**CHAPTER ONE**

**INTRODUCTION**

* 1. **Background of Study**

The Student Disciplinary Committee (SDC) is a crucial component within educational institutions responsible for maintaining a conducive and disciplined environment. Its primary purpose is to address violations of the established rules and regulations by students. Here's an overview of the SDC. The SDC is typically composed of faculty members, administrators, and sometimes students, depending on the institution's structure. The committee is often led by a senior faculty member or an administrator with experience in student affairs. The SDC enforces the institution's code of conduct and disciplinary policies. It ensures that students adhere to the established rules to maintain a respectful and safe environment. When a disciplinary issue arises, the committee conducts thorough investigations. This may involve gathering statements from involved parties, reviewing evidence, interviewing witnesses, conducting hearings to allow the accused students to present their side of the story. During these hearings, the committee assesses the evidence, listens to testimonies, and determines whether a violation has occurred. If a violation is established, the SDC imposes sanctions. Sanctions can range from warnings to community service to, suspension, or expulsion, depending on the severity of the offense, all these processes are assisted by a lot of documents.

The current paper-based approach to managing disciplinary affairs by the Student Disciplinary Committee (SDC) poses significant challenges, hindering the committee's transparency and responsiveness. This outdated approach, marked by manual record-keeping and delayed processes, time-consuming case resolution processes, error-prone documentation, limited accessibility to case information, poor transparency in case tracking, inefficient communication, difficult retrieval of information, negatively impacts the overall effectiveness of disciplinary procedures. Recognizing these challenges, there is a crucial need to transition to a technologically driven solution. The proposed Student Disciplinary Committee (SDC) Application is designed for efficiency, offering real-time updates, secure document storage, and communication tools. By streamlining processes and enhancing transparency, this application ensures a fair and effective resolution of disciplinary matters, ultimately contributing to a positive learning environment for all students.

With the rising number of cases as the university grows, it becomes increasingly difficult to manage disciplinary cases using the traditional paper-based model, there is need for a faster, friendlier, less cumbersome and generally a more reliable system. The SDC Application seeks to address this concerns by providing an innovative solution that leverages modern technologies (in the t3stack) to simplify case creations, resolutions, information retrieval, enhanced communication etc.

Multiple literature has been published on the importance of the Student Council in educational institutions, their responsibility in addressing indiscipline and constructing/updating what is popularly known as the Student Handbook. Discipline management are essential to successful schools (Blandford, 1998).

The implementation of the SDC Application is anticipated to have a profound impact on the university's disciplinary processes and overall learning environment. The transition to a streamlined, technology-driven system is expected to enhance efficiency, transparency, and fairness in managing disciplinary cases. Real-time updates and communication tools will facilitate quicker responses to issues, leading to more timely and effective resolutions. Ultimately, the positive outcome of this study would contribute to creating a conducive learning environment for all students, where disciplinary matters are handled with increased effectiveness and transparency amongst the academic/administrative.

* 1. **Statement of Problem**

The current paper-based approach to handling disciplinary activities by the Student Disciplinary Committee (SDC) poses several challenges. Inefficiency is a significant issue, as manual processes lead to delays in case creation, documentation, and resolution, impacting the overall efficiency of the committee. Transparency issues arise due to a lack of real-time communication, hindering the committee's ability to promptly address and analyze disciplinary cases. Additionally, delayed processes, cumbersome paperwork, and documentation challenges make it difficult to manage and organize paper documents, affecting the effectiveness of case management. Communication gaps further limit real-time updates, making it challenging for the committee to stay informed about the status of cases. These limitations collectively compromise the overall effectiveness of the disciplinary process, emphasizing the need for a transition to a more streamlined and technologically driven approach, such as the proposed Student Disciplinary Committee (SDC) Application.

**Principles and Theories:**

1. **User-Centered Design:** UCD is a multidisciplinary design approach that relies on user participation to enhance comprehension of task and user requirements, as well as iterative design and evaluation (Mao et al., 2005). The application will adhere to principles of user-centered design, incorporating feedback from both students and committee members to ensure usability and effectiveness.

2. **Agile Methodology:** Agile software development methodologies have been widely adopted and experimented with as it has been found to be a great practice better applications (Esfahani & Yu, 2010). The development process will follow agile principles, allowing for iterative improvements based on continuous feedback and evolving needs.

3. **Transparency and Accountability:** The application aligns with principles of transparency and accountability in organizational management, providing clear communication channels and documentation throughout the disciplinary process.

4. **Technology Adoption Theory:** The users are more likely to embrace effective use of new technologies if it is perceived as easy to use, provides clear advantages, and enhances their current practices.

5. **Conflict Resolution Theories:** The application's features for scheduled hearings and opportu nities for appeal draw on principles of conflict resolution theories, aiming to facilitate fair and effective resolution of disciplinary matters.

* 1. **Research Question**

How can the implementation of the Student Disciplinary Committee (SDC) Application enhance the management of disciplinary cases within the university, addressing the current limitations of the paper-based system and fostering transparency, efficiency, and fair resolution?

The study aims to investigate the effectiveness of introducing a digital platform to streamline disciplinary processes, with a focus on user experience, transparency, and accountability. The primary purpose is to identify and implement improvements that contribute to a more efficient and equitable management of disciplinary cases, ultimately creating a conducive learning environment for all students.

**1.4 Aim and Objectives**

**Aim:**

To develop a Student Disciplinary Committee (SDC) Application that enhances the management of disciplinary cases within the university.

**Objectives:**

1. To acquire information on the internal events of the SDC and be present for scheduled case hearings all to gain more insight about the internal operations of the committee.

2. To integrate the frontend and the backend using the t3 stack in a mono repository.

3. To design a user-friendly application that has a good looking user interface, friendly response to user actions, subtle animations and very few amounts of clicks to navigate to your desired destination all using the Figma Software.

4. To implement the SDC Application using HTML, CSS, Next.js, TailwindCSS and the backend using TRPC (Typescript Remote Procedure Calls) and the database using Planetscale MySQL serverless database.

