DEPARTMENTOF SOFTWARE ENGINEERING

INDUSTRIAL PRACTICE REPORT

Oromia Science and Technology

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Abbreviations

Abbreviations	
OSTB	Oromia Science and Technology Bureau
STEM	Science, Technology, Engineering, and Mathematics
R&D	Research and Development
UI	User interface
ERDs	Entity-Relationship Diagrams
UX	User experience
MVP	minimum viable product
CMS	content management systems
IT	Information Technology
SEO	Search engine optimized
OST	Oromia Science and Technology
API	Application Programming Interface.
RDBMS	relational database management system

CHAPTER ONE

INTRODUCTION

Oromia Science and Technology stands as a dynamic institution leading the charge in driving innovation, research, and technological advancements in Ethiopia's Oromia region. Its establishment, rooted in a visionary mission to harness the potential of science and technology for regional socio-economic development, has positioned it as a pivotal center for education, research, and technological innovation.

This report aims to provide insights into an internship hosting organization, with a particular focus on science and technology. We explore potential positioning strategies for the organization within the market. Also the internship position detailed. Overview and description of the main tasks during the internship period. We are also overview of the organization of work and the work environment, including descriptions of resources, tools, methods, and other relevant information in a typical professional setting.

Overall, this report offers a comprehensive overview of the internship hosting organization, the specific internship position, and the myriad opportunities within the realm of science and technology. It underscores the significance of practical experience, innovation, and collaborative efforts in driving socio-economic development and cultivating a vibrant ecosystem for the advancement of science and technology.

CHAPTER TWO

DESCRIPTION OF THE INTERNSHIP HOSTING ORGANIZATION AND POSITION

2.1 PURPOSE OF THE INTERNSHIP

The primary purpose of this internship was to provide us with a valuable learning experience and an opportunity to apply the knowledge and skills acquired during our academic studies in a real-world professional setting. It aimed to bridge the gap between theory and practice and help us develop a deeper understanding of the industry we are interested in.

2.2 INITIAL EXPECTATIONS

- **Customer Face-to-Face Connection:** One of our key expectations was to have direct customer interactions. We believed that this would be an excellent opportunity to enhance our interpersonal skills, learn about customer preferences, and gain insights into their needs and challenges.
- **Hands-on Experience:** We looked forward to gaining hands-on experience in various aspects of the business, including product/service development, marketing, and customer support.
- **Mentorship and Learning:** We expected to work closely with experienced professionals who could mentor us, offer guidance, and share their knowledge and expertise.
- **Networking Opportunities:** We hoped to build a professional network by connecting with colleagues, supervisors, and industry experts during our internship.
- **Contributing to Projects**: We aimed to make meaningful contributions to ongoing projects and learn from the practical application of our academic knowledge.

2.3 DESCRIPTION OF THE INTERNSHIP ORGANIZATION

2.3.1 FIELD OF ACTIVITY

Oromia Science and Technology Bureau (OSTB) in Ethiopia is responsible for promoting and coordinating science and technology-related activities in the Oromia region. The field of activity of OSTB covers a wide range of areas, aimed at fostering technological development, innovation,

and research within the region. Here are some key areas of activity for the Oromia Science and Technology Bureau:

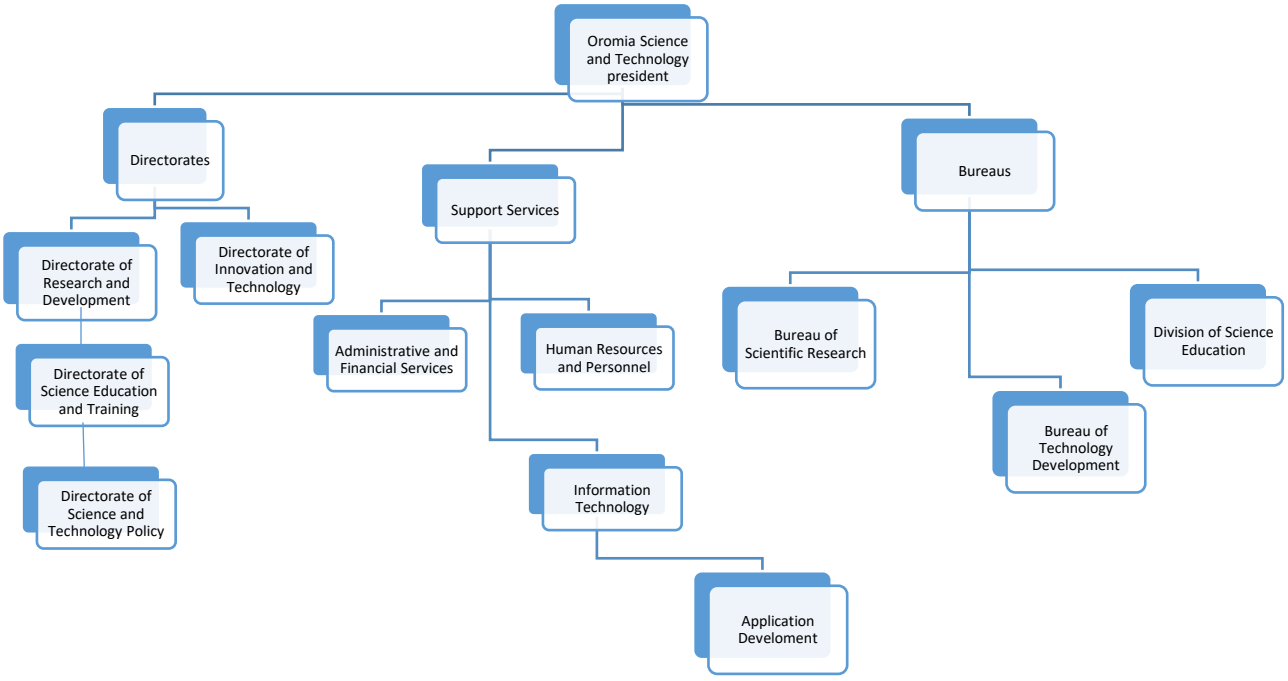
- **Research and Development (R&D**): OSTB plays a pivotal role in promoting and supporting research initiatives in various scientific and technological disciplines. This includes funding research projects, establishing research centers, and collaborating with educational institutions and research organizations.
- **Education and Skill Development:** OSTB may be involved in initiatives to improve science and technology education within the region. This can include supporting STEM (Science, Technology, Engineering, and Mathematics) education programs, providing scholarships, and organizing training and skill development workshops.
- **Technology Transfer:** Facilitating the transfer of technology from research institutions to practical applications in industries and businesses is an important role of OSTB. This involves bridging the gap between academia and industry.
- **Innovation and Startups:** Supporting innovation and entrepreneurship within the region is often a focus. This can include creating incubators or innovation hubs, providing resources and mentorship to startups, and fostering a culture of innovation.
- **Infrastructure Development:** OSTB may work on infrastructure projects related to science and technology, such as the establishment of technology parks, laboratories, and research facilities.
- **Promoting STEM Awareness:** Encouraging young people to pursue careers in science, technology, engineering, and mathematics is vital for the future of the region. OSTB may organize outreach programs, competitions, and events to promote STEM awareness among students.
- **Collaboration and Partnerships**: Establishing collaborations with national and international institutions, government agencies, and industry partners is crucial for OSTB to leverage resources, expertise, and funding for various initiatives.
- **Environmental and Agricultural Technology**: Given the agricultural significance of the Oromia region, OSTB may focus on developing and promoting technologies related to agriculture, sustainability, and environmental conservation.
- **Regulation and Policy:** Developing and implementing policies and regulations related to science and technology within the region to ensure responsible and ethical practices.

2.3.2 MAIN PRODUCTS AND SERVICES

As government science and technology bureaus or agencies typically engage in various activities and offer services that promote research, innovation, and technological development within their region. Here are some common products and services that such agencies may provide:

- **Website Development:** They offer custom website development services, tailored to meet the unique needs of each client. Our team uses the latest technologies and best practices to create responsive, mobile-friendly, and SEO-optimized websites.
- **E-Commerce Solutions:** Digital Web Creations provides comprehensive e-commerce solutions, enabling businesses to sell products and services online. They integrate secure payment gateways and develop user-friendly online stores.
- **Content Management Systems**: They specialize in developing websites using content management systems (CMS) like WordPress, allowing clients to easily update and manage their web content.
- **Web Design and User Experience (UX/UI):** They talented designers create visually appealing and intuitive website designs, ensuring an exceptional user experience and engaging user interface.
- **Web Maintenance and Support:** They offer ongoing website maintenance and support services to keep websites secure, up to date, and functioning optimally.
- **Research Funding:** OSTB may offer grants or funding opportunities to support scientific research and development projects in various fields, including agriculture, health, and technology.
- **Science and Technology Education**: Supporting science, technology, engineering, and mathematics (STEM) education through scholarships, programs, and initiatives aimed at fostering a skilled workforce.
- **Collaboration and Networking:** Facilitating collaborations between research institutions, universities, industries, and government bodies to create a vibrant ecosystem for scientific and technological advancement.
- **Public Awareness and Outreach:** The organizing awareness campaigns, workshops, seminars, and events to educate the public and students about the importance of science and technology.

2.3.3 ORGANIZATIONAL STRUCTURE



Figures 2.3.3 Organizational Structure of OST

- President: The highest-ranking official responsible for overseeing the entire institution.
- Directorate of Research and Development: Focuses on research initiatives and academic development.
- Directorate of Innovation and Technology: Promotes innovation and technological advancements.
- Administrative and Financial Services: Manages administrative and financial functions.
- Human Resources and Personnel: Oversees HR-related matters.
- Information Technology: Responsible for IT services and infrastructure, including application development.
- Bureau of Scientific Research: Conducts scientific research projects.
- Bureau of Technology Development: Drives technology development efforts.
- Division of Science Education: Handles science education programs.
- Directorate of Science and Technology Policy: Focuses on policy development and implementation.
- Directorate of Science Education and Training: Manages science education and training initiatives.

