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A REPORT ON FIELD ATTACHMENT/ INTERNSHIP AT UGANDA ELECTRICITY TRANSMISSION COMPANY LIMITED

Field Attachment Period 14th June to 4th August

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21/U/05126/PS

Field attachment Report submitted to the School of computing and Informatics Technology In Partial fulfilment of the requirements for the degree of Bachelor of Science in Computer Science of Makerere University Kampala

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Declaration

I, Mugumbya Benon, hereby declare that the report titled "A Report on Field Attachment/Internship at Uganda Electricity Transmission Company Limited" is my original work and has been prepared by me in fulfillment of the requirements of Intership Placement at Makerere University. I further confirm that all the information presented in this report is based on my personal experiences, observations, and research during my field attachment/internship period at Uganda Electricity Transmission Company Limited (UETCL).

Throughout the preparation of this report, I have made every effort to ensure that the work is entirely my own and reflects an honest representation of my time and interactions at UETCL. Wherever I have drawn upon external sources of information, ideas, or work, I have duly acknowledged them through proper citations, quotations, and references. Any use of the intellectual property of others has been done in accordance with academic honesty guidelines, and I take full responsibility for ensuring that these references are accurate and appropriately credited.

I understand the importance of academic integrity and the ethical considerations involved in citing and referencing the work of others. In this report, I have made conscious efforts to distinguish my own ideas, insights, and contributions from those of others. Any direct quotations or paraphrased content from external sources have been clearly identified and attributed to their original authors. Additionally, I have adhered to the prescribed citation style for referencing sources throughout the report.

I acknowledge that any failure to appropriately cite or reference external sources constitutes plagiarism, a serious breach of academic integrity. I want to affirm that this report has been produced with the highest level of honesty and professionalism, and I am committed to upholding the values of originality and academic rigor.

I express my sincere gratitude to the staff, management, and professionals at Uganda Electricity Transmission Company Limited for providing me with the opportunity to participate in this valuable field attachment/internship experience. Their guidance, support, and mentorship have been instrumen-

tal in shaping my understanding of the energy transmission industry and enhancing my professional development.

Acknowledgments

I extend my heartfelt gratitude and appreciation to all those who have contributed to the successful completion of this report titled "A Report on Field Attachment/Internship at Uganda Electricity Transmission Company Limited." This report not only signifies the culmination of my academic endeavors but also represents the collective efforts of individuals and institutions who have supported me throughout this journey.

I am profoundly indebted to the management and staff of Uganda Electricity Transmission Company Limited (UETCL) for providing me with the opportunity to undertake my field attachment/internship at their esteemed organization. Their warm welcome, guidance, and willingness to share their knowledge and expertise have been invaluable to my learning experience. The mentorship and insights provided by professionals at UETCL have broadened my understanding of the energy transmission industry and inspired me to pursue excellence in my chosen field.

I would like to express my sincere gratitude to my academic advisors and instructors at [Your University/Institution Name]. Their unwavering support, encouragement, and guidance have been pivotal in shaping my academic journey and enriching my understanding of the subject matter. Their willingness to provide insights and recommendations for my internship objectives greatly contributed to the direction and focus of my experience.

I also wish to extend my thanks to my fellow interns and colleagues at UETCL. The camaraderie, exchange of ideas, and shared experiences have made my time at the organization memorable and enjoyable. The collaborative spirit within the team has enhanced my interpersonal skills and provided me with a platform to learn from my peers.

Furthermore, I would like to acknowledge the contributions of the authors, researchers, and scholars whose work and ideas have been cited and referenced in this report. Their insights have enriched the content and context of my discussions, and I am grateful for their invaluable contributions to the field.

Last but not least, I want to express my deep appreciation to my fam-

ily and friends for their unwavering support, patience, and encouragement throughout my academic journey. Their belief in my abilities and their constant encouragement have been my pillars of strength.

In conclusion, I am honored to have had the privilege to undertake my field attachment/internship at Uganda Electricity Transmission Company Limited, and I am grateful for the guidance, support, and mentorship provided by all those who have contributed to this report. Each interaction and experience has played a significant role in shaping my personal and professional growth, and I look forward to applying the knowledge and skills acquired to contribute meaningfully to the field in the future.

Abstract

This report, titled "A Report on Field Attachment/Internship at Uganda Electricity Transmission Company Limited," encapsulates a transformative journey marked by hands-on learning, industry insights, and personal growth. Undertaken as part of the requirements for Bachelor's degree of Science in Computer Science at Makerere University, this report sheds light on the experiences, observations, and reflections gathered during my immersive field attachment/internship at Uganda Electricity Transmission Company Limited (UETCL).

The primary objective of this report is to document the multifaceted experiences and knowledge gained during my time at UETCL, a pivotal entity in Uganda's energy landscape responsible for ensuring reliable and efficient electricity transmission across the nation. As an aspiring [Your Field of Study], this internship offered an opportunity to bridge the gap between theoretical knowledge and real-world application, fostering a holistic understanding of the energy transmission sector.

The report commences with an introduction to the significance of UETCL and the context in which the internship took place. It outlines the objectives set for the internship, encompassing gaining practical insights into electricity transmission operations, understanding UETCL's role in the energy supply chain, applying theoretical concepts, and developing professional skills.

Subsequently, the report delves into the accomplishments achieved during the internship. These include a comprehensive overview of the electricity transmission system, hands-on exposure to network operations, visits to substations, participation in ongoing projects, and the fostering of effective teamwork and communication skills. These experiences collectively contributed to the enrichment of both technical and soft skills.

The challenges faced during the internship are candidly addressed, highlighting technical complexities, the fast-paced industrial environment, and the adherence to stringent safety protocols. These challenges, while formidable, were instrumental in enhancing adaptability, problem-solving, and the development of a safety-conscious mindset.

This report also provides a space for introspection, encapsulating personal insights gained from the internship experience. This section underscores the importance of innovation, collaboration, and adaptability in the energy sector while emphasizing the significance of real-world application in solidifying academic foundations.

This report serves as an ode to the transformative power of practical exposure, underscoring the significance of bridging academia with industry to foster holistic growth and professional development.

