk/
GoKP, Policy Board. Khyber Pakhtunkhwa. MTI's. Retrieved Feb 12, 2022 from https://policyboardkp.gov.pk/mtis/

Note: An attempt to read or download MTI's Governance Framework available on Policy Board KP website was futile. https://policyboardkp.gov.pk/downloads/

Note: The ATH, MTI, Abbottabad website is down since many months showing error.

## Appendix M: KPHED Permission Letter

**GOVERNMENT OF KHYBER PAKHTUNKHWA**
**HIGHER EDUCATION, ARCHIVES & LIBRARIES DEPARTMENT**

NO.SOG/HE/2-83/PIDE/2021
Dated 29-12-2021

To

Miss.Shagufta Aman,
Principal Investigator Research Project,
Faculty (Visiting) and Ph.D Scholar,
Department of Political Science,
University of Peshawar.

Subject: **REQUEST FOR FACILITATION IN THE RESEARCH PROJECT: TRANSFORMING PUBLIC SERVICE THROUGH DIGITAL GOVERNANCE INITIATIVES IN KHYBER PAKHTUNKHWA: BUREAUCRATIC CONDUCT, TRANSPARENCY IN SERVICE DELIVERY AND CITIZEN CENTRIC E-GOVERNANCE. BENEFIT FOR ALIEN REGISTRATION CARD HOLDERS UTILITIES.**

Respected Madam,

I am directed to refer to your letter No. /POL Science dated 20-12-2021 on the subject noted above and to convey the permission/NOC of this department, to carry out the survey and interview of the proposed officials/colleges.

(Encl: as above)

**(MUHAMMAD YASIN)**
SECTION OFFICER (General)

**Endst: No & Date even.**

Copy forwarded to the:-

1- Director Higher Education, Khyber Pakhtunkhwa.
2- Principal, Govt. College Peshawar.
3- Principal, Govt. Post Graduate College No. 1, Abbottabad.
4- Govt. Frontier College for Women, Peshawar.
5- Govt. Girls Degree College for Women, Abbottabad.

(With the request Facilitate the Survey team.)

6- PS to Secretary, Higher Education Department.
7- PS to Special Secretary, Higher Education Department.
8- PA to DS (Admn), Higher Education Department.

SECTION OFFICER (General)

## Appendix N: KPESED Permission Letter

**Government of Khyber Pakhtunkhwa,**
**Elementary & Secondary Education Department**

No. SOG/E&SE/1-15/2021
Dated Peshawar the 20/12/2021

To

Miss. Shagufta Aman
Principal Investigator Research Project,
Faculty (Visiting) and PhD, Research Scholar
Department of Political Science, University of Peshawar.

Subject: **REQUEST FOR FACILITATION IN THE RESEARCH PROJECT: TRANSFORMING PUBLIC SERVICE THROUGH DIGITAL GOVERNANCE INITIATIVES IN KHYBER PAKHTUNKHWA: BUREAUCRATIC CONDUCT, TRANSPARENCY IN SERVICE DELIVERY AND CITIZEN CENTRIC E-GOVERNANCE.**

I am directed to refer to your letter No. /POL Science dated 13-12-2021 on the subject noted above and to convey the permission/NOC of this department to carry out the survey and interview of the proposed officials/schools.

Section Officer (General)

Endst: No. and date even.

Copy forwarded to:

1. Director E&SE, Khyber Pakhtunkhwa.
2. School Principals (Government Shaheed Usama Bin Zafar Centennial Model Higher Secondary School Peshawar City, Govt Higher Secondary School No. 1 Abbottabad, Govt Lady Griffith Higher Secondary School Peshawar and Govt Comprehensive Girls High School Abbottabad.

   **With the request to facilitate the survey team.**
3. P.S to Secretary, E&SE Department.
4. P.A to Additional Secretary (E), E&SE Department.
5. P.A to Deputy Secretary (Admn), E&SE Department.

Section Officer (General)

## Appendix O: KP Education Monitoring Authority Permission Letter


"Our Faith, Corruption Free Pakistan"

**Government of Khyber Pakhtunkhwa**
**Education Monitoring Authority**

House No.7A, Near Army Check Post Shami Road Peshawar
# 091-9223128 Fax # 091-9223127 Email # adc.imu.peshawar@gmail.com

No. ADC/EMA/6-27/2021/81 Dated: 16.07.2021

To

Miss. Shagufta Aman,
Principal Investigator Research Project,
Faculty (Visiting) and PhD, Research Scholar,
Department of Political Science, University of Peshawar.

**SUBJECT:- REQUEST FOR FACILITATION IN THE RESEARCH PROJECT.**

I am directed to refer to the letter No.SOG/E&SE/1-15/2021 dated: 13/07/2021 received from Section Officer (General) E&SE Department on the subject noted above and to state that Education Monitoring Authority will facilitate the project team at maximum. It is further stated that this office may be intimated regarding the schedule in prior of the interview/survey, please.