2.3.4 NUMBER OF EMPLOYEES,

The Oromia Science and Technology institution employs a total of 147 individuals who contribute to the organization's mission and objectives. These employees fulfill various roles and responsibilities across different departments and divisions within the institution. The workforce at Oromia Science and Technology is likely composed of a diverse group of professionals, including academic staff, researchers, administrators, technical experts, and support staff. Each of these employees plays a crucial role in the institution's operations, whether it involves conducting research, teaching, managing administrative functions, providing IT support, or contributing to the overall development of science and technology initiatives in the Oromia region. The institution's staff members collaborate and work together to achieve its goals, which may include advancing scientific knowledge, promoting technological innovation, supporting education and training in science-related fields, and shaping science and technology policies to benefit the region and its residents.

With 147 employees, Oromia Science and Technology demonstrates its commitment to its mission and the importance it places on a dedicated and skilled workforce to drive advancements in science and technology within the Oromia region.

2.3.5 POSITIONING ON THE MARKET

The positioning of the Oromia Science and Technology Bureau (OSTB) in the market would depend on its specific goals and objectives, as well as the initiatives and activities it has undertaken to promote science, technology, and innovation within the Oromia region of Ethiopia. There are some potential ways in which OSTB could position itself in the market:

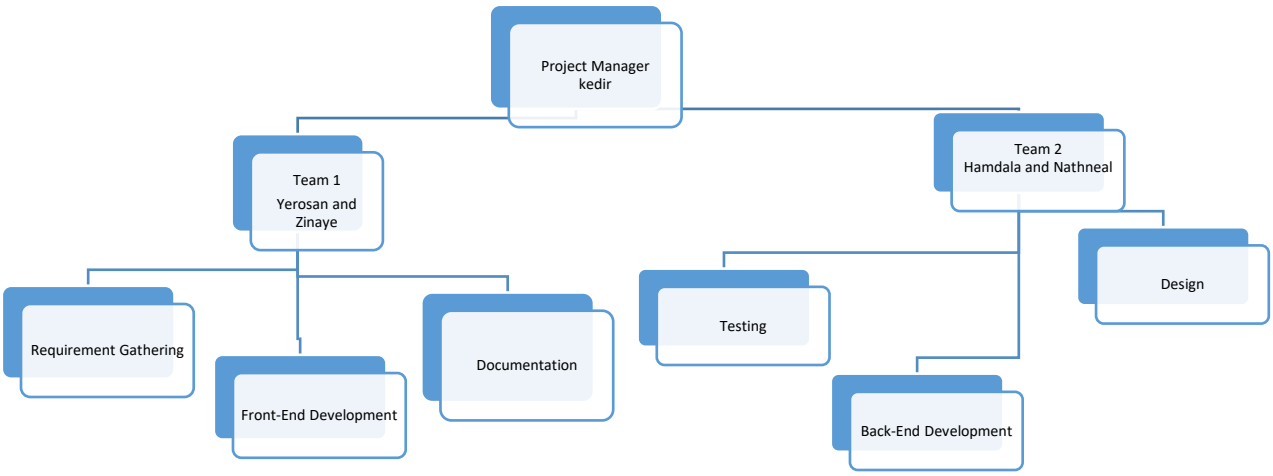
- **Regional Innovation Hub:** OSTB could position itself as a hub for innovation and technological advancement within the Oromia region. By providing support for startups, access to research facilities, and fostering collaboration between academia and industry, OSTB can play a central role in driving innovation and economic growth.
- **Research and Development Leader:** If OSTB is heavily involved in funding and supporting research projects in various scientific and technological fields, it could position itself as a leader in R&D within the region. This would make it an attractive partner for organizations seeking to leverage research expertise.

- **Technology Transfer Facilitator:** If OSTB focuses on technology transfer and commercialization of research outcomes, it can position itself as a facilitator for businesses looking to adopt cutting-edge technologies developed within the region.
- **STEM Education Promoter:** If OSTB places a strong emphasis on STEM education and workforce development, it can position itself as a key player in building a skilled workforce for the region, which can attract businesses and industries seeking talent.
- **Sustainability and Environmental Advocate:** If OSTB is actively involved in promoting sustainable practices and environmental technologies, it can position itself as a leader in sustainability efforts, attracting organizations and investors interested in sustainable development.
- **Policy and Regulation Expert:** If OSTB is instrumental in developing science and technology policies and regulations within the region, it can position itself as a go-to source for guidance on compliance and best practices.
- **Collaboration and Networking Hub:** OSTB can position itself as a hub for collaboration and networking, facilitating partnerships between research institutions, universities, industries, and government bodies. This can create a vibrant ecosystem for innovation and economic growth.
- **Community Engagement and Outreach:** By actively engaging with the local community and promoting the benefits of science and technology, OSTB can position itself as a trusted advocate for knowledge dissemination and community development.