5. To test the SDC Application using Jest.

5. To deploy the application on a server-less platform such as vercel

* 1. **Significance of the Study**

The Student Disciplinary Committee (SDC) Application holds immense significance in revolutionizing the management of disciplinary cases within educational institutions. Its key importance lies in addressing the shortcomings of the current paper-based system. The application enhances efficiency by streamlining case creation, documentation, and resolution processes, overcoming the delays and inefficiencies associated with manual methods. Furthermore, the SDC Application promotes transparency through real-time updates, scheduled hearings, and secure document storage, addressing the communication gaps present in the traditional approach. By leveraging technology, the application ensures a fair and effective resolution of disciplinary matters, contributing to a positive learning environment for all students. Overall, the SDC Application is a transformative tool that not only simplifies administrative tasks but also upholds transparency and accountability, fostering an improved disciplinary process.

**1.6 Scope of Study**

The scope of this study is centered around the implementation and impact assessment of the Student Disciplinary Committee (SDC) Application within the university environment. The study encompasses the development, deployment, and evaluation phases of the application. The geographical scope is limited to the university campus, where the application will be tested and refined based on user feedback.

Note:

1. **Application Development:** The study involves the design, development, and deployment of the SDC Application, ensuring its compatibility with the existing university systems.

2. **User Feedback and Refinement:** Feedback from both SDC committee members and offenders is a crucial aspect. The study includes mechanisms for collecting, analyzing, and incorporating feedback to enhance the application's functionality and user experience.

3. **Evaluation of Impact:** The study assesses the impact of the SDC Application on the efficiency, transparency, and fairness of the disciplinary process. Key performance indicators will be used to measure the success of the application.

4. **In-Campus Cases:** The study is confined to disciplinary cases that occur within the university premises. Cases related to off-campus incidents fall outside the scope of this research.

5. **Legal Framework:** While the application aims to enhance fairness in disciplinary proceedings, the study does not delve into the legal intricacies associated with disciplinary matters.

6. **External System Integration:** The scope is limited to the standalone functionality of the SDC Application within the university's administrative framework. Integration with external systems is excluded from this study.

**1.7 Organization of the Study**

Chapter one is the study’s introduction that includes information on its background, scope, significance, goal, aims and objectives.

Chapter two deals with the basic analysis in literature review of the project dealing with the introduction of the research topic, historical context of the topic, key concepts, methodologies used and research design and theoretical contributions.

Chapter three incorporates the system/project and research design methodology which includes the approaches to research, hypothesis and research question, software development methodology and various data collection schemes.

Chapter four deals with implementation and testing of the system comprising of its database, unit testing, usability testing and deeper discussions about the project.

Chapter five basically rounds up the project in conclusion, with summary and various recommendations and all references.

**1.8 Acronyms**

SDC: Student Disciplinary Committee

UCD: User-Centered Design

**1.9 Definition of operational terms**

**T3 Stack**: is a popular combination of 6 major technologies for building efficient, type safe web applications (Hung, 2023). These 6 major technologies are Typescript, Tailwind CSS, Next.js, Next-Auth, Prisma or Drizzle ORM and Planetscale MySQL serverless database.

**CHAPTER TWO**

**LITERATURE REVIEW**

* 1. **Introduction to the Research Topic**

The research area for this study focuses on revolutionizing disciplinary processes within educational institutions through the implementation of a technologically-driven solution, embodied in the proposed Student Disciplinary Committee (SDC) Application. Acknowledging the historical challenges posed by paper-based disciplinary systems, the study delves into the critical role played by the Student Disciplinary Committee (SDC) in maintaining a conducive and disciplined environment within universities. The current manual approach, characterized by delayed processes, error-prone documentation, and limited accessibility to case information, necessitates a shift towards a more efficient and transparent system. Drawing on key concepts such as User-Centered Design, Agile Methodology, Transparency, and Accountability, the research aims to develop an application that not only streamlines case creation, resolution, and communication but also enhances the overall fairness and effectiveness of disciplinary procedures. The literature review provides a foundation by examining historical contexts, key concepts, methodologies, and theoretical contributions related to the intersection of technology and disciplinary processes in educational settings. The subsequent chapters will further explore the research methodologies, system design, implementation, and evaluation of the SDC Application, with a focus on creating a positive learning environment for all students.

The significance of this research lies in several key aspects:

1. **Efficiency Enhancement:** The application aims to streamline and expedite disciplinary processes, eliminating the delays and inefficiencies inherent in manual record-keeping. This contributes to a more responsive and timely resolution of disciplinary cases, promoting a conducive learning environment.

2. **Transparency and Accountability:** By incorporating features such as real-time updates, scheduled hearings, and secure document storage, the SDC Application is set to enhance the disciplinary procedures. This not only addresses communication gaps but also ensures a fair and transparent resolution of cases.

3. **Positive Learning Environment:** The ultimate goal of the research is to foster a positive learning environment for all students. The application's ability to handle disciplinary matters efficiently and fairly contributes to reducing disruptions, maintaining discipline, and creating a supportive atmosphere for academic and personal growth.

4. **User-Centered Design:** The application's adherence to User-Centered Design principles ensures that it is user-friendly and aligns with the needs of both committee members and students involved in disciplinary cases.

5. **Technological Innovation:** The research introduces a technological solution by leveraging the T3 stack, consisting of Typescript, Tailwind CSS, Next.js, JWT-Authentication, DrizzleORM, and Planetscale.

6. **Research Contributions:** The study contributes to the existing body of literature by addressing the limitations of paper-based disciplinary systems and presenting a comprehensive technological solution.

**Objectives:**

1. To acquire information on the internal events of the SDC and be present for scheduled case hearings, all to gain more insight about the internal operations of the committee.

2. To integrate the frontend and the backend using the T3 stack in a mono repository.

3. To design a user-friendly application with a visually appealing user interface, responsive interactions, subtle animations, and minimal clicks for navigation, utilizing the Figma software.

4. To implement the SDC Application using HTML, CSS, Next.js, Tailwind CSS, and the backend using TRPC (Typescript Remote Procedure Calls) and the database using Planetscale.

5. To test the SDC Application using Jest.

6. To deploy the application on a server-less platform using vercel.com.

* 1. **Historical Context of the Research Topic**

The historical development of this area of study / research has witnessed various studies addressing technology application, development of web-based applications, and the integration of advanced technologies in police management. While the focus of these studies is on law enforcement, they offer valuable insights into technology's role in organizational management, an aspect that aligns with the development of the SDC Application.

**Research 1: Technology application and police management: issues and challenges (Liou K. T., International Journal of Organization Theory and Behavior, 2019)**

This study delves into critical issues and challenges associated with the application of technology to improve police organizations' management. It reviews the background of the police service model, the development of police-related technology, and their relationship with police performance measures. The findings emphasize the need to examine technology application from a broad perspective, considering not only operational issues but also organizational, management, community, and policy concerns. This research is foundational in highlighting the complexities and multifaceted nature of technology implementation in organizational settings, providing a framework for understanding the challenges and opportunities.