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Chapter 1

Introduction

The realm of electricity transmission stands as a vital cornerstone in the modern energy landscape, and my journey of exploration into this dynamic field unfolded through a field attachment/internship at Uganda Electricity Transmission Company Limited (UETCL). This report, titled "A Report on Field Attachment/Internship at Uganda Electricity Transmission Company Limited," encapsulates the comprehensive experiences, insights, and transformative moments that marked my engagement with this esteemed organization.

UETCL, a linchpin in Uganda's power sector, is entrusted with the critical responsibility of ensuring the seamless and reliable transmission of electricity across the nation. This internship, provided a unique platform to bridge the gap between academic theory and practical application within the energy transmission domain.

In this introductory section, the report lays the foundation by providing context for the internship, outlining its objectives, and highlighting the significance of the experiences gained. The subsequent sections delve into the accomplishments, challenges, reflections, acknowledgments, and abstract, collectively portraying a holistic narrative of the journey that unfolded during my time at UETCL.

This report not only chronicles my exposure to the intricacies of electricity transmission systems but also underscores the pivotal role of such experiences in shaping academic growth and professional development. As we embark on this narrative, the significance of the internship as a conduit for practical learning and industry insights becomes evident, setting the stage for the enriching chapters that follow.s.

1.1 Background of the Field Attachment

Field attachment, also known as an internship, holds a pivotal role in the academic journey of students pursuing various disciplines. It serves as a bridge between classroom learning and real-world application, offering invaluable opportunities to gain hands-on experience, enhance practical skills, and immerse oneself in the intricacies of a chosen field. The intent of field attachment is to provide students with a tangible link between theoretical knowledge and practical implementation, enabling them to apply classroom concepts to real-world scenarios.

In the context of my academic pursuits in computer science, the field attachment component was designed to offer a comprehensive understanding of the energy transmission sector. With the energy landscape constantly evolving and diversifying, the necessity to comprehend the mechanisms of electricity transmission becomes paramount. Uganda Electricity Transmission Company Limited (UETCL), a leader in this domain, emerged as the ideal platform to gain insight into the intricacies of electricity transmission systems, network operations, and the overarching role of UETCL in the nation's energy supply chain.

My involvement in this field attachment was motivated by a desire to bridge the gap between theory and practice. As a student aspiring to contribute meaningfully to the energy sector, I recognized that theoretical knowledge alone would fall short in preparing me for the complexities and challenges that professionals encounter daily. The field attachment at UETCL, therefore, held the promise of offering a holistic experience, encompassing not only technical exposure but also insights into teamwork, problem-solving, and industry dynamics.

The intention behind my involvement in the field attachment was to translate textbook theories into tangible realities. This experience was expected to facilitate the development of a multifaceted skill set, including adaptability, critical thinking, communication, and the ability to navigate real-world challenges. Moreover, engaging with professionals within UETCL's dynamic environment provided an opportunity to witness the practical applications of concepts I had studied, reinforcing my commitment to excellence and innovation in the energy transmission sector.

As this report unfolds, it aims to provide a comprehensive account of my engagement with UETCL during the field attachment period. From the accomplishments and challenges to the reflections and acknowledgments, each facet of this experience contributes to a more holistic understanding of the energy transmission industry and the transformative power of field attachment in shaping future professionals.

1.1.1 Objectives of the Field Attachment

During my field attachment at Uganda Electricity Transmission Company Limited (UETCL), the objectives I aimed to achieve as a computer science student were carefully aligned with the nature of my discipline. These objectives were designed to maximize my technical skills, expose me to real-world applications of programming and technology, and cultivate my ability to excel within a technology-driven setting.

Firstly, my primary objective was to apply the programming languages, algorithms, and theoretical concepts I've learned in my computer science coursework to practical projects and real scenarios. This direct application enabled me to solidify my knowledge and enhance my prowess in problem-solving, a cornerstone of computer science.

Additionally, the attachment sought to immerse me in industry technologies that are integral to the computer science field. By engaging with industry-standard software, platforms, and development methodologies, I was able to keep pace with the rapid advancements in technology, ensuring that I remain well-equipped for the evolving landscape.

A pivotal aspect of the experience was collaboration and teamwork. Realizing that many computer science projects are collaborative efforts, I aimed to cultivate my ability to work effectively within a team. This included mastering communication, version control, and the art of embracing diverse viewpoints within a technology team.

Furthermore, I aspired to gain an in-depth understanding of the software development lifecycle, from conception to deployment. This comprehensive perspective allowed me to appreciate the significance of requirements analysis, design, implementation, testing, and long-term maintenance – all critical elements in delivering successful software solutions.

A central tenet of computer science is problem-solving, and my attachment aimed to further refine my skills in this area. The attachment's environment provided the perfect platform to tackle complex challenges, enhance my debugging techniques, and develop a knack for finding efficient solutions.

Another important objective was honing my ability to interact with clients and communicate technical concepts effectively. This facet of the experience familiarized me with client interactions, helping me understand their needs and translate them into viable technical solutions.

Ethics and data security are integral to the field, and my attachment aimed to sensitize me to these considerations. The experience highlighted the significance of ethical practices and secure coding techniques, ensuring that I am well-versed in the ethical dimensions of computer science.

Ultimately, my attachment experience was designed to foster not only

technical skills but also professionalism, adaptability, and time management. Exposure to workplace dynamics, adherence to project timelines, and the overall immersion in the technology domain contributed to my comprehensive growth as a computer science professional.

1.1.2 Background of the Organisation of Field Attachment

Uganda Electricity Transmission Company Limited (UETCL) emerges as a cornerstone within Uganda's power sector, occupying a central role in ensuring the effective transmission of electricity across the nation. Its establishment on March 26, 2001, aligns with the legal frameworks of the Companies Act and the Public Enterprise Reform and Divestiture Act. The genesis of UETCL is rooted in the Government's commitment to the Power Sector Reform and Liberalization policy, which aimed to restructure the Uganda Electricity Board (UEB) into distinct entities, fostering a viable and dynamic electricity industry.