CHAPER THREE

DESCRIPTION OF THE INTERNSHIP POSITION

3.1 STRUCTURE OF TEAM



Figures 3.1 Structure of Team

3.2 DESCRIPTION OF THE INTERN'S ROLE

Overview of the internship experiences and contributions of Team members during their internship in Our Project. We held roles as requirement gatherers, testers, front-end and back-end developers, playing vital roles in projects that involved requirement gathering, quality assurance testing, front-end and back-end development.

- **Hamdala And Nathneal Roles and Responsibilities:**
  - **Testing:**

As testers, Hamdala and Nathneal were responsible for ensuring the quality and reliability of software products. Their duties included:

- Collaborating with the development team to understand project requirements and functionality.
- Designing and executing test cases, scripts, and scenarios to identify defects and issues.
- Logging and documenting identified defects and working closely with developers to facilitate their resolution.
- Conducting regression testing to verify that previous issues have been resolved and new features have not introduced new defects.
- Preparing and maintaining test documentation and reports.

➢ **Back-End Development:**

In their role as back-end developers, Hamdala and Nathneal were tasked with developing server-side components and logic. Their responsibilities included:

- Developing server-side scripts and applications using JavaScript and related technologies.
- Designing and implementing database schemas and optimizing database performance.
- Collaborating with front-end developers to ensure seamless integration between the front-end and back-end components.
- Writing clean, efficient, and maintainable code while adhering to coding standards.

❖ **Yerosan And Zinaye Roles and Responsibilities:**

This report summarizes the internship experiences and contributions of Yerosan and Zinaye during their internship at Oromia Science and Technology They served as requirement gatherers and front-end developers, playing crucial roles in projects that involved gathering, analyzing, and documenting requirements and implementing front-end solutions. This report provides insights into their roles, responsibilities, and accomplishments.

➢ **Requirement Gathering:**

As requirement gatherers, Yerosan and Zinaye were responsible for eliciting and documenting project requirements. Their duties included:

- Conducting interviews and meetings with stakeholders to understand their needs and objectives.
- Using various elicitation techniques, such as surveys and observations, to gather information.
- Collaborating with project teams to ensure a comprehensive understanding of requirements.
- Documenting requirements in a clear, concise, and organized manner, adhering to industry-standard templates and formats.
- Proactively seeking clarification from stakeholders to ensure unambiguous requirements.

➢ **Front-End Development:**

In their role as front-end developers, Yerosan and Zinaye were tasked with creating user interfaces and implementing front-end solutions. Their responsibilities included:

- Translating design mock-ups and wireframes into functional user interfaces.
- Writing clean, efficient, and maintainable code using React, CSS, and JavaScript.
- Ensuring cross-browser compatibility and responsive design for various devices.
- Collaborating with designers and back-end developers to integrate front-end components seamlessly.
- Conducting thorough testing to identify and resolve any front-end issues.

3.3 OVERVIEW OF THE ORGANIZATION OF WORK AND WORK ENVIRONMENT

We are overview of the organization of work and the work environment, including descriptions of resources, tools, methods, and other relevant information in a typical professional setting:

3.3.1 WORK ENVIRONMENT:

The organization maintains a modern and collaborative work environment designed to foster productivity, creativity, and teamwork. Key features of our work environment include:

❖ **Office Spaces:** We provide open-plan offices with designated workstations for each team member. These spaces are designed to encourage collaboration while offering opportunities for focused work.

❖ **Meeting Rooms:** Multiple well-equipped meeting rooms are available for team meetings, client discussions, and brainstorming sessions. Video conferencing facilities are also accessible to accommodate remote collaboration.

- **Break Areas:** We offer comfortable break areas where employees can relax, socialize, or unwind during breaks. These spaces are essential for maintaining work-life balance.
- **Technology Infrastructure:** The organization invests in the latest technology infrastructure, including high-speed internet, robust server systems, and secure data storage solutions.
- **Ergonomic Furniture:** Ergonomic chairs and desks are provided to ensure the comfort and well-being of our employees during extended work hours.
- **Natural Lighting:** The workspace is designed to maximize natural lighting, creating a pleasant and energizing atmosphere.

3.3.2 RESOURCES:

The organization provides a range of resources to support employees in their work:

- **Computers and Laptops:** Every team member is equipped with a dedicated computer or laptop that meets the necessary hardware and software requirements for their roles.
- **Software Tools:** We provide licensed software tools and applications essential for various job functions, including project management, design, development, and analytics.
- **Access to Data and Information:** Employees have access to a centralized database and knowledge-sharing platforms to access data, documents, and information relevant to their projects.
- **Library and Learning Resources:** The organization maintains a library of relevant books, journals, and online learning resources to support continuous professional development.

3.3.3 METHODS AND PROCESSES:

Our work environment is structured around efficient methods and processes:

- **Project Management:** We follow industry-standard project management methodologies, such as Agile, Scrum, or Waterfall, depending on the nature of the project. Dedicated project managers oversee project execution.
- **Collaboration Tools:** We use collaboration tools and software platforms to facilitate real-time communication and collaboration among team members, both in-house and remote.
- **Documentation:** Comprehensive documentation practices ensure that project details, requirements, and outcomes are well-documented and accessible to all stakeholders.
- **Quality Assurance:** Quality assurance processes and methodologies are implemented to maintain high standards and ensure the delivery of error-free products and services.

