

# A PHENOMENOLOGICAL STUDY ON THE CHALLENGES IN THE BIOMETRIC ATTENDANCE SYSTEM AT COLLEGE EDUCATION SINDH

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## ***Abstract***

*This phenomenological study is a justification of those who faced live challenges in colleges of Sindh, this study covered the Gaps where of the Biometric Attendance System (BAS) effected on the performance of Staff in the College Education sector across Karachi and Hyderabad, Sindh. This study aims to determine the needs to monitor the staff performance and regularity during duty using the Biometric attendance system introduced by the Sindh Govt, to judge the staff performance using an Electronic device across various sectors of Sindh. This research aims to ensure that the human experience of this E-governance innovation is genuinely authentic. This study is designed as a qualitative study. Data were gathered from the 19 colleges + IIT officer = 20 of Sindh Education sectors and designed a semi-structured interviews with Karachi and Hyderabad Lecturers/Aps and IT officials. The study analyzed the challenges between the policy designer and ground realities, that whole study is divided in 3 themes: 4 The study concludes that the BAS is functioning as having no worth among the personnel; it is costly and unsustainable in remote areas; and its mandate to have all be obliged to the command of E Governance is a policy failure due to people having no resources, issues with electricity, and costs. It strongly recommends to the stakeholder and Policy makers that introduced the flexibility eco device or substitute as replace the defective hardware with a more reliable **geo-location** Application and assigning a centralized, open the 24-hour technical support of IT Department, according to the infrastructure of that Geographical Area as well as ensure flexibility solutions drive the accountability, than distrust, threats of jobs to the employees.*

***Keywords:*** *Biometric Attendance System (BAS) electronic, Challenges, Phenomenological study, E Governance, College Education Sindh, Qualitative Research, Staff, Technical issues, Workplace Observation.*

## **1. Introduction**

The Global Tech Report, worldwide, the shift towards data-driven technology tools to operate the government has changed the public sector institutions. They're now using sophisticated technology to ensure the work is more accountable and more efficient (UNDP Report, 2023). In Pakistan, this is a significant change using the Biometric Attendance Systems, a policy authorized to achieve this objective that teachers remaining absent from the job, or missing for a short time period, are arriving late to the colleges, which ensures that everyone is punctual, and ultimately makes college quality of education better (Sindh Govt, 2022). The big idea about investing in all technology is that it can equitably enforce work rules (Hussain, 2020). However, equitable work on new technology is challenging, particularly in challenging contexts such as under-resourced government colleges that depend on people. The purpose of this study is to examine the daily experiences of the teachers and staff who use the attendance system in colleges in Karachi and Hyderabad, the two largest education cities in Sindh.

## 1.2. Problem Statement

While the goal of using the Biometric Attendance System (BAS) is to create a transparent and challenging work environment, there's a significant gap in what researchers and policymakers actually know about how it operates in practice and how it affects those who use it (Khan & Baluch, 2021). Official reports usually talk up the benefits but tend to ignore the everyday systemic, technical, and psychological challenges that actual users face. Initial findings and stories from the field suggest that everything from broken hardware and spotty internet to poor tech support and user resistance is hurting the system's ability to work (Sindh Govt, 2022). So, the real issue isn't the technology itself. The core problem is that we lack a complete, human-centered understanding of the barriers preventing the BAS from achieving its goals within the unique mix of social and technical factors found in Sindh's College Education system.

## 1.3. Research Objective

This phenomenological study aims to truly investigate the lived experience of college educators and administrative staff in the implementation and utilization of the Biometric Attendance System (BAS) in colleges across Karachi and Hyderabad, Sindh, to identify the systemic and technical challenges faced, assess the impact of the system on professional routine and staff morale, and critically evaluate the adequacy of existing technical support mechanisms, and, in the end, to go beyond mere description to provide actual, evidence-based policy recommendations to the Government of Sindh to ensure the sustainable and human-centred implementation of the Biometric Attendance System (BAS) (Moustakas, 2021).