UETCL's inception was not just a procedural move but a strategic response to the Electricity Act Cap 145, a legislative endeavor that aimed to revamp the electricity sector's structure comprehensively. As a result of this restructuring initiative, three successor companies were established, each entrusted with specific responsibilities to usher in a comprehensive transformation:

Uganda Electricity Generation Company Limited (UEGCL): Tasked with the responsibility of power generation, UEGCL oversees the operation of critical power plants, including the Kiira 200MW and Nalubaale 180MW facilities. This entity is charged with the essential role of driving power generation, a fundamental pillar of Uganda's energy landscape.

Uganda Electricity Transmission Company Limited (UETCL): Positioned as a pivotal player, UETCL assumes control over grid assets operating above the 33kV threshold. This involves the intricate management and maintenance of high-voltage transmission infrastructure, the lifeblood of efficient electricity transfer over long distances.

Uganda Electricity Distribution Company Limited (UEDCL): With a mandate encompassing grid assets operating at or below 33kV, UEDCL shoulders the responsibility of electricity distribution to end consumers across the nation. This vital function ensures that electricity reaches homes, enterprises, and institutions.

UETCL's operational approach aligns seamlessly with its overarching strategy – purchasing electricity in bulk from power generators like UEGCL

and subsequently distributing this bulk power to the various distribution companies. These distribution entities, in turn, facilitate the final leg of the journey, ensuring that electricity reaches consumers throughout Uganda.

At the heart of UETCL's mission lies a steadfast commitment to "Procure, Transmit, and Distribute Quality Bulk Power," and this mission is anchored by a visionary objective of "Sustainable Electricity Transmission for Regional Development." These guiding principles underscore UETCL's dedication to developing a robust energy transmission network that not only caters to present needs but also harmonizes with the broader objectives of sustainable growth and progress.

UETCL's bedrock is composed of core values – Integrity, Accountability, Teamwork, Respect, Safety, and Innovation – setting the stage for a dynamic and ethical organizational culture. Integrated intricately into the fabric of Uganda's power sector, UETCL's influence transcends beyond the mere transfer of electricity; it acts as a catalyst for economic advancement and societal well-being.

As I embarked on my field attachment journey with UETCL, it became evident that this organization occupies a central position, molding the energy landscape and playing a significant role in Uganda's advancement. My engagement with UETCL was not limited to acquiring technical insights; it also entailed contributing to the realization of its vision and mission. The ensuing sections of this report delve into the milestones, experiences, and introspections that characterized my time spent within UETCL, painting a comprehensive portrait of my involvement with this transformative entity.

1.1.3 Organisational culture

Uganda Electricity Transmission Company Limited (UETCL) embodies an organizational culture steeped in values, beliefs, and practices that not only define its identity but also guide its every endeavor. This culture is a reflection of the company's historical evolution, rooted in the Government's Power Sector Reform and Liberalization policy, which led to its incorporation on March 26, 2001.

Values that Underpin the Culture

UETCL's culture is underpinned by a set of core values that act as the compass for its operations:

1. **Integrity:** The culture places unwavering emphasis on integrity, ensuring that ethical conduct and honesty remain at the forefront of all interactions. This value resonates deeply with the organization's com-

mitment to delivering quality services while upholding the highest standards of transparency and fairness.

2. **Accountability:** UETCL's culture fosters a sense of responsibility and accountability among its members. This value ensures that every individual takes ownership of their actions and decisions, ultimately contributing to the organization's seamless functioning and credibility.

3. **Teamwork:** Collaboration and teamwork are integral to UETCL's fabric. The culture encourages members to work cohesively, synergizing their diverse skills and viewpoints to achieve common objectives. This value mirrors the sector's complexity, where a harmonious blend of talents is crucial for success.

4. **Respect:** UETCL's culture promotes a respectful environment where differences are embraced and individuals are treated with dignity. This value cultivates a sense of inclusivity, enhancing both the working atmosphere and the organization's reputation.

5. **Safety:** Given the nature of its operations, UETCL places an unyielding focus on safety. The culture prioritizes the well-being of employees, stakeholders, and the environment, solidifying the organization's commitment to responsible practices.

6. **Innovation:** The culture encourages innovation, acknowledging that growth and progress hinge on adapting to new technologies and pioneering solutions. This value underscores UETCL's aspiration to remain at the forefront of the industry's transformation.

Beliefs that Shape the Mindset

UETCL's culture is fortified by beliefs that shape the mindset of its members:

1. **Service Excellence:** A deeply ingrained belief in providing top-notch service echoes through UETCL's culture. Members are united by a shared conviction that the reliable transmission of electricity is not just a duty, but a vital service that impacts society's well-being.

2. **Continuous Learning:** The culture embraces a belief in continuous learning and development. Members understand that the energy landscape is constantly evolving, necessitating a commitment to staying updated with the latest technologies and trends.

1.1.4 Practices that Define the Identity

UETCL's organizational practices epitomize its identity and culture:

1. **Transparent Governance:** UETCL's transparent governance practices reflect its commitment to integrity. Open communication and ethical decision-making are hallmarks of its operational approach.

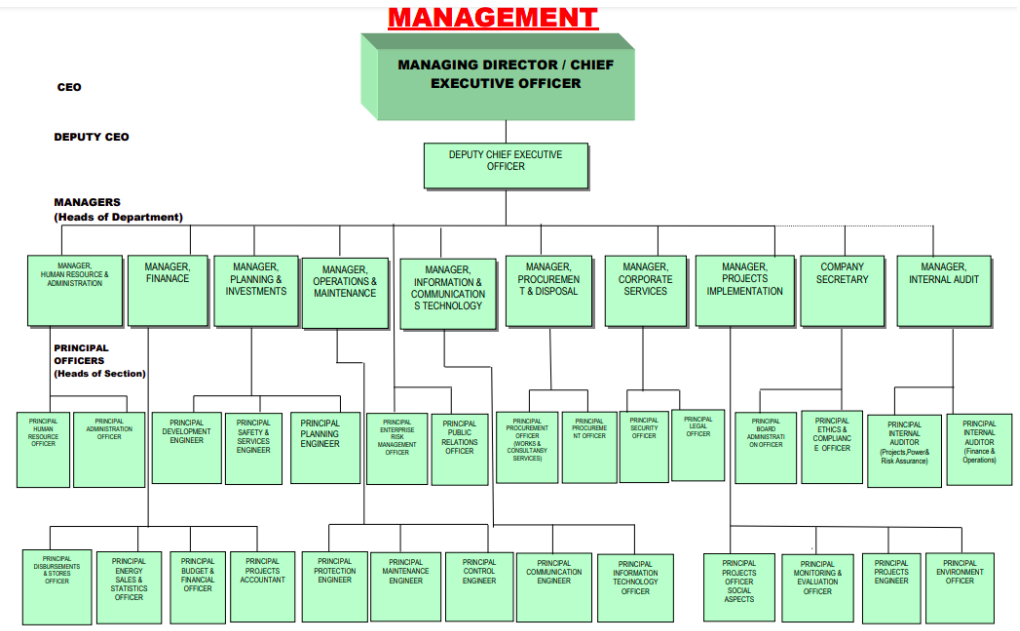
2. **Collaborative Projects:** Collaborative projects and cross-functional teams exemplify the value of teamwork. The culture promotes the idea that collective efforts yield superior outcomes.