16-07-21

**ASSISTANT DIRECTOR (COORDINATION)**

**A copy is forwarded for information to the: -**

1. Director General, Education Monitoring Authority (EMA).
2. Director, Education Monitoring Authority.
3. Section officer (General) E&SE Department with reference to his letter mentioned above.
4. Office Copy.

16-07-21

**ASSISTANT DIRECTOR (COORDINATION)**

## Appendix P: KPESED Permission Letter

**Government of Khyber Pakhtunkhwa,**
**Elementary & Secondary Education Department**

No. SOG/E&SE/1-15/2021
Dated Peshawar the 13/07/2021

To

Miss. Shagufta Aman
Principal Investigator Research Project,
Faculty (Visiting) and PhD, Research Scholar
Department of Political Science, University of Peshawar.

Subject: **REQUEST FOR FACILITATION IN THE RESEARCH PROJECT.**

I am directed to refer to your letter No. 29/POL Science dated 01-07-2021 on the subject noted above and to convey the permission/NOC of this department to carry out the survey and interview the officers of this department.

I am further directed to request you that proposed plan for survey and interview may also be shared with this department in advance, please.

**Section Officer (General)**

Endst: No. and date even.

Copy forwarded to:

1. Director E&SE, Khyber Pakhtunkhwa.
2. Director General Khyber Pakhtunkhwa Education Monitoring Authority.
3. School Principals (Government Shaheed Usama Bin Zafar Centennial Model Higher Secondary School Peshawar City and Government Higher Secondary School No. 1 Abbottabad).

**With the request to facilitate the survey team.**

4. P.S to Secretary, E&SE Department.
5. P.A to Additional Secretary (E), E&SE Department.
6. P.A to Deputy Secretary (Admn), E&SE Department.

O/C **Section Officer (General)**

## Appendix Q: KPESED Permission Letter

**Government of Khyber Pakhtunkhwa,**
**Elementary & Secondary Education Department**

No. SOG/E&SE/1-15/2021
Dated Peshawar the 29/07/2021

To

Director General,
Education Monitoring Authority,
Khyber Pakhtunkhwa.

Subject: **REQUEST FOR FACILITATION IN THE RESEARCH PROJECT.**

I am directed to refer to this department letter of even number dated 13-07-2021 on the subject noted above and to state that survey team of Department of Political Science, University of Peshawar is desired to visit your office on 30-07-2021 at 11:30AM.

I am further directed to request you to facilitate the survey team, please.

**Section Officer (General)**

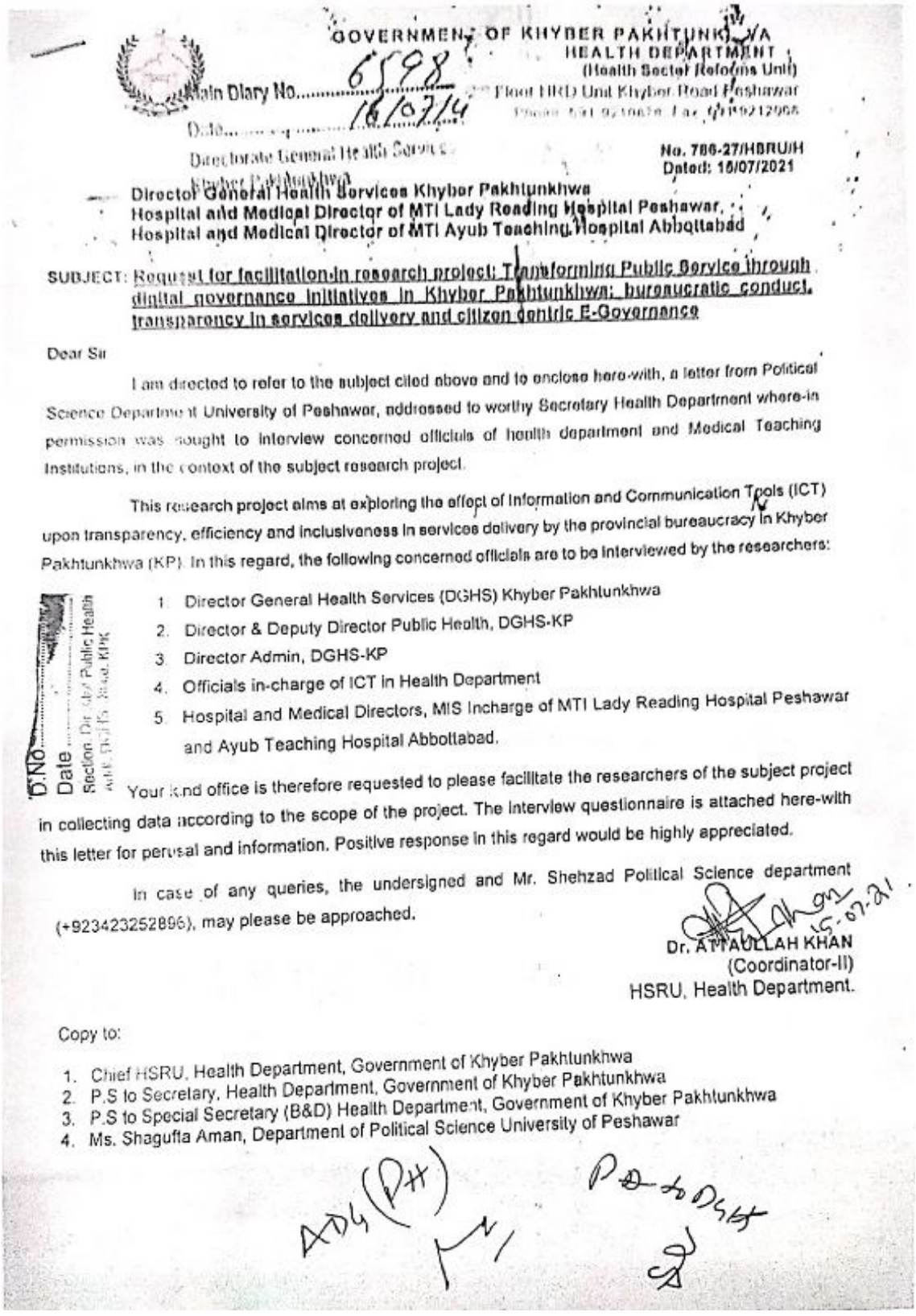
Endst: No. and date even.