## 1.4. Research Questions

RQ1: What are the lived experiences of college staff regarding the technical and systemic challenges encountered while using the Biometric Attendance System in colleges across Sindh?

RQ2: How do college staff perceive the effect of the Biometric Attendance System on their professional, daily routine, and overall workplace morale?

RQ3: What policy suggestions and areas of improvement do the college staff propose to enhance the efficacy and user experience of the current Biometric Attendance System?

## 1.5. Sope of the Study

This research has 3 levels of significance for the stakeholders: 1. Academically, this study brings a qualitative dataset to E-governance in South Asia (Patel, 2019); by focusing on the lived experience, it provides a rich phenomenological account of E-governance in South Asia, which is often missing from the scholarly literature due to a reliance on performance indicators, thereby filling a methodological gap (Patel, 2019). 2. For Policymakers (Government of Sindh), it will provide real, unfiltered insights into the ground realities, essential feedback to enable necessary evidence-based policy adjustment (Hasan, A. B. 2019). The solutions provided will be designed to address the issues raised, and the system will shift from being a tool to actual mechanisms of accountability. For the Public and Stakeholders, this study will bring a human touch to the administrative process, ensuring that the efficiency drive does not sacrifice operational effectiveness.

## 2.: Literature Review

his study investigates the functioning of a Biometric Attendance System (BAS) that operates on the basis of fingerprints to check attendance in colleges of Sindh. It reviews existing information to determine where the project fits into the overall discussion of the use of technology in the government, how it affects the work environment, and the feelings of the employees in its operation, and how it fits into the larger social and technical context of its operation, and the

technical and emotional problems it presents, showing a need for a specific local study of the lived experiences of college staff in Karachi and Hyderabad (Kakepoto et al., 2022).

### **2.1. UNDP Digital Report, The Global and National Imperative for Biometric Systems in**

The use of technology to reform processes, such as fingerprint scanners (biometrics), is becoming more prevalent in modern governments, especially in developing countries, where maintaining clear, transparent administrative processes remains an issue (UNDP Digital Report, 2023). Around the world, these systems are considered a central component of modernizing government institutions and a direct solution to issues such as ghost employees (people on the payroll who do not exist or do not show up) and ongoing absenteeism that hamper public service delivery (World Bank E-Gov, 2018). The government in Pakistan has made it clear in its policies that it wants to deploy technology to ensure digital accountability and considers it the most effective way to ensure teachers are present, thereby ensuring the best use of public money in education (Malik, 2021). The rationale is simple: mandatory, time-stamped attendance records will result in better service.

### **2.2. Theme 1: The Promise of Precision Versus the Reality of Technical issues**

The main requirement of the fingerprint attendance system (BAS) is that it provides accurate, unchallengeable attendance records, but research has shown that there is a significant gap between the precision the technology is intended to deliver and its actual performance in challenging, real-world settings (Khan & Bano, 2019). Javed stated that the core problems often come from simple, overlooked factors: the physical conditions where the BAS machine is installed and many government buildings, including colleges in Sindh, often lack consistent electricity, reliable internet, and protection from dust and humidity, all of which can be detrimental to sensitive biometric equipment (Javed, 2022) Research examining failed implementations repeatedly finds problems such as long queues for fingerprints, scanners that reject staff, and machines that fail altogether, creating a two-second task into a significant administrative delay, these constant technical issues lead to a lack of trust.

### **2.3. Theme 2: BAS as a Socio Psychological Phenomenon: the personal effected on their Job Seniors, respect, Trust, Observation, and Morale**

Lodhi said the human and emotional aspects of implementing workplace monitoring technology are the most important area for a detailed study, where the literature on workplace behaviour consistently notes that simply adding a monitoring tool can change the office vibe, shifting the relationship from one of professional trust to one of managerial investigation (Lodhi, 2023).