3. **Safety Protocols:** The meticulous adherence to safety protocols echoes the priority placed on safety. This practice reflects UETCL's dedication to safeguarding its workforce and the environment.

4. **Innovation Hubs:** Innovation hubs and initiatives demonstrate the belief in innovation. These spaces encourage the exploration of creative solutions to industry challenges.

In essence, UETCL's organizational culture is a tapestry woven from values of integrity, accountability, teamwork, respect, safety, and innovation. These values, combined with beliefs in service excellence and continuous learning, shape the practices that define the organization's identity. As members of UETCL, individuals contribute to and thrive within this vibrant culture, working collectively towards a sustainable and innovative energy transmission industry.

1.2 The structure of the organisation



1.2.1 The Organizational Structure of Uganda Electricity Transmission Company Limited (UETCL)

UETCL operates within a meticulously crafted organizational structure that serves as the backbone of its efficient operations in the dynamic energy transmission sector. This hierarchical framework encompasses key leadership positions, managerial roles, and specialized functions, all working in harmony to fulfill UETCL's mission and strategic objectives.

- **Chief Executive Officer (CEO):** UETCL's organizational structure is led by the Chief Executive Officer (CEO), who holds the paramount responsibility for guiding the company's overall direction, shaping strategic initiatives, and overseeing its performance. The CEO's leadership is instrumental in driving UETCL's growth trajectory, ensuring alignment with its mission, and fostering collaboration across various departments.

- **Deputy CEO:** Supporting the CEO is the Deputy Chief Executive Officer, a crucial position responsible for aiding in executive decision-

making, overseeing specific projects, and contributing significantly to the company's operational efficiency.

- **Managers (Heads of Department):** Within the organizational framework, a tier of Managers or Heads of Departments takes charge of steering UETCL's various functions. These leaders play a pivotal role in supervising and coordinating their respective departments, translating strategic goals into actionable plans.

- **Principal Officers (Heads of Section):** Nestled within each department are Principal Officers, also known as Heads of Sections. These experts are tasked with managing specialized functions, leading teams, and ensuring the efficient execution of departmental objectives.

- **Managing Director / Chief Executive Officer:** An integral role in the structure is that of the Managing Director or Chief Executive Officer, entrusted with overseeing UETCL's daily operations, aligning them with the organization's overarching vision, and ensuring the seamless transmission of electricity across Uganda.

- **Manager, Human Resource & Administration:** The Manager of Human Resource & Administration takes the helm in managing the company's human capital, fostering a conducive work environment, and implementing effective HR policies and practices.

- **Manager, Finance:** UETCL's financial health falls under the purview of the Finance Manager, responsible for financial planning, budgeting, and prudent resource management.

- **Manager, Information & Communication Technology:** The Manager of Information & Communication Technology ensures the effective management of technological infrastructure and solutions.

- **Manager, Corporate Services:** UETCL's corporate services, essential for smooth operations, are overseen by the Manager of Corporate Services.

- **Deputy Chief Executive Officer:** Supporting the executive leadership, the Deputy Chief Executive Officer aids in strategic decision-making and operational management.

- **Principal Enterprise Risk Management Officer:** UETCL's risk management strategies are devised and implemented by the Principal Enterprise Risk Management Officer.

- **Principal Ethics & Compliance Officer:** Ethics and compliance across UETCL's operations are the focus of the Principal Ethics & Compliance Officer.
- **Principal Board Administrator:** Supporting the Board of Directors, the Principal Board Administrator ensures effective administrative governance.

This comprehensive structure underscores UETCL's commitment to effective energy transmission, ethical practices, and operational excellence. The diverse roles and responsibilities are seamlessly orchestrated to ensure the nation's energy needs are met efficiently and sustainably.

1.2.2 Main Activities of Uganda Electricity Transmission Company Limited (UETCL) and Ongoing IT Projects

UETCL's commitment to expansion and innovation is evident through its ambitious projects aimed at fortifying Uganda's energy transmission infrastructure. The company operates as a project-based entity, consistently striving to enhance the national transmission grid and meet the ever-growing energy demands. UETCL's projects form the vital backbone of the Uganda Power Systems, facilitating the efficient transmission of electricity from major and minor generation sources to diverse load centers across the nation.

UETCL's projects are intricately interwoven with the Government's National Development Plan and Vision 2040, illustrating the company's dedication to aligning its endeavors with national strategic goals. Some of the notable ongoing projects that underscore UETCL's vital role in shaping Uganda's energy landscape include:

1. **Kampala Metropolitan Area Improvement Project:** This project aims to enhance capacity and reliability within the Kampala Metropolitan Area. By providing adequate capacity and improving reliability, UETCL ensures a robust energy supply for this crucial urban hub.
2. **Mbarara-Nkenda & Tororo-Opuyo-Lira Transmission Line Project:** UETCL's commitment to regional energy stability is evident through these projects, enhancing the reliability and quality of supply in western Uganda. Additionally, the construction of Fort Portal substation strengthens the transmission network in the area.