Copy forwarded to:

1. School Principals (Government Shaheed Usama Bin Zafar Centennial Model Higher Secondary School Peshawar City and Government Higher Secondary School No. 1 Abbottabad).
2. P.S to Secretary, E&SE Department.
3. P.A to Additional Secretary (E), E&SE Department.
4. P.A to Deputy Secretary (Admn), E&SE Department.

**Section Officer (General)**

## Appendix R: Health Department Permission Letter



GOVERNMENT OF KHYBER PAKHTUNKHWA
HEALTH DEPARTMENT
(Health Sector Reforms Unit)
Main Diary No. 6598 16/07/14
Directorate General Health Services
Khyber Pakhtunkhwa

No. 786-27/HSRU/H
Dated: 15/07/2021

Director General Health Services Khyber Pakhtunkhwa
Hospital and Medical Director of MTI Lady Reading Hospital Peshawar,
Hospital and Medical Director of MTI Ayub Teaching Hospital Abbottabad

SUBJECT: Request for facilitation in research project: Transforming Public Service through digital governance initiatives in Khyber Pakhtunkhwa; bureaucratic conduct, transparency in services delivery and citizen centric E-Governance

Dear Sir

I am directed to refer to the subject cited above and to enclose here-with, a letter from Political Science Department University of Peshawar, addressed to worthy Secretary Health Department where-in permission was sought to interview concerned officials of health department and Medical Teaching Institutions, in the context of the subject research project.

This research project aims at exploring the effect of Information and Communication Tools (ICT) upon transparency, efficiency and inclusiveness in services delivery by the provincial bureaucracy in Khyber Pakhtunkhwa (KP). In this regard, the following concerned officials are to be interviewed by the researchers:

D.No ..... Date ..... Section Dir. Gen. Public Health and Health Reforms Khyber Pakhtunkhwa

1. Director General Health Services (DGHS) Khyber Pakhtunkhwa
2. Director & Deputy Director Public Health, DGHS-KP
3. Director Admin, DGHS-KP
4. Officials in-charge of ICT in Health Department
5. Hospital and Medical Directors, MIS Incharge of MTI Lady Reading Hospital Peshawar and Ayub Teaching Hospital Abbottabad.

Your kind office is therefore requested to please facilitate the researchers of the subject project in collecting data according to the scope of the project. The interview questionnaire is attached here-with this letter for perusal and information. Positive response in this regard would be highly appreciated.

In case of any queries, the undersigned and Mr. Shehzad Political Science department (+923423252896), may please be approached.

15.07.21

Dr. ATTAULLAH KHAN
(Coordinator-II)
HSRU, Health Department.

