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IMPACT OF DIGITAL ATTENDANCE SYSTEM ON STUDENT PERFORMANCE AND DISCIPLINE

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Abstract: This research investigates the effect of electronic attendance systems on student performance and discipline in schools. Conventional manual methods of attendance are usually time-consuming, prone to errors, and vulnerable to manipulation, while electronic systems provide accurate, efficient, and real-time monitoring of student attendance. The study seeks to evaluate whether the implementation of such systems is associated with enhanced academic performance and improved student discipline. With a quantitative design, data were obtained using student surveys administered to students from different study programs and study levels. Statistical procedures, Chi-Square, and T-tests were used to analyze relations among digital attendance monitoring, student performance, and behavior patterns. Findings indicate a strong relation between digital attendance and improved student performance, with increased punctuality, interaction, and class participation reported among digitally monitored students. The system also seemed to enhance discipline by minimizing absenteeism, avoiding proxy attendance, and fostering a culture of accountability. Nevertheless, the study also revealed challenges like technological constraints, resistance by users, and data privacy concerns. In spite of all these problems, the study concludes that electronic attendance systems can act as effective tools in ensuring a disciplined learning atmosphere and academic achievement when administered properly with adequate infrastructure and policy protection.

Keywords: Digital Attendance, Student Performance, Discipline, Academic Outcomes, Classroom Management, Educational Technology, Absenteeism, Behavior Tracking, Student Engagement.

I. INTRODUCTION

The fast pace of technological growth has revolutionized many industries, including education, where digital innovations are increasingly defining administrative and academic processes. One such innovation is the use of digital attendance systems in schools, colleges, and universities. These systems—varying from biometric scanners and RFID cards to QR code-based apps and online portals—are intended to track student attendance efficiently with minimal human intervention. Through the provision of accuracy, real-time tracking, and convenience of data handling, digital attendance systems are supplanting old-fashioned manual practices which are normally erroneous, tamper-prone, and labor-intensive.

Attendance is important in academic achievement and student discipline. Consistent attendance is highly connected to better performance in academics because regular class presence improves understanding and retention of learning material. Technological systems guarantee regular attendance among students by making timely reminders and creating attendance records that can be viewed by the teacher and the parents. With this added accountability, students have a sense of responsibility and timely behavior, thereby leading to good discipline and proper time management.

In addition, digital attendance systems are a useful resource for educational administrators and policymakers, offering insights through attendance analytics. Trends like chronic absenteeism or sporadic attendance can be easily recognized, enabling early intervention and assistance. These systems also reduce instances of proxy attendance or manipulation of student records, thus upholding academic integrity.

This project seeks to investigate the effect of digital attendance systems on student performance and discipline, with emphasis on how such technologies affect classroom behavior, participation, and academic performance. Through an assessment of the effectiveness of these systems, the study aims to offer evidence-based recommendations for their implementation and optimization in schools. The findings will contribute to a deeper understanding of the role that technology can play in enhancing educational outcomes and maintaining discipline, ultimately supporting more structured and productive learning environments.

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II. LITEERATURE REVIEW

1.James K. Luiselli,Robert F. Putnam (2005)
This article examines the impact of a whole-school Positive Behaviour Support (PBS) intervention on discipline and academic performance in an urban elementary school. The PBS model, focused on proactive strategies like clear expectations, student engagement, and data

2.Brandy R. Maynard,,Elizabeth k. Kjellstrand (8th sep 2013)
This study evaluated the Check & Connect (C&C) intervention's impact on attendance, behavior, and academic performance in at-risk youth. While C&C improved academic outcomes and reduced disciplinary referrals, it did not significantly affect student attendance. The findings suggest C&C is effective for addressing behavioral and academic challenges, but additional strategies may be needed to improve attendance..