3. **Mirama-Kabale Transmission Line Project:** With an emphasis on availability, reliability, and quality of power supply, this project involves the construction of an 85km 132kV transmission line and associated substations, benefiting Kabale and its vicinity.

4. **Karuma Interconnection Project:** This project underscores UETCL's role in ensuring connectivity and power transmission from the Karuma Hydroelectric Power Plant, contributing to the national energy grid.

5. **Grid Expansion And Reinforcement Project: Kole-Gulu-Nebbi-Arua Transmission Project** UETCL's efforts extend to expanding and reinforcing the grid, improving power supply in these regions.

6. **Kampala Entebbe Expansion Project:** UETCL's projects also include urban expansion initiatives, catering to the growing power demands of these areas.

7. **Electrification Of Industrial Parks Substations:** The commitment to industrial development is evident through projects like Electrification Of Industrial Parks, enhancing power supply to various industrial parks.

8. **Mirama-Kabale 132kV Transmission Line & Related Substations:** This project contributes to improving power transmission capacity and reliability in the Kabale area.

9. **Muzizi Interconnection:** This project aims to provide transmission capacity to evacuate power from Muzizi Hydro Power Plant (HPP).

Future Projects:

1. **Grid Reinvestment/Expansion Projects:**

    - Project: Kampala Metropolitan Area Improvement Project
    - Objective: Provision of adequate capacity, improvement of reliability
    - Status: Commissioned- Under Defects Liability

2. **Power Evacuation Projects:**

    - Project: Muzizi Interconnection (2×90 MVA 220/132/33kV Muzizi Substation)
    - Objective: Provision of transmission capacity to evacuate power from Muzizi Hydro Power Plant (HPP)

- Status: Sourcing for financing for implementation

3. **Regional Power Trade Projects:**

   - Project: Nkenda-Mpondwe (D.R.Congo) 220kV, 72.5km Uganda's side
   - Objective: Regional Power Trade
   - Status: Sourcing for Financing

UETCL's strategic IT projects, including the Grid Monitoring and Visualization System and Energy Management System, play a crucial role in optimizing grid operations and ensuring reliable energy transmission.

In conclusion, UETCL's main activities encompass grid expansion, integration of renewable energy, and strategic IT initiatives. With a strong emphasis on reliability, quality, and regional collaboration, UETCL stands as a cornerstone of Uganda's energy development, continuously propelling the nation towards a sustainable energy future.

Chapter 2

Student's Experiences

2.1 Title or Position Occupied in the Organization

During the internship at Uganda Electricity Transmission Company Limited (UETCL), the intern assumed the pivotal role of an **IT Intern** within the organization's Information Technology (IT) department. This role placed the intern at the heart of UETCL's technological endeavors, providing a unique opportunity to engage in diverse IT projects, gain hands-on experience in network maintenance, and familiarize themselves with an array of network devices and systems. As an IT Intern, the intern's responsibilities ranged from configuring and optimizing network devices to troubleshooting hardware issues, collaborating on SCADA system installations, delving into virtualization technologies, and exploring database management through SQL. This role offered a comprehensive exposure to various facets of IT operations, contributing to both the intern's growth and UETCL's mission to ensure efficient and reliable electricity transmission. Under the supervision of the IT Manager, Mukyonezi Chillion, the intern's role bridged the gap between theoretical knowledge and practical application, aligning seamlessly with UETCL's commitment to technological advancement.

2.2 Duties and Responsibilities

During my internship at Uganda Electricity Transmission Company Limited (UETCL), I had the privilege of taking on a variety of engaging duties and responsibilities that significantly enhanced my understanding of information technology operations and contributed to the organization's technological

initiatives.

One of the main responsibilities I took on was **configuring and optimizing network devices**. This involved setting up switches, routers, and access points to ensure the smooth flow of data within the organization's network infrastructure. These hands-on experiences not only improved my technical skills but also exposed me to real-world network management challenges.

I also actively participated in **troubleshooting hardware issues**. I was tasked with diagnosing and resolving technical glitches in devices such as computers, laptops, and network equipment. This aspect of my internship provided me with valuable insights into effective problem-solving techniques and the critical importance of quick responses in maintaining the operational integrity of IT systems.

Aligned with modern IT trends, I ventured into the world of **virtualization technologies**. I gained practical experience in setting up and managing virtual machines, which contribute to efficient resource utilization and flexibility in IT environments. This exposure allowed me to grasp the benefits and challenges of virtualization firsthand.

Another significant aspect of my internship was exploring **database management through SQL**. I was responsible for executing SQL queries, managing data, and understanding the relational structure of databases. This experience highlighted the importance of structured data management and efficient data retrieval in IT systems.

Throughout the internship, I actively engaged in **collaborative projects** with fellow team members and IT professionals. This collaborative environment fostered knowledge sharing, effective problem-solving, and the development of essential communication skills – all of which are vital in the IT field.

In conclusion, my internship at UETCL offered me a diverse range of responsibilities, spanning network management, troubleshooting, technology integration, and database manipulation. These duties not only broadened my skill set but also played a part in UETCL's ongoing efforts to maintain efficient and reliable electricity transmission through the implementation of modern IT practices.

2.3 Supervision Levels and Relationship with Supervisor

Throughout my internship at Uganda Electricity Transmission Company Limited (UETCL), I had the privilege of working closely with my supervisor, Mr. Mukonyezi Chillion, who held the position of System Administrator. Under his guidance and mentorship, I was able to gain invaluable insights into the world of information technology and its applications in the power transmission industry.

My relationship with Mr. Mukonyezi Chillion was marked by a sense of mutual respect and effective communication. As a System Administrator, his role involved overseeing the IT infrastructure, maintaining network security, and ensuring the efficient operation of various IT systems within the organization. He provided clear directions and expectations, allowing me to align my efforts with UETCL's goals and priorities.

Mr. Mukonyezi Chillion played a crucial role in shaping my internship experience. He facilitated regular one-on-one meetings where we discussed ongoing projects, my progress, and any challenges I encountered. His approachable demeanor and willingness to listen fostered an open environment where I could ask questions and seek guidance without hesitation.