**Research 2: Research on Intelligent Mobile Police Application Based on 5G Technology (Cui C., Zhou G., Chen C., 2022 IEEE International Conference on Electrical Engineering, Big Data and Algorithms, EEBDA 2022)**

This conference proceedings paper explores the integration of 5G technology, big-data analysis, artificial intelligence, and intelligent monitoring equipment in mobile police applications. The study anticipates significant improvements in public safety, especially in scenarios with zero delay tolerance requirements and large population density. The research emphasizes the transformative potential of advanced technologies in enhancing daily police management and securing mega events. While the focus is on law enforcement, the integration of advanced technologies aligns with the broader theme of this research, showcasing the potential for technology-driven improvements in organizational processes.

* 1. **Key Concepts and Definitions**

1. **Student Disciplinary Committee (SDC):** The Student Disciplinary Committee is a key component within educational institutions responsible for addressing violations of established rules and regulations by students. It is typically composed of faculty members, administrators, and sometimes students, led by a senior faculty member or experienced administrator (Blandford, 1998).

2. **User-Centered Design (UCD):** User-Centered Design is a multidisciplinary design approach that emphasizes user participation to enhance comprehension of task and user requirements. It involves iterative design and evaluation processes, ensuring usability and effectiveness (Mao et al., 2005).

3. **Agile Methodology:** Agile software development methodologies involve an iterative and flexible approach, allowing for continuous feedback and adaptation to evolving needs (Esfahani & Yu, 2010). This methodology is adopted for the development of the SDC Application.

4. **CIA Triad:** The CIA Triad represents the core principles of cybersecurity, including Confidentiality, Integrity, and Availability. It ensures that data is kept private, accurate, and accessible only to authorized users when needed.

5. **Defense-in-Depth:** Defense-in-Depth is a cybersecurity model that emphasizes the use of multiple layers of security controls to protect systems and data. It includes network security, access controls, encryption, and intrusion detection (Cichonski et al., 2012).

6. **NIST Cybersecurity Framework:** Developed by the National Institute of Standards and Technology (NIST), this framework provides guidelines for organizations to manage and reduce cybersecurity risk. It consists of five core functions: Identify, Protect, Detect, Respond, and Recover (NIST, 2018).

7. **Zero Trust Security:** Zero Trust is a cybersecurity model that assumes no entity, whether inside or outside the organization, can be trusted by default. It requires continuous authentication and authorization for all users and devices.

8. **T3 Stack:** The T3 stack is a combination of Typescript, Tailwind CSS, Next.js, Next-Auth, Prisma or Drizzle ORM, and Planetscale MySQL serverless database. It provides a modern and efficient technology stack for building web applications (Hung, 2023).

9. **Student Handbook:** A set of rules and guidelines established by an educational institution to govern the behavior and actions of its students. The code of conduct outlines expected standards and disciplinary procedures for maintaining a respectful and safe environment.

10. **Paper-Based System:** Refers to the traditional method of managing disciplinary affairs using physical documents, paperwork, and manual record-keeping. The challenges associated with this system include delays, inefficiencies, transparency issues, and difficulties in information retrieval.

11. **SDC Application:** The proposed technological solution designed to streamline and enhance the management of disciplinary cases within the university. The application aims to replace the paper-based system, offering real-time updates, secure document storage, and efficient communication tools.

12. **Efficiency:** In the context of the SDC Application, efficiency refers to the ability of the system to expedite case creation, documentation, and resolution processes. The goal is to minimize delays, reduce paperwork, and improve the overall speed of the disciplinary procedures.

13. **Transparency:** A key principle underlying the SDC Application, transparency involves clear communication channels and documentation throughout the disciplinary process. Real-time updates, scheduled hearings, and secure document storage contribute to a transparent system.

14. **Fair Resolution:** Ensuring equitable outcomes in disciplinary matters. The SDC Application incorporates features aligned with conflict resolution theories to facilitate fair and effective resolutions during scheduled hearings and appeal processes.

* 1. **Review of Related Literature**

1. **Early Studies on Discipline Management in Schools (Blandford, 1998):**

Early studies laid the foundation by emphasizing the importance of discipline management in successful schools. Blandford (1998) highlighted the challenges and significance of maintaining discipline in educational settings, setting the historical context for later research.

2. **Introduction of User-Centered Design Principles (Mao et al., 2005):**

The introduction of User-Centered Design (UCD) principles marked a significant shift in research focus. Mao et al. (2005) explored UCD as a multidisciplinary approach, emphasizing user participation and iterative design processes. This thematic shift demonstrated a growing recognition of the importance of user experience in educational systems.

3. **Adoption of Agile Methodologies (Esfahani & Yu, 2010):**

As technology advanced, the adoption of agile methodologies became a prominent theme. Esfahani and Yu (2010) discussed the widespread adoption and experimentation with agile methodologies in software development. This chronological progression showcases a shift towards more flexible and adaptive approaches in designing educational systems.

4. **Technological Innovation with T3 Stack (Hung, 2023):**

The introduction of the T3 stack, a combination of Typescript, Tailwind CSS, Next.js, Next-Auth, Prisma or Drizzle ORM, and Planetscale MySQL serverless database, represents a contemporary milestone. Hung (2023) discussed the popularity and efficiency of the T3 stack, demonstrating a shift towards modern and robust technology stacks in educational technology development.

**2.5 Methodologies and Research Designs**

**1.** **Qualitative Case Studies on Discipline Management (Blandford, 1998):**

Early studies, such as those conducted by Blandford (1998), often employed qualitative case studies to explore the challenges and dynamics of discipline management in educational institutions. This method allowed for in-depth exploration and understanding of specific disciplinary cases. Strengths included rich contextual insights, but weaknesses involved potential subjectivity and limited generalizability.

**2. User-Centered Design Research (Mao et al., 2005):**

Studies focusing on User-Centered Design (Mao et al., 2005) often utilized qualitative research methods, including user interviews, usability testing, and iterative prototyping. These methods allowed researchers to gain a deep understanding of user needs and preferences. Strengths included user involvement and iterative improvements, but potential weaknesses included the subjectivity of user opinions and resource-intensive nature.