- **Feedback and Review:** Regular team meetings, reviews, and feedback sessions are conducted to evaluate progress, address challenges, and improve processes.

3.3.4 SAFETY AND WELL-BEING:

The organization places a strong emphasis on the safety and well-being of our employees:

- **Health and Safety Protocols:** We have established health and safety protocols to ensure the well-being of employees, including emergency response plans and first-aid facilities.
- **Work-Life Balance:** We encourage work-life balance through flexible work arrangements and policies that support a healthy work environment.
- **Mental Health Support:** Mental health resources and counseling services are available to support the well-being of our team members.

CHAPTER FOUR

DESCRIPTION OF THE EXPERIENCE

4.1 OVERVIEW AND DESCRIPTION OF THE MAIN TASKS DURING THE INTERNSHIP PERIOD

The internship involves actively participating in the development and deployment of an Online Examination and Practice System, a web-based platform aimed at providing users with the ability to take online exams and practice tests. The internship will expose interns to various aspects of software development, including front-end and back-end development, quality assurance, and project management.

- **Main Tasks and Responsibilities:**
- **Requirements Analysis and Elicitation:**
  - Collaborate with stakeholders and project managers to gather detailed requirements for the system.
  - Engage in interviews, workshops, and surveys to understand user needs and expectations.
  - Document user stories and functional requirements to guide development.
- **Front-End Development:**
  - Implement the user interface (UI) of the Online Examination and Practice System.
  - Translate design mock-ups and wireframes into interactive and responsive web pages.
  - Ensure the user interface is user-friendly, intuitive, and accessible.
- **Back-End Development:**
  - Develop the server-side components of the system using Node.js and related technologies.
  - Implement database schemas and optimize database performance.
  - Create APIs and services to support user authentication, exam creation, and scoring.
- **Database Design and Management:**
  - Design the database schema to store user data, questions, exams, and results.
  - Implement data validation, security measures, and efficient data retrieval mechanisms.
  - Ensure data integrity and reliability.
- **User Authentication and Security:**

- Implement robust user authentication and authorization mechanisms to protect user data and system integrity.
- Apply security best practices to safeguard against common web vulnerabilities.

➢ **Testing and Quality Assurance:**

- Create test cases and scenarios to thoroughly test the system's functionality.
- Conduct manual and automated testing to identify and report defects.
- Collaborate with the quality assurance team to ensure a bug-free and reliable system.

➢ **Documentation:**

- Maintain comprehensive documentation of the system's architecture, code, and configuration.
- Create user guides and documentation for system administrators.

➢ **User Training and Support:**

- Assist in developing user training materials and provide support to users during the testing and rollout phases.
- Address user inquiries and issues promptly and professionally.

➢ **Project Management:**

- Collaborate with project managers to plan and schedule tasks and milestones.
- Participate in regular project meetings to discuss progress, challenges, and solutions.
- Contribute to project planning and reporting.

4.2 MORE DETAILED ANALYSIS

To provide a more detailed analysis of the first three or more main tasks during the internship focused on building an Online Examination and Practice System:

❖ **Front-End Development**

➢ **Initial Task:**

The task involved implementing the user interface (UI) for the Online Examination and Practice System.

➢ **Solution:**

- We began by reviewing design mock-ups and wireframes provided by the design team.

- They used HTML, CSS, and JavaScript to translate these designs into functional web pages.
- Regular code reviews and collaboration with designers ensured alignment with the intended user experience.

➢ **Problems Encountered:**

- Browser Compatibility: Ensuring the UI worked seamlessly across various browsers and devices presented challenges due to differing rendering engines.
- Usability Feedback: Gathering feedback from users to refine the UI design was a time-consuming process.

➢ **Methods Used to Solve Them:**

- Cross-Browser Testing: Extensive testing was conducted to identify and address browser-specific issues and ensure cross-browser compatibility.
- Usability Testing: A usability testing phase was introduced to gather user feedback and make iterative improvements to the UI design.

➢ **End Result with Reasoning and Analysis:**

- The end result was a visually appealing and user-friendly user interface for the system.
- Cross-browser testing helped identify and resolve compatibility issues, ensuring a consistent user experience.
- Usability testing allowed the team to make data-driven design improvements, resulting in a more intuitive and efficient UI.
- Collaboration between front-end developers and designers was critical in achieving a UI that met both functional and aesthetic requirements.

❖ **Back-End Development**

➢ **Initial Task:**

- The task involved developing the server-side components and logic for the Online Examination and Practice System.

➢ **Solution:**

- We used a back-end framework and Node.js and Express to build the server-side functionality.
- They designed the database schema to store user data, questions, exams, and results.
- APIs and services were developed to support user authentication, exam creation, and scoring.