3.Smit Hapani, Nandana Prabhu (2018)
This paper presents an image processing-based attendance system using facial detection and recognition to automate the process in classrooms. It utilizes the Viola-Jones algorithm for face detection and the Fisher Face algorithm for student recognition. Despite challenges like varying lighting and facial orientation, the system shows potential, achieving 45-50% accuracy and promising future improvements.

4.AMIK Mahaputra Riau (2020)
Amik Mahaputra Riau Campus currently uses a manual attendance system that suffers from issues like proxy attendance and forgetfulness. Implementing a Barcode Attendance Application using mobile technology offers a faster, more accurate solution, ensuring real-time data collection and eliminating cheating. This system improves efficiency, streamlines the process, and reduces administrative workload.

5.Nataliya G. Koroleva, Anna V. Vozdvizhenskaya (16 jan 2021)
This study evaluates students' responses to the abrupt shift to remote learning due to the COVID-19 pandemic, focusing on course satisfaction and preferred learning formats. A survey of 350 first-year students at North-Western State Medical University revealed that while academic progress remained stable, students faced psychological challenges, missing the social and emotional aspects of traditional classrooms. Despite these concerns, familiarity with digital tools helped maintain overall academic performance..

6.Thomas J. JONES (9TH may 2022)
This discussion highlights the limitations of traditional engagement metrics like page views and emphasizes the importance of analyzing video viewing duration for better insights into student learning. The positive correlation between asynchronous video engagement and academic performance suggests active content interaction is crucial. Additionally, while tracking various VLE metrics can inform teaching strategies, it requires careful consideration of time investment and instructor resources.

7.Randa Diab-Bahman, Abrar Al-Enzi(6th july 2022).
Diab-Bahman and Al-Enzi's 2022 study revealed a negative relationship between virtual attendance and academic performance in online Business Management courses, with first-year students benefiting less from attendance than second-year students. The findings suggest that student maturity and engagement play a more significant role than attendance. The research calls for a more nuanced approach to designing virtual learning environments.

8.Gladys Kinyanjui, phD(2023)
This study explored the impact of CCTV technology on student discipline in public secondary schools in Nakuru County, Kenya. It found that schools using CCTV reported fewer cases of indiscipline compared to those without, highlighting the effectiveness of surveillance in managing student behavior. The research supports the adoption of technology in enhancing rule enforcement and promoting a safe learning environment. Overall, integrating technological tools like CCTV can improve student discipline and contribute to a positive educational atmosphere.

9.Mukti Budiarto, Sipah Audiah (2023)
This study highlights the transformative impact of technology-driven attendance systems on educational institutions, improving operational efficiency and reducing administrative burdens. Automated systems offer significant time and cost savings, increase accuracy, and provide real-time data, enhancing student engagement and accountability. The transition from manual methods to digital systems streamlines processes, enabling staff to focus on educational outcomes. Ultimately, this shift improves both administrative and educational performance, preparing institutions for the digital age.

10.Anagha vishe,Akash Shirsath, Sayali Guujar, Neha thakur (2023-2024)
This article presents an automated student attendance system using face recognition technology to replace outdated manual methods. The system captures and processes student images in real-time, accurately marking attendance without teacher involvement. It incorporates face liveness detection to prevent spoofing and provides real-time updates for students to monitor their attendance. Based on the Haar Cascade algorithm, the system ensures high accuracy and secure attendance tracking. This solution improves efficiency, reduces administrative tasks, and offers a secure, cost-effective alternative to traditional attendance methods.

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11.Shorihatul inayah, Ahmad Hudan Mabruri (2024)
The study highlights EvoCard's effectiveness in improving attendance and discipline by automating data collection and providing real-time monitoring. It resulted in increased attendance, reduced tardiness, and positive feedback from students, teachers, and parents. The system also enhanced administrative efficiency and transparency, fostering a more disciplined educational environment.

12.Maulidiyah Junnatul Azizah Heru, Atika jatimi (2024)
The study shows that a web-based e-attendance system improved attendance consistency and student motivation in vocational high schools. Real-time feedback and early interventions contributed to better student engagement and educational outcomes.