**3.** **Agile Software Development Research (Esfahani & Yu, 2010):**

Research on the adoption of Agile methodologies in software development (Esfahani & Yu, 2010) often involved quantitative methods, such as surveys and empirical studies analyzing project outcomes. Quantitative approaches provided measurable insights into the effectiveness of Agile practices. Strengths included statistical rigor, but potential weaknesses included oversimplification of complex processes and limited contextual understanding.

**4. Technological Innovation Research (Hung, 2023):**

Studies on technological innovations, like the T3 stack (Hung, 2023), often involved a combination of qualitative and quantitative methods. This could include surveys to assess developers' perceptions and preferences, as well as qualitative interviews to understand implementation challenges. Strengths included a holistic understanding, but weaknesses might involve the potential for conflicting results from different data sources.

**2.6 Empirical Studies**

**DISCIPLINARY ACTION COMMITTEE (DAC) (Notar, 2009)**

The research conducted by Notar (2009) employed a quantitative approach, surveying 62 students, faculty, and administrators involved in disciplinary processes. The study utilized structured questionnaires to gather data on the challenges faced by the disciplinary committee.

Findings highlighted significant delays in the current paper-based system, with over 70% of respondents expressing dissatisfaction with the efficiency. Lack of transparency was identified as a major concern, affecting both students and committee members.

**University Disciplinary Process: What's fair, What's Due, and What You Don't Get (Picozzi, 2020)**

In a longitudinal study by Picozzi. (2020), a mixed-methods approach was employed to assess the impact of disciplinary procedures on students' academic performance. Data were collected through both interviews and academic performance records.

The research demonstrated a correlation between prolonged disciplinary processes and a decline in academic performance. The longer the duration of the case resolution, the greater the negative impact on students' overall academic outcomes.

**Processes for resolving student disciplinary matters (Wilson, 2020)**

Wilson (2020) conducted a comparative analysis of universities that had implemented digital disciplinary management systems and those still relying on traditional paper-based approaches. Surveys and document analysis were employed.

Universities with digital systems exhibited improved efficiency, transparency, and stakeholder satisfaction. The reduction in case resolution time and enhanced communication were significant contributors to the positive outcomes.

**2.7 Conceptual Frameworks**

While the research on the development of the Student Disciplinary Committee (SDC) Application does not explicitly reference a specific conceptual framework, it draws on key theoretical principles and models that inform its design and implementation. The following conceptual frameworks and models play a significant role in guiding the research process:

1. **User-Centered Design (UCD):**

The application of User-Centered Design principles serves as an overarching conceptual framework. UCD emphasizes understanding user needs, involving users in the design process, and iteratively refining designs based on user feedback (Mao et al., 2005). In previous research, UCD has been applied in educational technology contexts to enhance usability and user satisfaction. It informs the SDC Application's design by ensuring that the system aligns with the needs and preferences of both the Student Disciplinary Committee members and the students involved in disciplinary cases.

2. **Agile Methodology:**

The adoption of Agile methodologies in the development process provides a conceptual framework for iterative and flexible project management (Esfahani & Yu, 2010). Agile principles, such as continuous feedback, collaboration, and adaptability, have been widely applied in software development. In the context of educational technology, Agile methodologies contribute to the responsiveness of the development process, allowing for ongoing improvements based on user feedback.

**3. Cybersecurity Principles (CIA Triad, Defense-in-Depth, NIST Framework):**

While not explicitly framed as a conceptual framework, the incorporation of cybersecurity principles provides a theoretical structure for safeguarding the application. The CIA Triad (Confidentiality, Integrity, and Availability), Defense-in-Depth, and the NIST Cybersecurity Framework guide the implementation of security measures in the SDC Application. Previous research in cybersecurity emphasizes these principles to protect systems and data, aligning with the goal of ensuring the confidentiality, integrity, and availability of disciplinary information.

**4. Technology Adoption Theory:**

The conceptual framework of Technology Adoption Theory guides the development process by considering the users' perceptions and acceptance of new technologies (Rogers, 1995). In previous research, this theory has been applied to understand how users embrace and integrate technological innovations. In the context of the SDC Application, the theory helps in designing a system that is user-friendly, perceived as advantageous, and aligns with the existing practices of the Student Disciplinary Committee.

**2.8 Debates and Controversies**

1. **Balancing Transparency and Privacy:**

Literature provides insights into the ongoing debate between transparency and privacy, such as the case of the European Digital Identity by Mooij (2023). The struggle to find a balance is exemplified in the legal judgment regarding the accessibility of the Ultimate Beneficial Ownership registry. The court acknowledged the importance of transparency but deemed the wide accessibility as disproportionate. This debate raises questions about how to strike a balance between the two, especially in the context of digital identity systems.

2. **Effectiveness of Technology in Disciplinary Processes:**

There is a need to critically evaluate the effectiveness of technology in disciplinary processes, and literature on the impact of information communication technology (ICT) on individuals (Wang et al., 2020) adds to this discussion. The study emphasizes that ICT affects employees by shaping job demands, autonomy, and relational aspects. The effectiveness of introducing technology in disciplinary proceedings may depend on how well it aligns with the work design aspects and user-technology fit factors.

3. **Resistance to Technological Change:**

Stewart's work (1957) on resistance to technological change highlights the historical perspective of the issue. The paper argues that the resistance problem has not been adequately addressed because important background factors influencing resistance have been overlooked. Understanding why, when, and where technological change is resisted is crucial for implementing successful technological solutions, especially in contexts where traditional systems are deeply ingrained.

**Gaps and Limitations:**

Wang et al. (2020) provide a comprehensive framework on how ICT influences work design aspects, yet there is a gap in the literature concerning the specific implications of ICT on the student disciplinary processes. The unique nature of educational institutions requires a dedicated examination of how technology impacts disciplinary frameworks and the student experience.

**How This Study Will Address These Gaps:**

The research on the Student Disciplinary Committee (SDC) Application aims to bridge these gaps by providing a context-specific exploration of how technology can be effectively introduced into educational disciplinary processes. By addressing the unique challenges of transparency, privacy, and resistance to technological change in educational settings, the aim of the study is to contribute valuable insights for improving disciplinary procedures in academic institutions. Additionally, focusing on the development and implementation of the SDC Application provides a practical solution to the limitations identified in the existing literature.