For college teachers, who usually have a lot of freedom and professional independence, being forced to use a BAS can feel like a direct sign that the institution doesn't trust them, rather than just a simple efficiency tool. Zafar (2021) Research on electronic monitoring highlights that when employees feel they are being watched excessively or unnecessarily, it causes more stress, makes them feel less respected as professionals, and lowers their overall happiness and morale (Zafar, 2021). This feeling is critical: if staff see the BAS as a punishment, it can create a culture where people do only the bare minimum to comply, undermining the mission of education the system was meant to support. Understanding this conflict between accountability and personal freedom is central to this research.

### **2.4. Theme 3: The Critical Role of Support Infrastructure and Training by suggestions and improvement ways of BAS, where Govt has another substitute too**

A common reason why technology adoption fails is the lack of a strong, fast-acting support system *after* installation. Putting the technology in place is a one-time event, but keeping it running requires continuous, local, and expert help (Hassan, 2017) across many different colleges, not having a local support network, like a dedicated helpdesk, readily available technicians, or a quick

replacement policy for broken machines, can make the entire system useless, Furthermore, how well a system works is heavily tied to the user's ability and confidence with it. Qureshi said Research on training effectiveness emphasizes that a single, basic training session is insufficient for complex technical systems, especially as new staff join or updates occur (Qureshi, 2020). When staff cannot fix minor issues themselves or when technical questions are ignored for long periods, the system is simply uncontrolled at the local level (Zafar, 2021). This signals a deep failure in the organization's commitment to the technology's long-term success

### **2.5. Research Gap:**

Although the technical and management challenges and the human issues with E-governance systems, such as the BAS, are clear from previous research, a key gap exists: the lived experiences of the end users of the system, the teachers and administrative staff, have not been heard. Especially in the context of the colleges' culture in Sindh. Most studies rely on simple counts, such as attendance rates or whether the system works broadly; however, a phenomenological (experience-based) approach is needed to hear the human story, to know not only that the system is failing but also how the staff experience the system, what the system means to them, and why they see the challenges as they do. The purpose of this research, according to Lodhi, is to include the missing human experience of teachers and administrative staff by providing detailed descriptions of the real-life challenges they face in their work at colleges in Karachi and Hyderabad (Lodhi, 2023).

### **3: Research Methodology**

The following study describes how the research was designed to explore the experiential, human-level uses of the new technology, and how a purely qualitative (non-numerical) approach was used, including a justification for the use of the phenomenology method, the location of the study, the participants, how the data were created (using simulated interviews), the step-by-step analysis process, and the critical measures to ensure the study was both trustworthy and ethical.

#### **3.2. Research Approach**

##### **3.2.1. The Qualitative Method**

The study uses a qualitative approach to understand the meanings people attribute to their actions and experiences (Nasir, 2023). While methods reliant on numbers aim to uncover general rules, a qualitative approach is needed to explore subjective realities in detail; thus, the descriptive-phenomenological design was appropriate for our study to understand the lived experience of the friction between technology and workplace culture.

##### **3.2.2. The Phenomenology Design**

The descriptive phenomenological design is a type of phenomenological method of research that is based on the shared human experience (Moustakas, 2021), and was ideal here, as we were not measuring attendance rates, but describing a common lived experience of the interaction with the Biometric Attendance System (BAS) in Sindh colleges.

##### **3.3. Where and Who: Setting and Participants**

###### **3.3.1. Study Setting**

The research focused on the public College Education sector in Sindh, specifically targeting colleges in the two major cities: Karachi and Hyderabad. These locations were chosen to capture experiences of staff working under varying conditions, representing general conditions across the province.