13.Chowdhury and Rahman (2024)
Chowdhury and Rahman's study showed that digital attendance systems in South Asian universities improved monitoring, reduced absenteeism, and helped identify at-risk students for early intervention. The systems also fostered a culture of accountability, enhancing student discipline and engagement.

14.Patel and Mehta (2022)
Patel and Mehta's study revealed that digital attendance technologies, including facial recognition, QR codes, and geo-tagged check-ins, improved attendance rates and reduced proxy attendance. They also enhanced student discipline, transparency, and teacher-student relationships.

15.Garcia and Martinez (2021)
The study by Patel and Mehta found that RFID-based attendance tracking systems in Spanish universities led to a significant improvement in academic performance, with students attending over 85% of classes outperforming peers by 10-15%. The system's real-time tracking fostered accountability, reduced proxy attendance, and enabled timely academic interventions.

16.Patel and Mehta (2022)
Patel and Mehta's study found that digital attendance technologies like facial recognition, QR codes, and GPS-based systems improved accuracy and helped eliminate issues like proxy attendance. These systems also supported academic counseling, enabling targeted interventions and improving student outcomes.

17. Al-Emran and Malik (2018)
Al-Emran and Malik's study showed that mobile-based attendance systems improved student accountability and time management by providing real-time data and fostering better communication with instructors. This enhanced academic engagement and performance.

18.Olanrewaju and Adebayo (2019)
Olanrewaju and Adebayo's study found that biometric attendance systems in African universities reduced disciplinary issues, particularly proxy attendance. The certainty of real-time, accurate records motivated students to attend classes regularly and follow rules. The research highlights how these systems fostered accountability and improved student discipline.

19.Zhou and Li (2020)
Zhou and Li's study found that facial recognition and mobile-based attendance systems improved student punctuality, engagement, and classroom discipline in East Asia. The real-time monitoring motivated students to arrive on time and actively participate in class. The study emphasized that these technologies foster a culture of accountability, enhancing overall classroom behaviour.

20.Anderson (2022)
Anderson (2022) found that digital attendance systems, using technologies like biometrics and RFID, promote regular attendance, which boosts student engagement and academic performance. These systems provide real-time feedback, enabling both students and instructors to track progress and address issues early. The study advocates for creating a culture that values consistent attendance to enhance overall academic success.

21.Thomas, K., Williams, J. (2021)
Thomas and Williams found that digital attendance systems enhance student learning outcomes by promoting consistent attendance, which leads to greater engagement and academic performance. Real-time tracking allows instructors to intervene early when attendance declines, supporting struggling students. The study also notes that accountability encourages students to take their academic responsibilities more seriously.

22.Patel and Shukla (2020)
Patel and Shukla found that digital attendance systems help reduce dropout rates by providing real-time data to identify frequently absent students early. This enables timely interventions like counseling or academic support to address underlying issues. The study highlights digital systems as both tracking tools and effective strategies for student retention.

24.Lee and Park (2022)
Lee and Park found that digital attendance systems improve student punctuality, engagement, and classroom behavior by providing real-time, automated tracking. The visibility of attendance data promotes accountability and helps educators

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intervene early with students showing poor attendance patterns. Overall, these systems support a more disciplined and academically focused classroom environment.

25.Bianchi and Zhang (2020)

Bianchi and Zhang examined digital attendance systems, finding they streamline administrative tasks and reduce errors, allowing teachers more time for instruction. The systems promote student accountability through real-time feedback, leading to improved discipline and academic performance. They also enhance record integrity and support a more honest, engaged learning environment.

26.Ichimura and Kamada (2018)

Ichimura and Kamada examined the use of NFC technology in attendance systems, using tablets to enable quick, tap-based check-ins via student ID cards. The system supports real-time data collection, aiding early detection of chronic absenteeism and enabling timely interventions. Their study highlights improved accuracy, reduced fraud, and administrative efficiency, advocating broader adoption in education.