**2.9 Theoretical Contributions**

This research significantly advances the theoretical framework of the educational technology and discipline management field by providing practical insights and innovative solutions. Integrating User-Centered Design (UCD) principles, Agile methodologies, and cybersecurity principles, the development of the Student Disciplinary Committee (SDC) Application serves as a model for applying established theories in a real-world educational context. By emphasizing the comprehensive integration of technology throughout the disciplinary process, including case creation, resolution, communication, and information retrieval, the study contributes to a more nuanced understanding of how technology can streamline and enhance disciplinary procedures. Furthermore, the research enriches the theoretical landscape by conducting a thorough exploration of stakeholder perspectives, ensuring a holistic view of user experiences. This holistic approach not only advances theoretical understanding but also offers a practical blueprint for the development and implementation of disciplinary technology, setting a precedent for future research and technological advancements in the field.

**2.10 Methodological Contributions**

This research will contribute to methodological advancements in the field by showcasing a comprehensive and iterative approach to the development and implementation of educational technology. The utilization of a diverse set of research methods, including user interviews, focus groups, case studies, observations, and document analysis, aligns with the multidimensional nature of the educational disciplinary context. Furthermore, the integration of a well-defined interview protocol, a strategic sampling strategy, and a meticulous transcription and analysis process for qualitative data ensures the robustness and reliability of the research findings. Additionally, the adoption of the Agile software development methodology for building the Student Disciplinary Committee (SDC) Application introduces a dynamic and adaptive approach, contributing methodological insights to the realm of educational software development. By amalgamating diverse research methods and embracing an agile approach, this research sets a methodological precedent for future studies seeking to address multifaceted challenges in educational technology implementation and development.

**2.11 Practical Implications**

Previous research in discipline management and educational technology has underscored the challenges posed by paper-based systems, emphasizing the need for technologically-driven solutions. Practical implications of this research include the recognition that outdated approaches hinder the transparency and efficiency of disciplinary procedures, affecting the overall learning environment. The proposed Student Disciplinary Committee (SDC) Application carries significant practical significance by addressing these shortcomings. By streamlining processes, enhancing transparency, and incorporating modern technologies, the application aims to revolutionize disciplinary affairs in educational institutions. The real-world application of the SDC Application offers a tangible solution to the identified challenges, providing a user-friendly platform that promotes timely case resolution, secure document storage, and effective communication. This practical implementation aligns with the overarching goal of creating a conducive learning environment by ensuring fair, transparent, and efficient disciplinary processes.

**2.12 Regional or Contextual Variations**

While the provided research studies focus on technology applications in police management, their findings may vary across different regions, contexts, or populations due to variations in legal frameworks, cultural norms, and technological infrastructure. Liou's examination of technology application in police organizations emphasizes the importance of addressing cultural and organizational factors, suggesting that the acceptance and effectiveness of technology could differ based on specific regional or institutional characteristics (Liou, 2019). Similarly, Cui et al.'s exploration of intelligent mobile police applications based on 5G technology may encounter variations in implementation success depending on the level of technological infrastructure and regulatory frameworks in different regions (Cui et al., 2022). These regional and contextual differences are considered when applying the findings of these studies to the development of the Student Disciplinary Committee (SDC) Application, ensuring that the technology aligns with the specific needs and conditions of the educational environment and its stakeholders.

**2.13 Related Works**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **Name** | **Title** | **Method** | **Findings** | **Limitation** |
| 1 | Diego L. Villarreal (2021) | Students Constitutional Rights and The University Disciplinary Committee | Qualitative Case Studies |  |  |
| 2 | Karlesky and Stephenson (1971) | Student Disciplinary Proceedings: Some Preliminary Questions | User Interviews |  |  |
| 3 | Smith R. Reddick. (2020) | Due Process Rights in Student Disciplinary Matters | Surveys |  |  |
| 4 | J. Crim. L. & Penal Stud (2019) | The Authority of Disciplinary Committee for Students to Oblige Third Parties to a Specific Behavior | Qualitative Case Studies |  |  |
| 5 | Notar (2009) | DISCIPLINARY ACTION COMMITTEE (DAC) | Empirical Studies |  |  |
| 6 | Julia pedley (2007) | THE DEVELOPMENT OF A STUDENT CONTRACT AND IMPROVEMENT IN STUDENT DISCIPLINARY PROCEDURES AT MASSEY UNIVERSITY | Qualitative Case Studies |  |  |
| 7 | Michael Heyman (2022) | Some Thoughts on University Disciplinary Proceedings | User Interviews |  |  |
| 8 | James M. Picozzi. (2020) | University Disciplinary Process: What's fair, What's Due, and What You Don't Get | User Interviews |  |  |
| 9 | Bayrami (2020) | A Comparison of Personality Characteristics and Coping Strategies in Students with Record in Disciplinary Committee of University and Normal Students | Surveys |  |  |
| 10 | Ige (2016) | Factors influencing disciplinary committee effectiveness: the case of universities in Ondo State, Nigeria | Qualitative Case Studies |  |  |
| 11 | Peter J.O. Aloka & Olaniyi Bojuwoye. (2023) | Gender differences in decisions on student disciplinary behaviors by disciplinary panels of selected Kenyan secondary schools | Literature Review |  |  |
| 12 | Edward N. Stoner II & Bradley J. Martineau (2019) | Disciplinary and Academic Decisions Pertaining to Students in Higher Education | Qualitative Case Studies |  |  |
| 13 | Papadakis et al. (2004) | Unprofessional Behavior in Medical School Is Associated with Subsequent Disciplinary Action by a State Medical Board | Qualitative Case Studies |  |  |
| 14 | Wilson (2020) | Processes for resolving student disciplinary matters | Literature Review |  |  |
| 15 | Tamu K. Walton (2019) | Protecting Student Privacy: Reporting Campus Crimes as an Alternative to Disclosing Student Disciplinary Records | Literature Review |  |  |

**CHAPTER THREE**

**SYSTEM DESIGN AND METHODOLOGY/RESEARCH METHODOLOGY**

* 1. **Research Approach**

In the system planning phase, incorporating qualitative research approaches, such as interviews and case studies, can be invaluable for gaining a deeper understanding of user needs, requirements, and potential challenges. Here's how the qualitative research approach can be applied during the system planning phase:

The research employs a multifaceted approach to comprehensively investigate and understand the current challenges and dynamics of the Student Disciplinary Committee (SDC) and its processes:

**1. User Interviews:** Conducting one-on-one or group interviews with key stakeholders, including SDC members, administrators, and students. This aims to gather qualitative insights into existing challenges, expectations for a new system, and specific desired features. The benefits include in-depth exploration of individual experiences and perspectives, offering nuanced information.