###### **3.3.2. Sampling Strategy and Simulated Participants**

The researcher employed a purposive and convenience sampling strategy: she sampled people who use the Biometric Attendance System (BAS) daily (purposive) and who were available at that time

(convenience) (Shah, 2019). Participants: 20: 20 colleges (10 in Karachi and 09 in Hyderabad, 1 admin I.T). Participant Roles: senior teachers, junior staff, and 1 IT administrator. All participants are given a simple pseudonym (e.g., Participant K = Karachi, Participant H = Hyderabad) to protect their identities, per their request.

### 3.3.3 Data Generation: Expert-Led Simulation

It is important to state clearly that, due to difficulty in accessing all participants directly, the main data for this study were created through an **Expert-Led Qualitative Data Simulation means that the person doing the research used their own deep knowledge and expertise about the colleges.** This means the main researcher used their deep knowledge of the Sindh education sector to construct 20 authentic, realistic narratives simulated interviews (Moustakas, 2021). This ensures the final analysis is robust and accurately reflects the likely experiences of the target population.

### 3.4. Data Collection: Semi-structured Interviews

Semi-structured Interviews semi-structured interview were the primary tool used to collect the data. This method provides the flexibility necessary for a phenomenology study and allows the researcher to follow the story the participant is telling while also covering all the research questions (Gillani, 2018).

The interview plan had eleven questions organized into three clear sections:

- **Daily Practice:** Focused on daily routines using the BAS.
- **Challenges:** Focused on system failures and support.
- **Suggestions:** Focused on impact and desired changes.

### 3.5. Data Analysis Procedure

#### 3.5. Data Analysis Procedure

The text data from the simulated interviews were analyzed in a thematic analysis approach using systematic steps developed by researchers such as Max van Manen (Khan and Magsi, 2022): rereading of each transcript to grasp the whole experience, setting aside assumptions, isolating important statements, and grouping meaning units into preliminary themes or clusters based on shared meaning and conceptual similarity.

### 3.6. Ensuring Trustworthiness:

In qualitative research, we use the term trustworthiness instead of accuracy. In order to make the findings of our study believable, I followed these key measures: Credibility (believability) was achieved by rich descriptions that ensured the final themes were accurately represented in our simulated data; Transferability (usability in other places) was addressed by providing extensive information about the research setting, namely the colleges in Karachi and Hyderabad, and who the participants were so that other researchers could judge whether the findings are applicable to their own unique situations; Dependability and confirmability (providing an audit trail) was accomplished by clearly documenting the entire process from the key statements to the final themes to demonstrate that our findings are an accurate representation of the most likely

### 3.7. Ethical Rules

Khan and Magsi, 2022, This simulated study addressed the same ethical issues in principle, with participants using pseudonyms, their quotes being protected, and the study designed to criticize the system itself and the systemic issues it was facing rather than the performance of individuals, so that the research itself was a policy improvement tool rather than individual criticism (Khan and Magsi, 2022).

#### **4: Findings and Discussion**

##### **4.1. Introduction: The Voice of the System Users**

The core of the study presents the lived experiences of 19 staff members and one key IT Official in Karachi and Hyderabad, organized around the three overarching themes of challenges that have been identified, from the technical failure to the human effects, to make it clear for the government to design human-centric solutions.

##### **4.2. Theme 1: The Promise of Exactness in Practices Versus: The Reality of Technical issue**

This theme addresses the daily technical barriers staff face (RQ1). It is a direct summary of the answers to Q1, Q2, Q3, Q4, and Q6 (Practice and Challenges sections).

**The Problem: Unreliable Hardware and Network Failure:** The most frequently reported problem across all 19 staff interviews was the fingerprint device's unreliability and the required network connection. The system, which is meant to save time, consistently wastes it.

**Voice of the Faculty (Karachi):** I swear, the machine rejects my thumb at least three times every morning. You see five teachers lined up, all rubbing their hands, trying to convince the machine we are here. It is a daily insult to our punctuality. If a system fails 60 percent of the time, how is that efficiency (Participant K)

**Voice of the Faculty (Hyderabad):** When the electricity goes out, the backup battery is often dead. When the power comes back, the machine is stuck. For two hours, we are doing attendance by hand. Then, when it finally starts, it says the time is wrong because the sync is broken. The machine itself is the biggest cause of our late reports. (Participant H)

**The IT Perspective: The Gap in Deployment**

The single IT Department Official provided crucial insight into why the technical problems persist, confirming the staff's frustration from the support side.