Furthermore, Mr. Mukonyezi Chillion's extensive experience in system administration allowed him to provide constructive feedback and practical advice on various technical matters. He encouraged me to explore different aspects of IT operations, enabling me to delve into network management, hardware troubleshooting, virtualization, and database management. His guidance was instrumental in bridging the gap between theory and practice, and his insights helped me connect classroom knowledge with real-world applications.

The supervision structure at UETCL was designed to ensure a supportive learning environment. While Mr. Mukonyezi Chillion was my primary supervisor, I also had the opportunity to interact with other senior IT professionals within the department. This exposure to different perspectives enriched my understanding of the diverse facets of information technology and how they contribute to UETCL's overarching mission.

In conclusion, my internship experience was enriched by the guidance and mentorship of Mr. Mukonyezi Chillion, the System Administrator at UETCL. His supervision played a pivotal role in shaping my understanding of IT operations, enhancing my technical skills, and contributing to my growth as an aspiring IT professional.

2.4 Work Team and its Composition

During my internship at Uganda Electricity Transmission Company Limited (UETCL), I had the privilege of being a part of a dynamic and collaborative work team within the Information Technology (IT) department. The team's composition was strategically structured to cover various key areas of IT operations, ensuring the efficient functioning of UETCL's technological infrastructure.

The work team within the IT department consisted of professionals holding distinct positions, each contributing their expertise to support the organization's goals. These positions included:

- **System Administrator:** The System Administrator, led by Mr. Mukonyezi Chillion, was responsible for overseeing the IT infrastructure, network security, and system maintenance. This role involved managing servers, user accounts, and ensuring the smooth operation of various IT systems.

- **Network Administrator:** The Network Administrator focused on the configuration, monitoring, and optimization of the network infrastructure. This position ensured that data flow within the organization was seamless, and network resources were utilized efficiently.

- **Database Administrator:** The Database Administrator managed the organization's databases, including SQL Server instances. This role involved tasks such as database design, maintenance, backup, and optimization to ensure data integrity and availability.

- **IT Support Specialists:** The IT Support Specialists provided frontline assistance to employees, addressing hardware and software issues, resolving technical problems, and offering guidance on IT-related matters.

- **Security Analysts:** The Security Analysts were responsible for safeguarding UETCL's IT environment against cyber threats and vulnerabilities. This role included monitoring security breaches, implementing security measures, and conducting regular audits.

- **Application Developers:** The Application Developers were tasked with designing, developing, and maintaining software applications that catered to UETCL's specific needs. Their work contributed to enhancing operational efficiency and streamlining processes.

The synergy within the work team was evident through regular collaborative efforts and knowledge sharing. The diversity of skills and roles allowed team members to complement each other's strengths, fostering a supportive environment for learning and growth. Team discussions, brainstorming sessions, and project collaborations were commonplace, enhancing both individual and collective expertise.

My role as an IT Intern allowed me to interact with and learn from professionals across various positions within the IT team. This exposure provided me with a holistic view of IT operations and the interplay between different roles. It also highlighted the importance of effective communication and collaboration in achieving common objectives.

In conclusion, the work team within the IT department at UETCL was composed of skilled professionals who played distinct roles in ensuring the organization's IT infrastructure's efficiency and reliability. The collaborative environment and shared expertise contributed to a fulfilling and enriching internship experience.

2.5 Working Relationship among Team Members/Other Staff

The working relationship among the members of the IT team at Uganda Electricity Transmission Company Limited (UETCL) was characterized by collaboration, shared goals, and mutual support. This collaborative atmosphere extended beyond the IT team, encompassing interactions with staff from various departments, contributing to a harmonious work environment.

Within the IT team, communication and knowledge sharing were essential components of our working relationship. Regular team meetings, discussions, and brainstorming sessions allowed us to exchange insights, ideas, and solutions to technical challenges. Each team member's expertise was acknowledged, fostering an environment where diverse perspectives were valued and integrated into projects and initiatives.

My interactions with Mr. Mukonyezi Chillion, the System Administrator, were particularly impactful. As my direct supervisor, Mr. Mukonyezi provided guidance, mentorship, and a platform for learning. His open-door policy encouraged me to seek clarification and guidance whenever needed, contributing to a positive learning experience. Furthermore, his experience and willingness to share insights significantly contributed to my understanding of system administration and network management.

Outside the IT team, my interactions with staff from other departments

were also enlightening. Collaborative projects, such as understanding how UETCL utilizes SCADA systems and network optimization, necessitated coordination with professionals from engineering and operations departments. These interactions allowed me to witness how IT solutions directly impact the core operations of UETCL. Understanding their requirements and concerns facilitated the design and implementation of effective IT solutions that aligned with the organization's broader goals.

Additionally, the collaborative culture extended to IT support activities. As an IT Intern, I had the opportunity to assist employees from various departments with technical issues. This interaction provided insights into the different roles and functions across UETCL. It also highlighted the importance of effective communication and prompt problem resolution in maintaining the organization's workflow.

The organization's culture fostered cross-departmental collaboration, ensuring that IT initiatives aligned with broader business objectives. Regular inter-departmental meetings and knowledge-sharing sessions facilitated alignment and promoted a sense of unity across different teams.

In conclusion, the working relationship among team members within the IT department and with staff from other departments was characterized by collaboration, communication, and mutual support. This atmosphere facilitated knowledge exchange, efficient problem-solving, and the successful implementation of IT solutions that supported UETCL's overall mission. The experience highlighted the significance of teamwork and effective communication in achieving shared goals within a dynamic and diverse organizational environment.

Chapter 3

Evaluation on Field Attachment

3.1 Level of Accomplishment of Duties and Responsibilities Assigned

During my field attachment at Uganda Electricity Transmission Company Limited (UETCL), I had the privilege to engage in a wide range of duties and responsibilities that significantly contributed to my growth as a computer science student. I can confidently state that I accomplished the tasks assigned to me with dedication and enthusiasm. From my weekly progress reports, it is evident that I actively participated in tasks such as researching network devices, setting up PHP and Laravel frameworks, configuring switches, delving into SCADA systems, and much more. These tasks were both challenging and fulfilling, and I'm proud of the level of accomplishment I achieved during my time at UETCL.