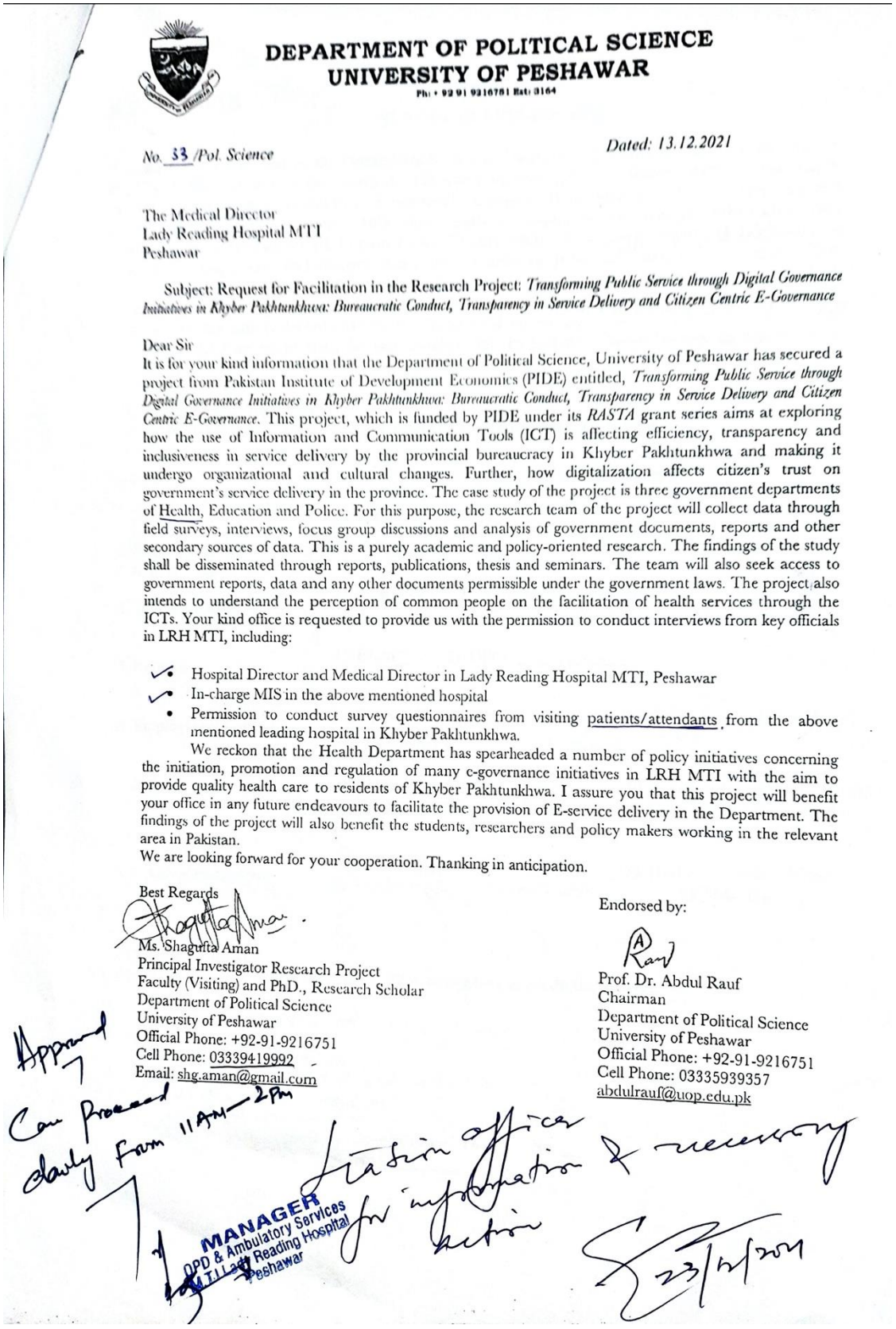
Copy to:

1. Chief HSRU, Health Department, Government of Khyber Pakhtunkhwa
2. P.S to Secretary, Health Department, Government of Khyber Pakhtunkhwa
3. P.S to Special Secretary (B&D) Health Department, Government of Khyber Pakhtunkhwa
4. Ms. Shagufta Aman, Department of Political Science University of Peshawar

ADG (PH)

P.A to DGHS

## Appendix S: LRH MTI Permission Letter



**DEPARTMENT OF POLITICAL SCIENCE**
**UNIVERSITY OF PESHAWAR**
Ph: + 92 91 9216781 Ext: 3164

No. 33 /Pol. Science

Dated: 13.12.2021

The Medical Director
Lady Reading Hospital MTI
Peshawar

Subject: Request for Facilitation in the Research Project: *Transforming Public Service through Digital Governance Initiatives in Khyber Pakhtunkhwa: Bureaucratic Conduct, Transparency in Service Delivery and Citizen Centric E-Governance*

Dear Sir
It is for your kind information that the Department of Political Science, University of Peshawar has secured a project from Pakistan Institute of Development Economics (PIDE) entitled, *Transforming Public Service through Digital Governance Initiatives in Khyber Pakhtunkhwa: Bureaucratic Conduct, Transparency in Service Delivery and Citizen Centric E-Governance*. This project, which is funded by PIDE under its *RASTA* grant series aims at exploring how the use of Information and Communication Tools (ICT) is affecting efficiency, transparency and inclusiveness in service delivery by the provincial bureaucracy in Khyber Pakhtunkhwa and making it undergo organizational and cultural changes. Further, how digitalization affects citizen's trust on government's service delivery in the province. The case study of the project is three government departments of Health, Education and Police. For this purpose, the research team of the project will collect data through field surveys, interviews, focus group discussions and analysis of government documents, reports and other secondary sources of data. This is a purely academic and policy-oriented research. The findings of the study shall be disseminated through reports, publications, thesis and seminars. The team will also seek access to government reports, data and any other documents permissible under the government laws. The project also intends to understand the perception of common people on the facilitation of health services through the ICTs. Your kind office is requested to provide us with the permission to conduct interviews from key officials in LRH MTI, including:

- Hospital Director and Medical Director in Lady Reading Hospital MTI, Peshawar
- In-charge MIS in the above mentioned hospital
- Permission to conduct survey questionnaires from visiting patients/attendants from the above mentioned leading hospital in Khyber Pakhtunkhwa.