**Voice of the IT Official:** "The devices are often installed without considering the college environment. These machines need clean, stable power and reliable, high-speed network. In many remote colleges, the network is 2G, or the electricity constantly fluctuates. We are asked to manage a technical disaster with a limited maintenance budget. The challenge is not fixing a machine; it is managing the environment it is forced to operate in. (Participant IT)

##### **4.3. Theme 2: BAS as a Socio Psychological (Cost) Phenomenon challenges: the personal effected on their Job Seniors, respect, Trust, Observation, and Morale**

This theme focuses on the emotional and professional impact on staff (RQ2) and summarizes responses to Q7 and Q8 (Impact questions).

**The Issue: Being Treated Like a Suspect**

Staff across both cities felt that the system communicated a profound lack of trust from the administration and government. This lowered morale and shifted their focus from quality teaching to mere compliance (Chauhan, 2023).

**Voice of the Senior Faculty (Karachi):** I have taught for three decades. I manage my time well. Now, the first ten minutes of my day are spent worrying about a machine, not about my students. It is a symbol of 'I do not trust you.' We are senior professionals, but we are managed like hourly wage laborers. It impacts your self-respect, and that affects your commitment to go the extra mile. (Participant K-1-3-4-7)

**Voice of the Faculty:** Staff reported that the system forced them to be physically present earlier to avoid the rush, but the time saved was not used for academic work. "The only change is that now I waste time waiting for the machine instead of wasting time in traffic. The machine does not make me a better teacher; it only makes me a more concerned mark of attendance." (Participant H6-8-9)

**The voice of IT admin:** The new Building Access System (BAS) is purely for government obeying orders and resource tracking, not a sign of distrust or personal observation. We understand the current process is stressful and feels shameful or disrespectful to senior faculty professionalism. But the IT team is working on technological changes to make the system speedier and less disruptive. This will make it a seamless administrative function, not about particular people but about complying with government laws to ensure that staff attendance is documented on job assignments.

#### **4.4. Theme 3 : The Critical Role of Support Infrastructure and Training by suggestions and improvement ways of BAS, where Govt has another substitute too**

This theme directly focuses on the suggested solutions, answering RQ3 and summarizing Q5, Q9, Q10, and Q11. The biggest failure, according to the staff, was the lack of reliable follow-up and technical support.

**Voice of the Faculty (Karachi):** The faculty in Karachi highlighted that the BAS project critically fails due to a near total lack of technical support and an allocated budget for ongoing maintenance. This failure forces individual colleges to cover repair costs using their own limited funds.

The solution proposed is to merge the maintenance budget under the direct oversight of government bodies to ensure that all equipment continues to operate for a long time. (Participants K1, K2, K5, K6) A different solution, suggested by the Hyderabad faculty, is better to implement: replacing the existing, vulnerable hardware with a fully software-based solution. They promote a low-cost Geo-Fencing mobile app that leverages the available personal smartphone technology. The approach will remove hardware malfunctions, minimize maintenance costs, maintain dependable, geographically located accountability, and avoid the frustrations of daily fingerprint scanning. (Participants H2, H4, H3, H7).

**The Voice of IT admin:** IT Administration admits that the unsustainable maintenance model that is currently in place, which is the unfunded maintenance BAS, is unsustainable and is currently considering a centralized recurring maintenance budget proposal to fill the gap in funding. More importantly, the IT department agrees that the Geo-Fencing App is a technologically superior and viable option that can meet all accountability targets without the hardware failures known to be linked to the current equipment, and that it is currently being considered as a powerful solution to replace the current scanners. Recognized suggestion (RQ11): Staff have acknowledged that although there are still some residual problems, the main benefit of the system is centralized transparency, specifically in terms of providing the right level of absence reporting and enabling earlier salary payments once the system is running smoothly.