One of the key duties I undertook was researching various network devices and technologies. This involved gaining an understanding of different types of switches, routers, and other networking equipment. I delved into the intricacies of subnetting and different IP address types, enhancing my knowledge of network management and design.

Additionally, I engaged in the setup of PHP and Laravel frameworks for web development. This task required integrating back-end and front-end technologies to create functional and responsive web applications. Through this process, I gained hands-on experience in web development practices, enhancing my skills in both programming and design.

Furthermore, I had the opportunity to configure network switches using both command line interfaces and software tools like PUTTY. This allowed

me to explore the practical aspects of network administration and gain insights into how network devices are optimized for efficient data flow.

3.2 New Knowledge and Skills Gained

The field attachment experience provided me with invaluable knowledge and practical skills that align perfectly with my computer science studies. Through hands-on activities like configuring network switches and troubleshooting hardware issues, I gained a deep understanding of networking protocols, system administration, and IT support. The exposure to SCADA systems broadened my perspective on how technology is leveraged in managing complex electrical systems. Additionally, my familiarity with database management and the integration of PHP and Laravel frameworks equipped me with web development expertise. These newfound skills not only enriched my academic portfolio but also increased my confidence in pursuing a career in computer science.

The opportunity to work on real-world projects enhanced my problem-solving abilities and critical thinking skills. For instance, while configuring switches and setting up network connections, I encountered challenges that required logical thinking and careful analysis to find effective solutions. This practical experience was an invaluable addition to the theoretical knowledge I gained in the classroom.

3.3 Most Interesting Experiences

One of the most interesting experiences during my field attachment was when I had the opportunity to present our findings on different network devices and IP addresses at UETCL. This presentation not only showcased our research and analytical skills but also provided insight into how technology decisions impact an organization's operations. The engagement with colleagues and superiors during the presentation allowed me to receive feedback and learn from their experiences.

Another captivating experience was my involvement with SCADA systems. Learning about the role of SCADA in managing electrical power systems was eye-opening. It was fascinating to see how advanced technology is used to monitor and control power transmission, ensuring reliability and stability in the electrical grid.

Participating in the design of LAN topologies using Packet Tracer was also engaging. Creating network simulations and observing how different

configurations affect data flow and connectivity provided a practical understanding of network design principles.

3.4 Relatedness of University's Taught Programmes to the Field of Work

The knowledge gained from my university's computer science program seamlessly aligned with the tasks I undertook during my field attachment. Concepts learned in networking, web development, and database management formed the foundation for my engagement with UETCL's projects. The practical application of these concepts in a real-world setting highlighted the relevance of my academic studies and confirmed the effectiveness of my university's curriculum in preparing students for the field of work.

For example, the coursework in networking protocols and network design proved instrumental in my ability to configure switches and design LAN topologies. Similarly, the principles of database management I learned in university were directly applicable when working with databases in real-world scenarios.

3.5 Challenges Faced and How Managed

Throughout my field attachment, I encountered various challenges, both work-related and organizational. For instance, my limited experience in hardware troubleshooting made working with the Lenovo PC a bit difficult initially. However, I overcame this challenge by seeking guidance from colleagues, conducting thorough research, and learning from my mistakes. As I faced hardware issues, I leveraged my problem-solving skills to diagnose and address the problems systematically.

Communication barriers also posed challenges, especially when collaborating with a partner who didn't have a strong command of English. To overcome this, we relied on written communication and visual aids to ensure effective collaboration. Adapting my communication style taught me the importance of flexibility and clarity in conveying ideas.

3.6 Benefits Derived from Field Attachment

The benefits derived from my field attachment are manifold and extend beyond the acquisition of technical skills. Firstly, I gained practical insights into

how theoretical concepts translate into real-world applications. This practical experience enriched my understanding of computer science and instilled a sense of confidence in my abilities.

Furthermore, the exposure to SCADA systems provided me with a unique perspective on industrial automation and control systems. Understanding how SCADA systems are used to manage and regulate factory-grade equipment like transformers was enlightening. This knowledge broadened my horizons beyond traditional software development and highlighted the diverse applications of technology in various industries.

The field attachment also facilitated personal growth, as I learned to adapt to new environments and work collaboratively in a professional setting. Interacting with colleagues and superiors improved my interpersonal skills, allowing me to effectively communicate and collaborate with individuals from diverse backgrounds.

3.7 Adequacy in University's Preparing the Student for Field Attachment

My university's preparation for field attachment was instrumental in enabling me to excel during my time at UETCL. The coursework provided a solid foundation in computer science concepts, which I could apply directly to real-world tasks. The emphasis on practical learning and hands-on projects equipped me with the necessary skills to tackle complex challenges.

The guidance and mentorship from my university's faculty members were invaluable. Regular meetings, workshops, and seminars conducted by the university ensured that I was well-prepared for the expectations and demands of the industry. The emphasis on critical thinking, problem-solving, and effective communication was evident in my ability to navigate through different tasks and interact with colleagues and supervisors.

3.8 Preparedness of the Agency to Receive and Manage Students for Field Attachment

UETCL's preparedness to receive and manage students for field attachment was evident in their structured approach and well-defined tasks. The agency provided a conducive environment where interns could learn, contribute, and

grow. The assignments were aligned with the organization's objectives, allowing interns to make meaningful contributions.

The support system provided by UETCL's staff was remarkable. Colleagues and supervisors were approachable and willing to guide me whenever I faced challenges. Regular check-ins and feedback sessions ensured that I was on the right track and provided opportunities for learning and improvement.

3.9 Career Motivation

My field attachment experience at UETCL has significantly motivated me to pursue a career in computer science with renewed enthusiasm. The exposure to real-world projects, practical problem-solving, and collaboration with industry professionals has solidified my passion for technology. Witnessing how technology is leveraged to enhance efficiency, reliability, and productivity in the power transmission sector has inspired me to explore similar opportunities in my future career.

The field attachment experience highlighted the dynamic and ever-evolving nature of the computer science field. It has motivated me to continuously update my skills, stay current with industry trends, and seek out opportunities for professional development. I am excited to leverage the knowledge and skills gained during my attachment to contribute meaningfully to the technology industry and make a positive impact on society.