- **Problems Encountered:**
    - Data Security: Ensuring data security and protecting user information required careful consideration.
    - Scalability: Anticipating future growth and ensuring the system could handle increasing user loads posed challenges.
- **Methods Used to Solve Them:**
    - Security Best Practices: Implemented encryption, user authentication, and authorization mechanisms to enhance data security.
    - Performance Testing: Load testing was conducted to identify potential bottlenecks and optimize the system for scalability.
- **End Result with Reasoning and Analysis:**
    - The end result was a robust and secure back-end system capable of handling user data and exam-related processes efficiently.
    - Implementing security best practices ensured that user data was safeguarded, enhancing user trust.
    - Performance testing provided insights into system scalability, enabling optimizations to accommodate future growth.
    - Collaboration with front-end developers was crucial to ensuring seamless data communication and system functionality.

❖ **Requirements Analysis and Elicitation**

Initial Task: The initial task for interns involved gathering and analyzing requirements for the Online Examination and Practice System.

- **Solution:**
    - We engaged in extensive discussions with stakeholders, including educators and students, to understand their specific needs and expectations.
    - They conducted surveys to collect quantitative data on preferred features and usability requirements.
    - User stories and functional requirements were documented to provide a clear foundation for development.
- **Problems Encountered:**
    - Ambiguity in Requirements: Some stakeholders had vague or conflicting requirements, which posed a challenge in creating clear and actionable user stories.

- Scope Creep: Additional requirements were continuously introduced during the requirement gathering phase, which impacted project timelines.

➢ **Methods Used to Solve Them:**

- Stakeholder Interviews: Interns conducted in-depth interviews to clarify vague requirements and obtain a better understanding of stakeholders' needs.
- Requirements Prioritization: To manage scope creep, requirements were prioritized based on business value, and less critical features were deferred for future phases.

➢ **End Result with Reasoning and Analysis:**

- The end result was a comprehensive set of user stories and functional requirements that provided a clear roadmap for development.
- By engaging with stakeholders and conducting surveys, the team gained valuable insights into user preferences and expectations.
- Despite initial challenges, prioritizing requirements ensured that the core features essential for a minimum viable product (MVP) were delivered within the project timeline.
- The well-documented requirements served as a solid foundation for subsequent development tasks, ensuring alignment with stakeholder needs.

❖ **Database Design and Management**

➢ **Initial Task:**

- The task involved designing and managing the database for the Online Examination and Practice System.

➢ **Solution:**

- Interns collaborated with the development team to define the database requirements based on the project's data model.
- They used a relational database management system (RDBMS) and SQL to create the database schema.
- Efforts were made to optimize database queries for efficient data retrieval and storage.

➢ **Problems Encountered:**

- Complex Data Structure: The project required a complex data structure to manage user accounts, questions, exams, and results, making database design challenging.
- Data Integrity: Ensuring data integrity while handling concurrent user actions was crucial and posed a potential issue.

- **Methods Used to Solve Them:**
    - Entity-Relationship Diagrams (ERDs): ERDs were created to visualize the relationships between different data entities, facilitating a clearer database design.
    - Transactions and Locking: Techniques like transactions and locking mechanisms were implemented to maintain data integrity in a multi-user environment.
- **End Result with Reasoning and Analysis:**
    - The end result was a well-structured and efficient database that could manage user data, questions, exams, and results seamlessly.
    - The use of ERDs helped in conceptualizing the database design, ensuring that it aligned with the project's requirements.
    - Implementing transactions and locking mechanisms helped prevent data anomalies and conflicts when multiple users interacted with the system simultaneously.
    - The optimized database design contributed to improved system performance and responsiveness, enhancing the overall user experience

CHAPTER FIVE

ANALYSIS OF THE EXPERIENCE

5.1 ASSESSMENT OF ASSIGNMENT PERFORMANCE AND NEW KNOWLEDGE AND SKILLS ACQUIRED

5.1.1 KNOWLEDGE AND SKILLS FROM UNIVERSITY

Although Wachemo University is the one of the 3rd generation Universities in Ethiopia that provides the Software engineering department. We are very glad we decided study Software engineering in WCU as we found it fascinating. Because, we have best a very talented and experienced teacher in the department. We have good and suitable learning environment that helps us to grasp, catch or get intended knowledge regards to software engineering. Almost all courses we have been studying in the University under Software engineering department were useful Courses during industrial practice. The course such as: -

- SRS
- Programming languages
- Database Management System and etc. was have huge contribution during project development

The university has put great effort to include various courses that would help in the real world working environment. However, still lots of efforts are to be made because the current courses and knowledge gained in the college is still not sufficient enough to work in the practical environment. The university must execute some research and studies to select the courses that fulfill the current market requirements that would help the students to qualify themselves in the practical implications as well

5.1.2 KNOWLEDGE AND SKILLS FROM INTERNSHIP

The Industrial Practice program was quite beneficial for us. During an internship, you can acquire a wide range of skills, both technical and soft skills. The specific skills you gain will depend on the nature of the internship and the tasks and projects you are involved in. Here are some common types of skills you can acquire from an internship:

- **Technical Skills:**
  - **Programming Languages**: Depending on the internship, We learn programming languages such as JavaScript more.