We reckon that the Health Department has spearheaded a number of policy initiatives concerning the initiation, promotion and regulation of many e-governance initiatives in LRH MTI with the aim to provide quality health care to residents of Khyber Pakhtunkhwa. I assure you that this project will benefit your office in any future endeavours to facilitate the provision of E-service delivery in the Department. The findings of the project will also benefit the students, researchers and policy makers working in the relevant area in Pakistan.
We are looking forward for your cooperation. Thanking in anticipation.

Best Regards

Ms. Shagufta Aman
Principal Investigator Research Project
Faculty (Visiting) and PhD., Research Scholar
Department of Political Science
University of Peshawar
Official Phone: +92-91-9216751
Cell Phone: 03339419992
Email: shg.aman@gmail.com

Endorsed by:

Prof. Dr. Abdul Rauf
Chairman
Department of Political Science
University of Peshawar
Official Phone: +92-91-9216751
Cell Phone: 03335939357
abdulrauf@uop.edu.pk

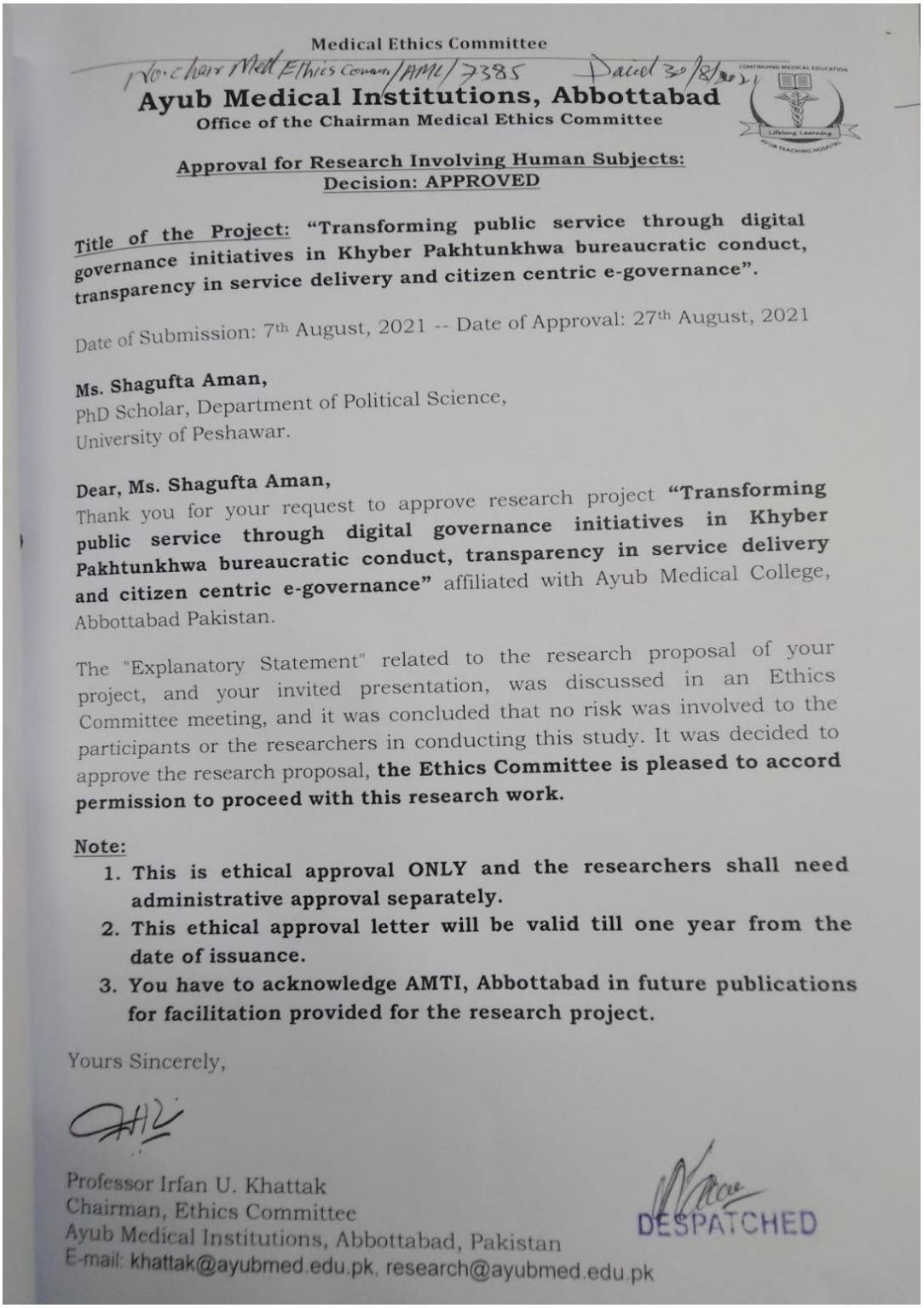
Approved
Can Proceed daily from 11AM – 2PM