**2. Focus Groups:** This involves organizing focus group sessions with committee members, administrators, and students to encourage group discussions on disciplinary procedures. The purpose is to uncover shared opinions, identify common pain points, and stimulate group dynamics for new insights. The collaborative environment of focus groups allows participants to build upon each other's ideas, generating a comprehensive understanding of the issues.

**3. Case Studies:** The objective is to analyze existing disciplinary cases through a detailed case study approach. This aims to identify patterns, bottlenecks, and variations in the current processes, including the lifecycle of a case. The benefits of case studies lie in providing a real-world context, helping the project team uncover intricacies and make informed decisions during planning.

**4. Observations:** Firsthand observation of current disciplinary proceedings to understand day-to-day operations, interactions, and challenges faced by committee members and stakeholders. Observations offer a holistic perspective, revealing aspects of the process that might not be explicitly communicated during interviews or focus groups.

**5. Document Analysis:** Reviewing existing documents, reports, and records related to disciplinary cases. This aims to understand the paperwork involved, the nature of documentation, and potential areas for improvement. Document analysis can reveal inefficiencies or gaps in the current documentation process, informing the planning of a more streamlined system.

* 1. **Research Questions and Hypothesis**

1. How does the current paper-based approach to managing disciplinary affairs by the Student Disciplinary Committee (SDC) impact the efficiency and effectiveness of the disciplinary process within the university?

2. What are the specific challenges and limitations faced by the SDC in the existing manual system, particularly in terms of transparency, communication, and responsiveness?

3. How can the implementation of the proposed Student Disciplinary Committee (SDC) Application address the identified challenges and improve the overall management of disciplinary cases?

4. What are the expectations and preferences of key stakeholders, including SDC members, administrators, and students, regarding the features and functionalities of a technologically-driven solution for disciplinary processes?

5. How do user-centered design principles, agile methodology, and transparency and accountability theories contribute to the development and successful implementation of the SDC Application?

6. What impact is anticipated from the deployment of the SDC Application on the efficiency, transparency, and fairness of the university's disciplinary processes, and how can this impact be measured and evaluated?

7. In what ways does the SDC Application align with or diverge from existing technological frameworks and theories in the field of educational technology and disciplinary management?

* 1. **Research Design**

The research design for the SDC Application aligns more closely with the exploratory research design. This choice is motivated by the project's goal of understanding and discovering new aspects of software development, specifically in the context of enhancing the management of disciplinary cases within the university setting. The emphasis is on gaining insights, uncovering patterns, and informing the development of an innovative technological solution. The exploratory research design allows for flexibility and adaptability in exploring various dimensions of the disciplinary process and understanding the diverse perspectives of stakeholders.

* 1. **Software Development Methodology**

The selected software development methodology for this project is Agile. The Agile methodology is well-suited for the development of the Student Disciplinary Committee (SDC) Application as it emphasizes flexibility, iterative development, and continuous feedback, aligning with the exploratory nature of the research goals.

Adaptation of Agile Methodology to Specific Research Goals:

1. **Iterative Development:** The Agile methodology's iterative approach allows for the continuous refinement of the SDC Application based on evolving insights. Regular feedback from stakeholders, including committee members, administrators, and students, will be incorporated to ensure that the application aligns with their expectations and effectively addresses the identified challenges.

2. **User-Centered Design (UCD):** The principles of User-Centered Design are integral to Agile. The Agile approach allows for the incorporation of feedback from users at every stage of development. Regular usability testing and user feedback sessions will be conducted to ensure that the application's user interface and functionalities are intuitive and user-friendly.

3. **Collaborative Environment:** Agile promotes collaboration among cross-functional teams. In the case of the SDC Application, collaboration between developers, designers, and end-users (committee members and students) is crucial. Agile ceremonies like sprint planning, daily stand-ups, and sprint reviews will facilitate continuous communication and collaboration.

4. **Adaptability to Changing Requirements: Agile's** adaptability to changing requirements aligns well with the exploratory nature of the research. As new insights are gained through user interviews, focus groups, and other research methods, the Agile approach allows for the incorporation of these insights into the ongoing development process.

5. **Incremental Deliveries:** Agile's incremental approach enables the project team to deliver functional increments of the SDC Application in short cycles. This allows stakeholders to see tangible progress regularly, providing opportunities for feedback and adjustments.

* 1. **Data Collection Methods**

**Interview Protocol:**

Objective: The objective of the interviews is to gather qualitative insights into the challenges faced by the Student Disciplinary Committee (SDC) and stakeholders' expectations from the new SDC Application.

**Protocol:**

1. Participant Selection: Identify key stakeholders, including SDC committee members, administrators, and students. Ensure diverse representation to capture various perspectives.

2. Informed Consent: Begin with an introduction, explaining the purpose of the interview, assuring confidentiality, and obtaining informed consent.

3. Open-Ended Questions: Use open-ended questions to encourage participants to share their experiences and perspectives freely. Example questions may include:

- What challenges do you currently face in the disciplinary process?

- What features do you believe would enhance the effectiveness of the SDC Application?

4. Follow-up Probes: Use follow-up questions to delve deeper into specific issues raised by participants.

5. Recording: With participants' consent, record the interviews to ensure accurate capture of responses.

**Sampling Strategy:**

Objective: The sampling strategy aims to ensure representation from diverse perspectives within the university community.

**Strategy:**

1. Purposeful Sampling: Select participants purposefully based on their roles in the disciplinary process. This includes SDC committee members, administrators, and students involved in disciplinary cases.

2. Diversity: Ensure diversity in terms of gender, academic disciplines, and experiences to capture a comprehensive range of perspectives.

3. Saturation: Continue sampling until data saturation is reached, where new interviews provide limited additional insights.

**Transcription and Analysis:**

**Objective:** The transcription and analysis process aims to identify common themes, challenges, and expectations from the SDC Application.

**Process:**

1. Transcription: Transcribe recorded interviews verbatim, capturing nuances such as tone and emphasis.

2. Coding: Utilize thematic coding to identify recurring patterns and themes within the transcripts.

3. Categorization: Group codes into categories representing broader themes, such as "Challenges in Current Process" or "Desired Features."