- **Web Development:** Skills in web development technologies React.js
- **Backend Development:** Skills in server-side technologies like Node.js Express.js.
- **Version Control:** Proficiency in version control systems like GitHub for code collaboration and management.
- **Testing and Quality Assurance:** Skills in software testing, including unit testing, integration testing, and end-to-end testing.
- **Cloud Computing:** Understanding cloud platforms like AWS, Azure, Google Cloud, or others for hosting and scaling applications.
- **API Development:** Experience in designing and building RESTful APIs.
- **Data Analysis:** Skills in data analysis tools and techniques, such as data visualization, data cleaning, and data manipulation.

❖ **Soft Skills:**

- **Communication:** Improved written and verbal communication skills, including the ability to articulate ideas and collaborate effectively.
- **Teamwork:** Experience working collaboratively with team members, understanding team dynamics, and contributing to group projects.
- **Problem-Solving**: Developing problem-solving skills to address technical and non-technical challenges.
- **Time Management:** Efficiently managing tasks, prioritizing work, and meeting deadlines.
- **Adaptability:** The ability to adapt to new technologies, tools, and work environments.
- **Leadership:** Opportunities to see on leadership roles within projects or teams.
- **Critical Thinking:** The ability to analyze situations, make informed decisions, and think critically.
- **Networking:** Building professional relationships and expanding your network within the industry.
- **Customer Service**: If applicable, handling customer inquiries, support requests, and improving customer service skills.
- **Conflict Resolution:** Dealing with conflicts or challenges within the workplace and finding solutions.

And also we gained new knowledge in the area of developing website development using React.js, Node.js, Express By studying project or tasks, we also learnt that how database products store the information. We have got some insight into a how a new field looks like when in the initial stage and what are the various things which need to be done initially like requirement collection, and update the existing solutions. During the internship we could contribute independently to ongoing research projects. Programming tutorials but especially explanations from my tutor and other colleagues helped us improving our skills.

5.2 ASSESSMENT OF APPLICABILITY OF THE KNOWLEDGE/SKILLS ACQUIRED IN THE COURSE OF STUDIES IN PRACTICE

It's great to hear that we have acquired a variety of knowledge and skills both from Wachemo University and Oromia Science and Technology experience. We are summary of the skills we've mentioned applying in our practical work:

- **Programming Languages:** We apply programming languages such as JavaScript in your web development projects, including React.js for front-end and Node.js with Express.js for back-end development.
- **Web Development:** We use your web development skills to create and maintain websites and web applications, incorporating technologies like React.js for user interfaces.
- **Backend Development:** We work on the server-side of applications, utilizing technologies like Node.js and Express.js to build robust and efficient back-end systems.
- **Version Control:** We use GitHub for code collaboration and version control, allowing you to work effectively in a team and manage code changes.
- **Testing and Quality Assurance:** We apply software testing skills, including unit testing, integration testing, and end-to-end testing, to ensure the quality and reliability of your software products.
- **Cloud Computing:** We have knowledge of cloud platforms like AWS, Azure, or Google Cloud, which you apply for hosting and scaling applications.
- **API Development:** We design and build RESTful APIs, enabling communication between different components of your applications.

- **Data Analysis:** We utilize data analysis tools and techniques for tasks such as data visualization, data cleaning, and data manipulation, enhancing your ability to work with data-driven applications.
- **Communication:** We effectively communicate with team members, clients, or end-users, ensuring that project requirements are understood and met.
- **Teamwork:** We collaborate with team members, contributing to group projects and understanding team dynamics.
- **Problem-Solving:** We apply problem-solving skills to address technical and non-technical challenges that arise during projects.
- **Time Management:** We efficiently manage tasks, prioritize work, and meet deadlines to ensure project success.
- **Adaptability:** We adapt to new technologies, tools, and work environments, staying current in a rapidly evolving field.
- **Leadership:** We see on leadership roles within projects or teams, guiding and coordinating efforts as needed.
- **Critical Thinking:** we analyze situations, make informed decisions, and think critically to overcome obstacles and optimize solutions.
- **Networking:** We build professional relationships and expand your network within the industry, which can lead to future opportunities and collaborations.
- **Customer Service:** We handle customer inquiries and support requests, applying your customer service skills to enhance user satisfaction.
- **Conflict Resolution:** we address conflicts or challenges within the workplace and find effective solutions to maintain a productive working environment.

Overall, our combination of technical and soft skills acquired from both your university education and internship has prepared you well for practical work in the field of software engineering, allowing you to contribute effectively to projects and adapt to the ever-changing demands of the industry.

5.3 ASSESSMENT OF SUITABILITY OF THE SELECTED HOST ORGANIZATION

Oromia Science and Technology, as a governmental organization, offers a well-rounded and supportive environment for us to achieve their internship objectives. Its alignment with software engineering goals, access to technical resources, mentorship opportunities, and engagement in impactful projects make it a strong choice for those looking to gain practical experience and contribute to real-world software solutions.