Liaison officer for information & necessary action

MANAGER
OPD & Ambulatory Services
LRH Lady Reading Hospital
Peshawar

23/12/2021

## Appendix T: ATH MTI Permission Letter



Medical Ethics Committee

No: Chair Med Ethics Comm/AMI/7385 Dated 30/8/2021

**Ayub Medical Institutions, Abbottabad**

**Office of the Chairman Medical Ethics Committee**

**Approval for Research Involving Human Subjects:**
**Decision: APPROVED**

**Title of the Project:** **"Transforming public service through digital governance initiatives in Khyber Pakhtunkhwa bureaucratic conduct, transparency in service delivery and citizen centric e-governance".**

Date of Submission: 7th August, 2021 -- Date of Approval: 27th August, 2021

**Ms. Shagufta Aman,**
PhD Scholar, Department of Political Science,
University of Peshawar.

**Dear, Ms. Shagufta Aman,**
Thank you for your request to approve research project **"Transforming public service through digital governance initiatives in Khyber Pakhtunkhwa bureaucratic conduct, transparency in service delivery and citizen centric e-governance"** affiliated with Ayub Medical College, Abbottabad Pakistan.

The "Explanatory Statement" related to the research proposal of your project, and your invited presentation, was discussed in an Ethics Committee meeting, and it was concluded that no risk was involved to the participants or the researchers in conducting this study. It was decided to approve the research proposal, **the Ethics Committee is pleased to accord permission to proceed with this research work.**

**Note:**

1. **This is ethical approval ONLY and the researchers shall need administrative approval separately.**
2. **This ethical approval letter will be valid till one year from the date of issuance.**
3. **You have to acknowledge AMTI, Abbottabad in future publications for facilitation provided for the research project.**

Yours Sincerely,

Professor Irfan U. Khattak
Chairman, Ethics Committee
Ayub Medical Institutions, Abbottabad, Pakistan
E-mail: khattak@ayubmed.edu.pk, research@ayubmed.edu.pk

DESPATCHED

## Appendix U: Additional Institutions Connected with KPE&SED

| | KPE&SED Affiliated Institutions |
|---|---|
| 1 | **Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA):**<br>Education Monitoring Authority, Khyber Pakhtunkhwa (KPEMA). With a motto 'Better Education with Better Living Standards,' this monitoring authority made in 2014 aims at establishing performance monitoring mechanisms over schools and increasing public awareness and ensuring social accountability by giving access to information about school facilities, infrastructure and service delivery outcomes; information on key indicators is posted on the web for citizens to review. Data evaluation is also one of the tasks done to evaluate the performance of public schools across the province. The 'accurate and timely' data is further shared with all the education departments as well. KPEMA is also required to randomly select a sample of schools in various Districts for ensuring accuracy of data and developing remedial measures for data inconsistencies etc. The website shows the % age of teacher's presence across the province and also information about the total number of schools and madrassas in KP province (EMA GoKP, 2014).<br>Link: http://175.107.63.45/newimusite/ |
| 2 | **The Elementary and Secondary Education Foundation (ESEF**):<br>It is another affiliated institution, which is tasked with setting up informal community schools in those hilly areas of Khyber Pakhtunkhwa where there are few government schools available (GoKP ESEF, n.d.).<br>Link: https://eef.org.pk/ |
| 3 | **Education Management Information System (EMIS):**<br>EMIS is "an Information System for Managers of the Education System". EMIS is a Tool for:<br><br>1. Data collection<br>2. Storage<br>3. Integration<br>4. Analysis<br>5. Dissemination<br><br>This unit of KPE&SED, headed by a director, it is responsible for all IT undertakings in primary and secondary education, including HR Information System, School Management Information System, E-Transfer System, Bio-metric Attendance System and other IT related activities. The director of EMIS, reported EMIS Cell functioning in each district of Khyber Pakhtunkhwa and manned by around 400 to 450 technical manpower (S. M. Khan, Personal interview, July 14, 2021)Link:<br>https://ese.kp.gov.pk/page/education_management_information_system_emis |
| 4 | **Education Sector Reforms Unit (ESRU):**<br>This body working under the KPE&SED is mandated to 'plan, coordinate, monitor and evaluate' the ongoing reforms activities/programs,' undertaken with the DPC (Departmental Promotion Committee) and future reforms activities (KPESED, 2021). The website provides a list of donors and the amount of money provided to the ESRU, which accounts for a total PKR 55,338 million, spent on providing incentives to ***female teachers*** in disadvantaged districts of Kohistan, Shangla, Battagram, Tank, Dir Upper and Buner. Additionally, in order to promote girls' education, ***girl students*** (grades 6-10) in Khyber Pakhtunkhwa are also provided with stipends through the local Post Offices & Education District Offices. The website claims 309090 students have benefited from this project in 2009-10 and around 90 poor intelligent students have been provided admission in 7th class in centers of excellence in the province (KPESED, 2021).<br>**Link: https://ese.kp.gov.pk/page/education_sector_reforms_unit_esru#:~:text=The%20Main%20Purpose%20of%20the,and%20future%20reforms%20activities%2Fprograms.** |
| 5 | **Private School Regulatory Authority (KPPSRA):**<br>A further body adjunct to the KPE&SED is the Private School Regulatory Authority (KPPSRA), it's website on the KPE&SED's direct s to download the Pakistan Citizen Portal app to register complaints against the private schools. The portal also shows the number of private schools registered with KPPSRA to be around 8893.<br>Link: https://psra.gkp.pk/ |