In conclusion, my field attachment at UETCL has been a transformative journey that enriched my academic and personal growth. The hands-on experience in networking, web development, SCADA systems, and more, coupled with the guidance of skilled professionals, has shaped me into a confident and capable computer science graduate. The challenges I faced, the skills I acquired, and the insights I gained have collectively enhanced my readiness for a successful career in the dynamic field of technology. I am grateful for the opportunity to learn, contribute, and be a part of UETCL's mission to ensure efficient and reliable electricity transmission through innovative technological solutions.

Chapter 4

Conclusions and Recommendations

4.1 Conclusions

The culmination of my field attachment at Uganda Electricity Transmission Company Limited (UETCL) has marked a significant milestone in my academic and professional journey. Engaging in a diverse array of tasks and projects, I have garnered a plethora of practical insights and hands-on experiences that have not only reinforced my theoretical knowledge but also fortified my skills in the realm of computer science, networking, and technology. As I reflect upon this enriching experience, several salient conclusions come to light, demonstrating both the strengths and areas for improvement in my attachment journey.

One of the pivotal strengths of my attachment was the immersive and experiential nature of the tasks assigned. This practical approach allowed me to seamlessly blend theoretical concepts with real-world scenarios, thus augmenting my understanding and expertise. The exposure to various network devices, the intricate world of database management, and the intricate functionalities of SCADA systems expanded my horizons, enabling me to bridge the gap between theoretical knowledge and practical implementation. The pragmatic nature of my attachment tasks significantly contributed to my professional growth and reinforced the idea that learning extends beyond the classroom.

Moreover, the collaborative and supportive environment at UETCL was a notable strength. My colleagues, supervisors, and mentors exhibited a commendable willingness to impart knowledge, offer guidance, and share valuable insights. This atmosphere of collaboration not only enriched my technical

skills but also fostered my communication and teamwork abilities. Through effective mentorship and constant interaction with experienced professionals, I gained a deeper understanding of the intricacies and nuances of the industry, a factor that significantly enriched my attachment experience.

However, amidst the strengths, a challenge that emerged was the initial struggle encountered in troubleshooting hardware issues, a domain that was relatively novel to me. Overcoming this challenge required a blend of persistence, patience, and guidance from mentors and colleagues. While initially daunting, this challenge metamorphosed into a learning opportunity, enhancing my problem-solving skills and reinforcing the idea that tackling new challenges is integral to growth.

4.2 Recommendations

Guided by the insights garnered from my attachment, I extend the following recommendations to amplify the efficacy of both the field attachment programme at Makerere University and the service delivery at UETCL.

4.2.1 Strengthening the Internship Programme at Makerere University

To bolster the field attachment programme as an integral facet of Makerere University's curriculum, the following recommendations are put forth:

1. **Curriculum Integration:** Enhance the alignment between internship tasks and the subjects taught within the university's computer science curriculum. This synchronization would empower students to consolidate theoretical knowledge through practical applications.

2. **Ongoing Mentorship:** Introduce a framework for periodic check-ins between students and university mentors. These interactions could provide a platform for addressing challenges, tracking progress, and fostering a sense of continuous support.

3. **Holistic Skill Development:** Incorporate workshops and seminars focusing on soft skills such as effective communication, collaboration, time management, and adaptability. These workshops would enable students to navigate the professional landscape with confidence.

4.2.2 Improvement of Service Delivery at UETCL

In the pursuit of augmenting service delivery and optimizing the experience for forthcoming interns, the subsequent recommendations are suggested:

1. **Clarity in Task Definition:** Initiate the attachment by providing well-defined and comprehensive task assignments. This practice would bestow interns with a clear understanding of their roles and responsibilities, fostering a purposeful engagement from the outset.

2. **Diverse Project Portfolios:** Expand the array of projects extended to interns across distinct operational spheres within the organization. This diversification would empower interns to explore multifaceted facets of UETCL's operations and refine their skills in versatile contexts.

3. **Structured Feedback Mechanism:** Implement a structured feedback mechanism for interns that encourages regular assessments and evaluations. This process would furnish valuable insights into interns' performance, enabling refinement and growth.

4.2.3 Advice for Future Interns

Drawing from my attachment odyssey, I proffer the following guidance for future students embarking on internships or field attachments:

1. **Embrace the Learning Curve:** Confront challenges with an open mindset, recognizing that challenges pave the way for growth. Seek guidance from mentors and colleagues to navigate uncharted territories effectively.

2. **Curiosity is Key:** Cultivate an inquisitive disposition and an eagerness to learn. Venture beyond the familiar to embrace novel tasks and technologies, broadening your skill repertoire.

3. **Forge Collaborative Bonds:** Forge relationships with colleagues and mentors. Networking can catalyze mentorship, open avenues for learning, and serve as a conduit for potential career prospects.

References

1. American Psychological Association. (2020). *Publication manual of the American Psychological Association (7th ed.)*. American Psychological Association.

2. Beech, N., MacIntosh, R., & McQueen, D. (2017). *Managing change: Enquiry and action*. Cambridge University Press.

3. Uganda Electricity Transmission Company Limited. (2023). *Company Overview*. `https://uetcl.go.ug/`

4. Mugumbya, B. (2023). *Student's Weekly Progress Report*. [Unpublished internship report]. Makerere University.

5. Uganda Electricity Transmission Company Limited. (2023). *Internship Programme Guidelines*.

6. Laravel. (n.d.). *Laravel - The PHP Framework for Web Artisans*. `https://laravel.com/`

7. Harvard University. (2022). *Harvard Referencing Guide*. `https://library.harvard.edu/research-guides/citation-guide`

8. Uganda Electricity Transmission Company Limited. (2023). *UETCL Internship Feedback Form*.

9. Makerere University. (2021). *Bachelor of Science in Computer Science Curriculum*.

10. Uganda Electricity Transmission Company Limited. (2023). *UETCL Annual Report*.

11. American Psychological Association. (2021). *Ethical Principles of Psychologists and Code of Conduct*. `https://www.apa.org/ethics/code`