- **Technical Resources and Infrastructure:**

OST have a modern technical resources and infrastructure necessary for software development. This includes hardware, software tools, and robust development environments, ensuring that you have the necessary tools to excel in your internship projects.

- **Mentorship and Professional Development:**

Within OST, We get experienced professionals and experts in software engineering. These individuals can serve as mentors and provide invaluable guidance throughout our internship. Their expertise can help us refine our skills and navigate complex software development challenges.

- **Real-World Projects:**

Governmental organizations often undertake large-scale projects that have a significant impact on the community. We with the opportunity to work on real-world software projects, allowing we to apply our skills to meaningful initiatives.

- **Exposure to Diverse Domains:**

Governmental organizations like OST frequently engage in projects across various domains, such as healthcare, agriculture, education, and public administration. This exposure to diverse fields can broaden our horizons as a software engineer, allowing us to adapt our skills to different sectors.

- **Ethical and Responsible Development:**

OST, as a governmental organization, is likely to adhere to ethical and responsible software development practices. This experience will teach you the importance of ethical considerations in software engineering, which is crucial in the professional world.

- **Collaborative Environment:**

We worked in a collaborative and multidisciplinary environment. Interacting with professionals from various backgrounds can enhance your teamwork and communication skills, which are valuable assets in software engineering.

- **Potential for Long-Term Opportunities:**

Interning at OST may open doors for long-term career opportunities within the organization or the broader public sector. Governmental organizations often offer stable and rewarding career paths.

- **Networking Opportunities:**

OST we get a unique networking experience. We'll have the chance to connect with professionals in the public sector, which can be valuable for future job prospects and collaborations.

SUMMARY

This report provides information about an internship hosting organization and the position held by the intern. The purpose of the internship is to provide a valuable learning experience and an opportunity to apply the knowledge and skills acquired during academic studies in a real-world professional setting. The internship organization is focused on fostering technological development, innovation, and research within the region, with a vision to harness the potential of science and technology for socio-economic development.

The organization offers various products and services, including website development using content management systems (CMS) like WordPress. They specialize in creating custom websites and providing ongoing maintenance and support. They also offer e-commerce solutions, enabling businesses to sell products and services online. The organization is involved in promoting STEM education, supporting programs and initiatives aimed at fostering a skilled workforce in science, technology, engineering, and mathematics.

The intern's role within the organization is described, and the structure of the team is outlined. The internship experience includes gaining hands-on experience in various aspects of the business, such as product/service development, marketing, and customer support. The work environment is described, including the resources and methods/processes used. Safety and well-being are also highlighted.

The document mentions the organization's focus on collaboration and partnerships, emphasizing the importance of working with national and international institutions, government agencies, and industry partners to leverage resources, expertise, and funding for various initiatives. The organization aims to bridge the gap between academia and industry and position itself as a hub for collaboration and networking.

Potential ways in which the organization could position itself in the market are discussed. This includes being a regional innovation hub, promoting sustainability and environmental technologies, and being a facilitator for technology transfer and commercialization of research outcomes.

The report concludes with an analysis of the internship experience, assessing the performance and new knowledge and skills acquired. The applicability of the knowledge/skills acquired in the course of studies in practice is also evaluated. The suitability of the selected host organization is discussed as well.

Overall, this report provides a detailed overview of the internship hosting organization, the intern's role, the organization's products and services, and it's positioning in the market. It also highlights the importance of collaboration, partnerships, and community engagement in driving innovation and economic growth.

REFERENCES

[1] Guidelines for writing an internship report Wachemo University, Department of Software Engineering, 2016.

[2] Official website of Oromia Science and Technology http://www.ost.gov.et/

[3] Official website of Wachemo University https://wcu.edu.et/

[4] D. Simon, How to do research, http://academic.csuohio.edu/simond/courses/research.doc.

[5] LinkedIn page of Oromia Science and https://www.linkedin.com/in/oromia-science-and-technology-816368148?originalSubdomain=et

[6] Facebook page of Oromia Science and Technology https://www.facebook.com/p/Oromia-Science-Technology-and-Information-Communication-Authority-100066795229195/.

Appendix some questions regarding to this report

No.	Questions	Resolutions
1	**What type of language we use for front-end?**	**JavaScript and it's framework React.js**
2	**What type of language we use for back-end?**	**Node.js, Express and MySQL**
3	**Which type of software they want that we do for it?**	**As Expected**
4	**Which type of software they want that we do for them?**	**Web application**
5	**What kind of new skill we acquired?**	**Soft and Technical skills. Like communication, team work, react.js and node.js skills etc.…**
6	**What is your ultimate goal for this project?**	**To avoid chatting and available for all student practice exam**
7	**What type of user use the system?**	**Student and Admin**
8	**How do you prioritize our workload?**	**It depends on priority and time**
9	**For what purpose the system is important?**	**all student practice exam**
10	**By what language the user understand the system?**	**English Language and afan Oromo**
11	**What's a challenging situation you experienced while working on a project?**	**Less Time**
12	**What kind of main products and services they** offers?	website development Research Funding Science and Technology Education

Table of Appendix