## Appendix V: Additional Institutions connected with KPHED

| | KPHED Affiliated Institutions |
|---|---|
| **1** | Directorate of Higher Education (https://hed.kp.gov.pk/ ) |
| **2** | Directorate of Archives and Libraries (http://kpdal.gov.pk/ ) |
| **3** | Higher Education Teachers Training Academy (HETTA) (no separate website; https://hed.kp.gov.pk/page/higher_education_teacher_training_academy_hetta ) |
| **4** | Project Management Unit (https://hed.kp.gov.pk/page/project_management_unit) |
| **5** | Higher Education Regulatory Authority (HERA) (http://www.herakp.gov.pk/) |
| **6** | Testing and Evaluation Agency (https://hed.kp.gov.pk/page/educational_testing_and_evaluation_agency) |
| **7** | Frontier Education Foundation (FEF) (https://kpef.edu.pk/public/app) |
| **8** | Employee Education Foundation (EEF) (https://hed.kp.gov.pk/page/employeeseducationfoundationeef) |

**Appendix W: Total Number of Schools & Madrassah in Khyber Pakhtunkhwa (KPEMA)**

**Website visited in May, 2021**

Schools Break Up

| Levels | Boys | Girls | Total |
|---|---|---|---|
| Mosque | 766 | 0 | 766 |
| Primary | 12596 | 8660 | 21256 |
| Middle | 1439 | 1199 | 2638 |
| High | 1435 | 830 | 2265 |
| Higher Secondary | 470 | 269 | 739 |
| **Total** | **16706** | **10958** | **27664** |

Source: KPEMA, GoKP. (n.d). Schools Break Up. Retrieved May 2, 2021 from website : http://175.107.63.45/NewIMUSite/index.aspx#

**Website visited in February, 2022**

Schools Break Up

| Levels | Boys | Girls | Total |
|---|---|---|---|
| Mosque | 326 | 0 | 326 |
| Primary | 8727 | 6812 | 15539 |
| Middle | 1098 | 991 | 2089 |
| High | 1060 | 633 | 1693 |
| Higher Secondary | 321 | 192 | 513 |
| **Total** | **11532** | **8628** | **20160** |

Source: KPEMA, GoKP (n.d). Schools Break Up. Retrieved February 2022 from website : http://175.107.63.45/NewIMUSite/index.aspx#

## Appendix X : Total Number of colleges in Khyber Pakhtunkhwa (KPEMA)

**(Website visited in May, 20221)**

| Level | Total | Males | Females |
|---|---|---|---|
| Colleges | 189 | 114 | 75 |
| Students | 164,886 | 106,198 | 58,775 |
| Post-Graduate Colleges | 20 | 15 | 5 |
| Teaching staff | 5531 | - | - |
| Post-Graduate Colleges | | | |

Source: HED, GoKP. (n.d). Welcome to Higher Education Archives & Libraries Department Government of Khyber Pakhtunkhwa. Retrieved May 2, 2021 from website : https://hed.kp.gov.pk/

**Website visited in Feb, 2022**

| Level | Total | Males | Females |
|---|---|---|---|
| Colleges | 177 | 109 | 68 |
| Students | 150,691 | 95,014 | 55677 |
| Post-Graduate Colleges | 20 | 15 | 5 |
| Teaching staff | 5531 | - | - |

Source: HED, GoKP. (n.d). Welcome to Higher Education Archives & Libraries Department Government of Khyber Pakhtunkhwa. Retrieved Feb 2, 2021 from website : https://hed.kp.gov.pk/

Note: The number of colleges are however underreported on the website. According to a newspaper report, there are 303 fully functional colleges in Khyber Pakhtunkhwa, out of these 177 are male and 126 are female colleges. As reported in newspapers, around 67 new colleges are under construction, with 29 of these colleges for females. In the last financial year (2020-21), around 20 colleges were completed. Under the current 2021 Annual Development Program (ADP), 12 new colleges will be built in erstwhile FATA (The News, August 29, 2021). To quote the HED Minister, 'launching of web portal for Higher Education Department Khyber Pakhtunkhwa is an important step towards merit and transparency,' (HED GoKP. b, n.d.).

## Appendix Y: Early Age Programming and IT Essentials Initiative' KPE&SED

| Projects launched | Date | Districts covered | Number of schools | Number of beneficiaries (students) |
|---|---|---|---|---|
| Phase I | Jan 2017- Dec 2017 | 13 districts | 57 schools | 3000 students |
| Phase II | Jan 2018- June 2019 | 14 districts | 300 schools | 17000 students |
| Phase III | currently running | 10 districts | 225 schools | 11000 students |

This initiative falls under the Digital skills pillar of the 'Khyber Pakhtunkhwa Digital Strategy' and is praised by the KPITB website in these words 'The project has produced remarkable results and the computer literacy and digital skill level of the marginalized students at government schools have improved significantly.' However a click on the 'list of school' section shows that the URL is not available (GoKP, KPITB Early Age Programming, n.d.).