4. Data Synthesis: Synthesize categorized data to develop a comprehensive understanding of stakeholders' perspectives.

5. Constant Comparison: Continuously compare new data with previously coded data to ensure consistency and refine emerging themes.

**Software:** Utilize qualitative data analysis software, such as NVivo or Dedoose, to facilitate efficient coding and analysis.

This interview protocol, sampling strategy, and analysis approach are designed to ensure a rich and diverse dataset, facilitating a comprehensive understanding of stakeholders' perspectives and informing the development of the SDC Application.

* 1. **Ethical Considerations**

Ethical considerations in this research are paramount, especially concerning participant privacy, informed consent, and data security. To address these concerns, strict adherence to ethical guidelines will be maintained throughout the study. Participant privacy will be safeguarded by anonymizing all data collected, ensuring that no personally identifiable information is disclosed in any publication or presentation. Informed consent will be obtained from all participants, clearly explaining the research purpose, procedures, and potential risks, and participants will be given the choice to withdraw from the study at any point without consequences. Additionally, explicit permission will be sought for the use of any direct quotes or identifiable information in publications. Data security measures will include the use of secure storage and backup systems to prevent unauthorized access, and all digital and physical research data will be protected with encryption and access controls. The research will strictly adhere to institutional review board (IRB) guidelines and ethical standards to ensure the highest level of ethical conduct throughout the entire research process.

* 1. **Tools & Software**

The research will utilize a combination of tools, software, and frameworks to effectively address its objectives:

1. **Figma for User Interface Design:** Figma which is a collaborative design tool, will be employed for designing the user interface of the Student Disciplinary Committee (SDC) Application. This tool allows for real-time collaboration and prototyping, ensuring a user-friendly and visually appealing design.

2. **Next.js, Tailwind CSS, and HTML for Frontend Development:** Next.js and Tailwind CSS will be used for the frontend development of the SDC Application, providing a robust and efficient framework for building responsive and scalable web applications. HTML will complement these technologies for structuring the application's frontend.

3. **TRPC (Typescript Remote Procedure Calls) for Backend Development:** TRPC, based on Typescript, will serve as the backend framework for building the SDC Application. This technology facilitates the development of type-safe APIs, enhancing the reliability and maintainability of the backend.

4. **Planetscale MySQL Serverless Database for Data Storage:** Planetscale MySQL will be employed as the database solution for the SDC Application. Its serverless architecture offers scalability and reliability for storing and managing data related to disciplinary cases.

5. **Jest for Testing:** Jest, a JavaScript testing framework, will be used to test the various components and functionalities of the SDC Application. This will ensure the application's reliability, robustness, and adherence to requirements.

6. **Vercel for Deployment:** Vercel, a serverless deployment platform, will be utilized for deploying the SDC Application. It provides a scalable and efficient hosting solution for web applications, ensuring accessibility and responsiveness.

7. **Axiom for Production Logging:** Axiom will be integrated for production logging in the SDC Application, enabling efficient monitoring and diagnostics, ensuring a robust and secure user authentication system.

These tools and frameworks are carefully chosen to align with the research goals, promoting efficiency, scalability, and the successful development and deployment of the Student Disciplinary Committee Application.

* 1. **Research Timeline**

Below is a timeline following the Agile methodology for the specified phases of this research. Note that the phases may overlap due to the application of Agile in the software development life cycle of the SDC Application:

**October 28, 2023 - June 28, 2024:**

**Data Collection:**

- Conduct initial literature review and refine research questions.

- Develop interview protocol and sampling strategy.

- Begin participant recruitment and conduct initial interviews.

- Simultaneously start collecting relevant documents and observational data.

- Refine data collected as things change.

- Validate findings through member checking.

**Design:**

- Develop a draft design for the Student Disciplinary Committee (SDC) Application.

- Iterate on the SDC Application design based on initial feedback.

- Collaborate with stakeholders to ensure design alignment with user needs.

**Implementation:**

- Begin coding the application based on the finalized design.

- Continue coding and develop key features of the SDC Application.

- Conduct regular sprint reviews and adapt the development plan as needed.

- Integrate user feedback.

**Testing:**

- Testing of application features.

- Integrating Github Actions to ensure peak product quality

**Deploy:**

- Deploy the SDC Application for a trial period.

**Reviewing:**

- Review application functionalities and make necessary adjustments.

- Monitoring the applications core web vitals to ensure the application is optimized and up to the required crux standard.

- Analyze the impact of the SDC Application on disciplinary processes through qualitative analysis.

- Work with vercels axiom.co integration to properly analyze applications activities.

* 1. **Data Analysis/Evaluation Plan**

To address the research questions and hypotheses, a mixed-methods approach combining qualitative and quantitative techniques will be employed. The data analysis plan is outlined as follows:

**Quantitative:**

- Survey data analysis using descriptive statistics to measure perceived efficiency and effectiveness.

- Comparative analysis of disciplinary process efficiency pre and post implementation.

- Pre and post implementation survey to measure changes in perceived challenges and improvements.

**Qualitative:**

- Thematic analysis of interview and focus group transcripts, identifying common challenges related to transparency, communication, and responsiveness.

- In-depth interviews and focus groups, employing thematic analysis to identify and categorize stakeholder expectations and preferences.

- Content analysis of design documents and stakeholder feedback, examining how user-centered design and agile methodology contribute to the application's development.

- Comparative analysis of the SDC Application features against existing technological frameworks in educational technology and disciplinary management.

- Content analysis of system usage data and participant feedback.

- Thematic analysis of participant feedback on the impact.

**Data Integration:**

- Integrating findings from quantitative surveys and qualitative analyses to provide a comprehensive understanding.

* 1. **Validity and Reliability**

**Quantitative Research (Surveys, Data Analysis):**

1. **Questionnaire Design:** Thorough review and pre-testing of the survey instrument to ensure clarity, relevance, and appropriateness of questions.

2. **Pilot Testing:** Conducting a pilot survey with a small sample to identify and address potential issues with question wording or response categories.

3. **Content Validity:** Ensuring that survey questions align with the research objectives and cover the relevant dimensions of the study.

4. **Reliability Measures:** Employing established reliability measures, such as internal consistency analysis (Cronbach's alpha), to assess the reliability of survey constructs.

5. **Random Sampling:** Employing random sampling techniques to enhance the generalizability of findings to the broader population.

6. **Data Verification:** Implementing double-entry verification for data accuracy and consistency.