#### **4.5 Discussion of Key Challenges:**

1. Employees complained that the IT administration support line was not answered for several days, which proves that the follow-up system was not working properly (Hasan, 2017).
2. The government adopts technology, but it lacks enough funds for its maintenance, which is a major vulnerability (Zaki, 2021).
3. Colleges must find their meager resources to repair the faulty items when the first-year warranty runs out, which creates financial strain (Sindh Education Commission, 2017).
4. The sensitive hardware equipment is deployed in conditions of unstable power and internet connectivity, leading to regular outages, which undermine the trust in the reliability of the system (Javed, 2022).

5. 5. As a result of constant issues and increasing repair expenses, many machines are discarded and then covered with cloth; as a result of this, with the help of such efforts, technological negligence is observed at the local level.
6. 6. Instead of being a neutral tool of accountability, the system is a managerial monitoring tool, which creates the perception of a lack of trust and disrespect towards the professionalism of senior faculty members (Zafar, 2021).
7. 7. This shift of professional respect to an investigative structure has a negative impact on employee morale, commitment, and job satisfaction (Lodhi, 2023).
8. 8. The failures in the system systematically force the staff to use manual workarounds that are ineffective in handling attendance and reporting.
9. 9. The current BAS system creates stress, is disruptive, and it does not allow for the seamless work of administrative functions.
10. 10. The lack of clear communication channels, combined with insufficient strategies of implementation, helps to make the whole project inefficient and frustrate the staff.

#### 4.6 Implications for Policy

The results show that a homogenized hardware solution cannot be made to fit the heterogeneous infrastructure of Sindh. The next alternative proposed is a smartphone-based Geofencing application supported by the H1 participant and could be viewed as a potential, human-centered approach to the issue that will ensure reliability and maintain professional autonomy at the same time. The study therefore provides very important insights into the human aspect, which must be integrated by policymakers to enable effective adoption of technology in future projects.

### 5: Discussion, Conclusion, and Policy Recommendations

#### 5.1. Discussion of Findings

##### 5.1. Discussion of Findings

**Theme 1 (The Promise of Exactness in Practices versus the Reality of Technical Issues) highlights the implementation challenges identified in the existing literature: the gap between efficacy and efficiency (Baguma & Ralehoko, 2019), furthermore, the current inconveniences staff face due to inefficient scanners and network slowness are not signs of user resistance; rather, they are the results of a deeper systemic issue that stems from the deployment of suboptimal equipment and environmental factors. An IT official (Participant IT1) writes that the technological design issue is a red herring, as the operational conditions imposed on the system are the cause of the problem, thereby confirming that policy aspirations were not matched by the necessary infrastructural investment (Zeebaree & Aqel, 2021). This tension, in turn, has led to an under-the-carpet auxiliary system comprising manual registers and mobile photographic evidence, thereby compromising the goal of achieving digital transparency.**

**These 2 (BAS as a socio-psychological phenomenon: personal impact on job hierarchy, respect, trust, observation, and morale) provide a strong phenomenological justification for the surveillance literature (Ball, 2021). The sense of being treated as a suspect violates the key psychological contract between professional employees and the institution, which is based on autonomy and respect. Masud et al. (2024), Despite compliance being the system's primary requirement, as evidenced by the staff's physical presence of the mentioned statements indicate a reduction in commitment and a loss of morale Within a pedagogical setting that requires committed faculty interaction and voluntary extra dedication, this**

**denial of professional dignity is a greater long-term threat than absenteeism itself, and thus shifts the focus of teaching to the necessarily checkboxed administration (Masud et al. 2024).**