## Appendix Z: Information on Different Apps Launched by KPE&SED

| KPESED Apps on Google Play | | | | | |
|---|---|---|---|---|---|
| | **Apps** | | **Launched** | **Downloads** | **Rating, Reviews & Link** |
| **1** | **KPESED Books App** | This app is developed to facilitate users by E Reading of books in soft form. | February 5, 2022 | 1000+ | Rating: 3.1<br>Reviews: very bad reviews with complaints about non-availability of books and inability to open the books.<br>Link:<br>https://play.google.com/store/apps/details?id=com.sad.schoolbooks |
| **2** | **KPESE – Virtual Teacher** | A question answer platform for student, parent and general public to spark the spirit of conceptual knowledge. Experts answer any question in Elementary education level in the subjects of Physics, Chemistry, Biology and Mathematics With the hope to improve knowledge of the students and general public | August 17, 2020 | 10,000 | Rating: 3.3<br>Reviews: with complaints of not working<br>Link:<br>https://play.google.com/store/apps/details?id=com.asif.virtualteacher |
| **3** | **KPESE-(HRIS)** | Human Resource Information System | Sep 3, 2021 | 100,000+ | Rating: 3.2<br>Reviews: Complaints of it being time consuming, non-user interface, not working ..<br>With complaints of it not working properly, lots of bugs, errors and showing incorrect information terming it 'horrible app'; 'the worst app ever'; 'application and browser portal not working; 'no data could be uploaded'; 'poor interface, hard to use', 'app not working' etc.<br>(https://play.google.com/store/apps/details?id=com.asif.kpese_hris&hl=en&gl=US&showAllReviews=true).<br><br>Link:<br>https://play.google.com/store/apps/details?id=com.asif.kpese_hris |
| **4** | **KPESE-SQMI (EMIS)** | School Quality management initiative (SQMI) to revitalize the function of the ASDEOs and SDEOs to inspect the quality of teaching and | Nov 13, 2020 | 500+ | Rating: No rating<br>Reviews: complaints of not working<br>Link:<br>https://play.google.com/store/apps/details?id=com.ese.sqmi |

| | | | | | |
|---|---|---|---|---|---|
| | | learning processes in primary schools and to provide regular, timely feedback to the observed teachers and head teachers for remedial actions | | | |
| **5** | **KPESED - Monthly Assessment Induction Program** | KPESED introduced induction program for newly recruited teachers. This application will be used to conduct monthly assessment | Feb 9, 2020 | 10,000+ | Rating: 4.5<br>Reviews: Complaints of the app not working properly<br>Link:<br>https://play.google.com/store/apps/details?id=com.induction.MA.kpk.api&hl=en&gl=US |
| **6** | **Induction Program KP (ESED) PITE, Peshawar, KP** | The first of its kind "Induction Program" (IP) for newly hired teachers to enhance their content knowledge and pedagogical skills in the subjects of English, Math, and Science.<br>The program has been designed by Directorate of Curriculum and Teacher Education (DCTE) and will be implemented by Provincial Institute of Teacher Education (PITE).<br>The program will be delivered to primary, middle and secondary school Beginning Teachers (BTs).<br>A specialized learning management system has been developed for the delivery of content in the above-mentioned subject areas and | March 7, 2020 | 10,000+ | Rating: 3.1<br>Reviews: problems with video uploading, time-consuming and disappointing<br>Link:<br>https://play.google.com/store/apps/details?id=com.induction.Sec.kpk |

| | | | | | |
|---|---|---|---|---|---|
| | | to manage the learning process of these teachers over an extended period of more than six months. Note: This application for government teachers of Khyber Pakhtunkhwa. application need an additional download of 16 - 18 Gb content which is already copied to teacher's tablets. Other users who wish to download the application may need additional data to run the program | | | |
| **7** | **e-Transfer KPE&SED** | Transfer Process of Teachers simpler, efficient and Transparent E-Transfer Policy for transfer/posting of teaching staff in the province implemented through a mobile application. KPESE-e-Transfer is android based application available free of cost on Google Play Store. KPESE-e-Transfer consists of the following options. 1. Search Posts: Search in a list of vacant posts added/announced by the concerned DEO. 2. Transfer Application: Applying for transfer 3.My Applications: After successfully | March 12, 2020 | 10,000+ | Rating: No rating<br>Review: Complaints about the web server not working properly.<br>Link:<br>https://play.google.com/store/apps/details?id=.com.asif.development.etransferappnew&hl=en&gl=US<br><br>https://apkcombo.com/kpese-etransfer/com.asif.development.etransferappnew/ |

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| | | submitted your transfer application you can view/download your application. Also you can check your Application status (Pending, verified, order issued) 4.Settings: Changing password and logout. | | | |