**Qualitative Research (Interviews, Focus Groups, Thematic Analysis):**

1. **Interview Protocol:** Developing a well-defined interview protocol, aligning questions with research objectives, and ensuring clarity and neutrality.

2. **Prolonged Engagement:** Establishing prolonged engagement with the research context to build trust and rapport with participants, enhancing the depth of qualitative data.

3. **Member Checking:** Seeking feedback from participants on the accuracy and interpretation of their responses to enhance credibility.

4. **Peer Debriefing:** Regular debriefing sessions with a research team or peers to discuss emerging themes, interpretations, and potential biases.

5. **Triangulation:** Utilizing multiple data sources (interviews, focus groups, document analysis) to enhance the trustworthiness of findings through triangulation.

6. **Thematic Analysis Reliability:** Employing inter-coder reliability measures for consistency among researchers involved in thematic analysis.

**Overall Strategies:**

1. **Researcher Reflexivity:** Acknowledging and documenting the researcher's potential biases and perspectives to enhance transparency.

2. **Clear Documentation:** Maintaining clear and comprehensive documentation of research processes, decisions, and changes.

**Ethical Considerations:**

1. **Informed Consent:** Making sure participants are fully informed about the study's purpose, and procedures.

2. **Confidentiality:** Protecting participant confidentiality through anonymization and secure data storage.

* 1. **Data Presentation**

1. **Textual Presentation:**

Clear and detailed textual descriptions will accompany the presentation of each research finding, providing context, interpretations, and implications. Organizing findings in a structured format, with sections and subsections corresponding to each research question or objective.

2. **Tables:**

Using tables to present summarized quantitative data, key metrics, or comparisons. This should facilitate transparency and allow readers delve into specific aspects of the findings.

3. **Charts and Graphs:**

Utilizing charts and graphs (e.g., bar charts, line graphs) for visual representation of quantitative trends, patterns, or comparisons.

* 1. **Research Methodology for Software Development**

**Project Objectives and Research Questions:**

1. **Impact of Current System:**

- Question: How does the existing paper-based approach within the Student Disciplinary Committee impact the efficiency and effectiveness of the university's disciplinary process?

- Objective: Gain firsthand insight into the challenges and inefficiencies of the current system through active participation in SDC events.

2. **Challenges and Limitations:**

- Question: What are the specific challenges and limitations faced by the SDC in the manual system, particularly related to transparency, communication, and responsiveness?

- Objective: Identify areas for improvement by understanding the practical challenges faced by the committee in the current manual system.

3. **Implementation Impact:**

- Question: How can the proposed SDC Application address the identified challenges and enhance the overall management of disciplinary cases?

- Objective: Evaluate the impact and effectiveness of the application in addressing identified challenges and streamlining processes.

4. **Stakeholder Expectations:**

- Question: What are the expectations and preferences of key stakeholders, including SDC members, administrators, and students, regarding the features of a technologically-driven solution?

- Objective: Inform the application design based on stakeholder expectations and preferences, ensuring alignment with user needs.

5. **Contributions of Methodologies:**

- Question: How do user-centered design principles, agile methodology, and transparency and accountability theories contribute to the development and successful implementation of the SDC Application?

- Objective: Examine the practical application and contributions of these methodologies in the context of educational technology development.

6. **Impact Measurement:**

- Question: What impact is anticipated from the deployment of the SDC Application on the efficiency, transparency, and fairness of the university's disciplinary processes, and how can this impact be measured and evaluated?

- Objective: Establish measurable criteria to assess the application's impact and effectiveness in achieving desired outcomes.

7. **Alignment with Technological Frameworks:**

- Question: In what ways does the SDC Application align with or diverge from existing technological frameworks and theories in the field of educational technology and disciplinary management?

- Objective: Situate the SDC Application within the broader technological landscape, identifying synergies and distinctive features.

* 1. **Software Development for the SDC Application**

**3.13.1 System Design and Methodology:**

The system design and methodology of the Student Disciplinary Committee (SDC) Application follow a user-centric and agile approach. The methodology involves iterative cycles, incorporating user feedback at various stages to ensure the application meets the specific needs of stakeholders. The system design focuses on modularity, scalability, and a seamless user experience. Agile principles guide the development process, allowing for adaptability to evolving requirements and ensuring the efficient implementation of features in alignment with the overarching goals.

**3.13.2 Review of Methodologies:**

Several methodologies were reviewed, including Waterfall, Scrum, Kanban, and Lean. Waterfall, while structured, was deemed too inflexible for the dynamic requirements of the educational environment. Scrum and Kanban were considered but lacked the depth needed for this comprehensive project. Lean, emphasizing efficiency and waste reduction, influenced certain aspects. However, the chosen approach aligns closely with the iterative and user-focused principles of Agile, ensuring responsiveness to user needs and continuous improvement.

**3.13.3 Adopted/Adapted Methodology:**

The adopted methodology for the SDC Application is Agile, emphasizing user collaboration, flexibility, and incremental progress. This decision stems from the need for constant stakeholder involvement, given the diverse user groups involved – SDC members, administrators, and students. Agile allows for iterative enhancements, incorporating feedback promptly. The methodology aligns seamlessly with the user-centered design principles essential for the success of an educational technology application.

**3.13.4 System Modelling:**

1. **Use Case Diagram:** Illustrating interactions between users and the system.

2. **Activity Diagram:** Describing the workflow and sequence of activities within the application.

3. **Class Diagram:** Depicting the relationships and structure of classes, facilitating a clear understanding of the application's data model.

**3.13.5 System Requirements:**

The system requirements are classified into functional and non-functional categories. Prioritization is done using the MoSCoW method, ensuring clarity on essential features. Functional requirements encompass case creation, real-time updates, document management, and secure user authentication. Non-functional requirements include data security, system responsiveness, and scalability. MoSCoW priorities guide the development process, emphasizing critical features to meet user needs effectively.

**3.13.6 Interface Design:**

The interface design of the SDC Application prioritizes a user-friendly experience. Figma is employed for design mock-ups, ensuring a visually appealing and intuitive interface. The design adheres to user-centered principles, minimizing user interactions for seamless navigation. The interface aligns with stakeholders' expectations, fostering user satisfaction.

**3.13.7 Database Schema Design:**

The database schema design is crafted using dbdiagram.io, ensuring a structured and efficient data model. It encompasses tables for users, cases, school, and other relevant entities, promoting data integrity and optimal retrieval. The design supports the application's functionality and aligns with best practices for secure and scalable database management.

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