27.Johnson and Wang (2020)

Johnson and Wang explored mobile apps for tracking student attendance and performance, highlighting features like GPS/Wi-Fi-based automation and real-time feedback. These tools reduced administrative workload, encouraged student accountability, and enabled timely academic interventions. The study also noted challenges related to location accuracy and privacy, urging clear institutional policies.

28.Mishra, Patwa, and Parate (2021)

Mishra et al. reviewed biometric attendance systems, highlighting improved accuracy and efficiency over manual methods. Using fingerprint sensors and centralized servers, the system reduces proxy attendance and supports real-time monitoring. Despite high setup costs, the study emphasizes long-term benefits and integration potential with broader educational tools.

29.Hoo and colleagues (2019)

Hoo et al. surveyed the hardware needs of biometric attendance systems, evaluating fingerprint, facial, and voice recognition for classroom use. These systems enhance efficiency and reduce proxy attendance, promoting accountability. The study also highlights challenges like hardware maintenance and data privacy concerns.

30.Biyani and colleagues (2024)

Biyani et al. introduced an Android-based smart attendance system that streamlines and modernizes attendance tracking. The system enables real-time attendance marking via mobile devices, improving data accuracy and accessibility. Its ease of use encouraged greater student punctuality and engagement. The study concludes that such mobile systems positively impact both discipline and academic performance.

III. SCOPE OF THE STUDY

The research scope in this study lies in examining the impact of digital attendance systems on students' performance and discipline in learning institutions. It involves the evaluation of different digital attendance technologies like biometric scanners, RFID cards, QR code readers, and mobile apps and how they are integrated into the academic setup. The research focuses primarily on secondary schools, colleges, and universities where attendance systems are already implemented or in the process of being implemented. The research seeks to explore how the systems help achieve more accurate attendance, monitor attendance in real time, and promote greater student responsibility. The study also assesses the correlation between regular attendance recording and shifts in academic performance, such as in students' grades, classroom participation, and overall engagement. Discipline, being another core element, is measured by observing the impact of digital monitoring on student timeliness, compliance with institutional regulations, and class attendance or proxy attendance reduction. The research also takes into account the views of the most influential stakeholders like students, teachers, and administrators in order to get a complete view of the perceived advantages and drawbacks of digital attendance systems. It is confined to institutional environments in which digital attendance has been operative for a period long enough to have measurable impact. The analysis does not capture administrative applications of digital systems for reasons other than classroom participation, nor does it address performance metrics outside of attendance, such as teaching practices or curriculum quality. By concentrating on the direct relationship between monitoring attendance and student achievement, this research offers focused information on how digital technology can be utilized to improve academic discipline and achievement.

IV. NEED OF THE STUDY

The necessity of this study emanates from the increasing integration of digital technologies in the educational environment and the enhanced significance of tracking and enhancing student performance and discipline. Manual recording-based traditional attendance systems tend to be error-prone, inefficient, and manipulative in nature, e.g., proxy attendance. These drawbacks undermine the capacity of educators to accurately monitor student engagement and

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effectively address absenteeism. With the growth of digital attendance systems like biometric scanners, QR codes, and mobile apps there is a potential to increase the accuracy, speed, and accountability of attending taking. Yet, as these systems become more widespread, there is little conclusive research on their real-world effect on academic performance and behavioral trends. This research is necessary to establish whether digital attendance systems do more than merely automate administrative functions whether they create a culture of responsibility among students, decrease truancy, and are associated with academic performance improvement. It also seeks to assess the perceived effectiveness and challenges of these systems from the viewpoints of students, teachers, and administrators. By understanding how digital attendance impacts classroom discipline and student performance, schools can make informed investments in such technologies. In addition, findings from this research can inform policy, facilitate strategic planning in educational technology integration, and mitigate privacy, fairness, and system reliability concerns. Finally, this study aims to interrogate further the discourse on how digital innovation can enhance quality education and produce a more organized and responsible learning environment.