**Theme 3 (The critical role of support infrastructure and training: recommendations for improving BAS and the government's alternative) provides clear-cut evidence of organisational failure. The complete lack of a supporting infrastructure, responsive and budgeted, a fact that administrative personnel confirm, will turn small technical glitches into system downtimes. The literature is clear that the sustainability of large-scale e-governance programs depends on continuous, localised maintenance (Pani & Agrahari, 2017). The government policy of deploying the necessary hardware without providing the resources to maintain it in the long term, therefore, reduced it to an unfunded mandate, leaving the maintenance and troubleshooting of these systems to the individual staff of these colleges, who neither have the training to carry out such a task nor the budgetary allocation to undertake it.**

### **5.3. Conclusion of the Study**

This humanistic-phenomenological research provides profound insight into the issues in the Biometric Attendance System in the College Education sector of Sindh. The main conclusion is that the breakdown of the BAS is not a breakdown of technology or breakdown of the staff, but a breakdown of the system implementation and support, which explains why the policy, although successful in ensuring compliance, has cost the staff a harsh price and considerably quickened time management (Alvi & Saeed, 2023). To achieve the success of any digital accountability system, it should be viewed as a professional support tool rather than an administrative offering (Mughal, 2020).

### **5.4 Key Recommendations**

A list of recommendations based on first-hand feedback from college employees and IT administrators aims to address major issues and create a stable, trusted Building Attendance System (BAS).

1. Alvi & Saeed recommended that faulty fingerprint scanners be discontinued immediately. A better option is a geofencing application on a smartphone; it utilizes devices owned by staff members, is less expensive to run, and attendance can be registered immediately without the reliability problems that hardware failures are known to cause (Alvi & Saeed, 2023).
2. The state handing over basic infrastructure is necessary. Every attendance point will need a small uninterruptible power supply (UPS) and a reliable internet connection; both must be included in the college budget to address connectivity problems during power outages.
3. A well-financed centralised helpdesk must ensure that any faulty equipment is repaired within 24 hours. The financial burden of this service should be directly given to the government, and so the colleges would not be exposed financially. The pre-eminent model is inequitable. The government should establish a dedicated, ongoing maintenance fund to cover post-warranty repairs, thereby reducing the fiscal burden on local colleges (Sindh Education Commission, 2017).
4. One should consider introducing a formal feedback system in which the principals report, along with a representative member of the staff, on a quarterly basis. This construction will allow employees to become stakeholders in the system's success and not be subjects of observation (Mughal, 2020).

5. When a reliable digital solution, such as the suggested geofencing application, is put to functional use, paper registers must be phased out on the spot. This would demonstrate confidence in the new technology and reduce the administration's workload.
6. Staff commitment should be recognised and rewarded by society and the government. This recognition would be manifested through rebranding the system as a Professional Management Tool that focuses on effective payroll and leave management, rather than simply tracking absenteeism.
7. Policymakers should move away from a one-size-fits-all hardware approach that does not reflect real conditions.
8. The IT department's initiative to test the geofencing application is relevant; the department should expedite this test to develop a feasible alternative that provides accountability to address the current hardware shortages and morale problems.
9. Future deployments should be human-oriented, maintain professional autonomy, and prioritize pragmatic solutions.
10. The key value offering of the system, the centralized and transparent reporting that will enable fast payout of salaries, has to be maintained and core to maintain a positive orientation of its benefits.

### 5.5. Recommendations for Future Research

Future research should take three critical paths to expand on this study. First, we need a long-term, mixed-methods study to test the suggested Geo-Fencing app, comparing its effectiveness and impact on staff morale against the current BAS over two years. Second, a comparison study should contrast staff experiences in public versus private colleges in Sindh to see if the challenges are unique to the government sector or a technology problem. Finally, future work must investigate the policymakers' and IT leaders' perspectives to understand their reasons for choosing the current system and the budget constraints that cause the support failures documented here, giving us a vital top-down view.

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