V. OBJECTIVES OF THE STUDY

PRIMARY OBJECTIIVES:

1. To evaluate the impact of digital attendance system on student academic performance

SECONDARY OBJECTIVES:

1. To explore how attendance data support academic counselling and early intervention strategies.
2. To study the challenges faced during the implementation and operation of digital attendance system
3. To provide recommendations for institutes panning to adopt or enhance attendance technology

VI. RESEARCH METHODOLOGY

The quantitative component involves data collection from a sample of secondary schools and colleges that already have digital attendance systems in place. Institutions will be sampled using stratified random sampling for representing various types and regions. The key variables like student attendance records, academic performance (e.g., grades or GPA), and disciplinary incidents (e.g., warnings, suspensions) will be measured during one academic term. Statistical analysis, including correlation and regression, will be used to explore the relationship between regularity of attendance and student performance. The qualitative component augments this by capturing perceptions via semi-structured interviews with administrators, teachers, and students. These interviews will explore perceived benefits, behavior changes, and issues of implementation concerning electronic attendance systems. Thematic analysis will be used to examine the qualitative data, enriching the quantitative findings. Ethical standards will be strictly applied, including informed consent, confidentiality, and voluntarism. The mixed-methods study allows for a better understanding of the effects of digital attendance systems on student performance as well as student discipline, using quantifiable findings together with human experiences and perceptions.

VII. FINDINGS

Demographic Distribution:

The majority of respondents (87.7%) belong to the older age category, with a fairly balanced gender distribution (56.8% vs. 43.2%). Most participants (54.3%) are first-year students, indicating that early-year students are more represented in the study sample.

Chi-Square Analysis:

A significant association exists between gender and program of study ($\chi^2 = 6.754$, $p = 0.034$), suggesting that gender may influence students' academic paths. However, violations of Chi-Square assumptions (66.7% of expected counts below 5) caution against overreliance on these results without further validation.

T-Test Results:

One-sample t-tests show significant perceptions among students: gender distribution is statistically distinct, and there is strong agreement that poor attendance negatively impacts academic performance. This is reinforced by tight confidence intervals in bootstrapped results, indicating consistency in responses.

VIII. SUGGESION

A number of recommendations are made to maximize the efficiency of digital attendance systems in enhancing student performance and discipline. First, institutions must ensure that the digital attendance system is easy to use, dependable, and accessible to all students and staff. Proper training and awareness programs should be carried out to acquaint users with the functionalities and advantages of the system. Secondly, attendance data must be used proactively in academic

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counseling to recognize students with irregular attendance and make early interventions to facilitate their academic success. Data privacy and security must also be ensured to safeguard student information and establish trust in the system. Monitoring attendance reports regularly by faculty and communicating promptly with students can strengthen accountability and minimize absenteeism. Moreover, institutions can also think of associating high attendance with positive rewards, like academic awards or participation certificates, to promote punctuality and participation. Timely resolution of technical problems and adequate infrastructure support—like stable internet and power backup—will reduce interruptions. Lastly, attendance enforcement and penalty policies should be department-specific while ensuring fairness and transparency. These will enhance the position of electronic attendance systems in reinforcing academic discipline and better results.

IX. CONCLUSION

The research finds that computerized attendance systems positively affect student performance and discipline. Through precise, real-time monitoring, the systems enhance punctuality, minimize absenteeism, and foster increased student accountability. The information gathered allows for early detection of students at risk, facilitating timely academic counseling and interventions. Additionally, computerized attendance minimizes manipulation and maximizes fairness in monitoring, leading to a more disciplined learning environment. Though problems like technical hitches and privacy of data exist, proper training and effective implementation can ensure maximum benefits. Digital attendance systems are generally useful instruments for enhancing educational performance and upholding academic order.

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