Problem Statement and Goals
MES-ERP

Team #26, Ethical Pals
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Table 1: Revision History

Date	Developer(s)	Change
Sep 24th, 2024	Omar	Problem Statment and all subsections
Sep 24th, 2024	Rachid, Sufyan	Sections 2, 3, and 4
Sep 24th, 2024	Omar, Rachid, Sufyan, Housam, Taaha	Appendix

1 Problem Statement

1.1 Problem Statement

The MES (McMaster Engineering Society) is looking to develop a finance and accounting system that will streamline the financial operations of 60 student groups. Currently, the financial operations involve inefficient, fragmented processes that make it difficult to track budgets, manage expenses, and process reimbursement requests. The platform created will intake reimbursement receipts to help track budgets, manage expense reporting, and streamline reimbursement requests in an orderly fashion. By offering custom budget creation, live ledger tracking, modular receipt submission, and multiple approval levels, the system will provide a single, accessible platform by outputting reimbursement requests and responses for all financial matters related to the MES and it's member clubs or organizations.

1.2 Problem

The main problem the MES is facing is the large amount of reimbursement requests and financial documents it receives that must be processed. There is a current lack of organization for such requests and no clear system of how to deal with them except manually, there is no system in place to deal with them. This makes the MES lose track of the requests which leads to large wait times on the part of the clubs for reimbursement, which puts many of the club organizers in a tough position waiting for reimbursement.

1.3 Inputs and Outputs

- Inputs: Reimbursement receipts and financial documents provided to the McMaster Engineering Society (MES) by the clubs.
- Outputs: Processing and reimbursement for all expense requests to the club organizers who request them, as well as a response back to the student groups.
- Comprehensive and up-to-date financial records for the MES, detailing the recipients of payments and the corresponding payment dates.

1.4 Stakeholders

The stakeholders for this project include:

- Luke Schuurman, Vice President, Finance of the McMaster Engineering Society (MES).
- Members of the MES, including student groups and individuals who submit reimbursement requests.
- The MES, which oversees the financial support and reimbursement processes for various student groups.
- Any regulatory bodies that govern financial transactions and compliance within McMaster.
- Vendors and service providers who interact with the MES for financial transactions and reimbursements.
- The broader university community and potential investors who may have an interest in the financial transparency and efficiency of the MES.

1.5 Environment

We intend for our solution to be usable on all platforms (Windows, Linux, and Mac), but not on mobile devices; it will most likely be hosted on a server owned by McMaster, but must be lightweight enough for a laptop to host the

solution. The laptop hosting the information should be a modern laptop with at least 4 GB of RAM, a modern CPU (mid-range released within the last 5 years, e.g. i5 8300h), and access to the internet. The frontend of the program will be programmed in React, with the backend being in NextJS. These hardware restrictions are subject to change as the solution evolves.

2 Goals

1. **Customizable Approval Workflows**
   Allow custom approval workflows that enable different student groups to customize the approval workflows according to their unique needs for expense and budget approvals. This will provide flexibility, allowing for the platform to scale and conform to the diverse requirements of various teams. This will be considered successful if 95% of users are able to create workflows well suited to their needs without errors or complaints.

2. **Audit and Compliance Tracking**
   Implement detailed audit logs for all transactions, approvals, and modifications to ensure accountability and compliance with financial regulations. This will ensure that all financial activities are traceable and meet compliance standards, reducing risks and delays during audit processes. The audit log should record 100% of relevant activities, with full traceability and no gaps in tracking.

3. **User Dashboard with Financial Overview**
   Develop a dashboard that provides users with real-time summaries of their budgets, expenses, pending reimbursements, and financial approvals. This will offer users a comprehensive view of their financial standing at any given time which will help gauge future decisions and reflection on past data. The dashboard accurately displays data for 100% of transactions, with a refresh rate under 5 minutes.

4. **Machine Learning Based Expense Categorization**
   Train and implement a machine learning algorithm to automatically categorize expenses based on historical reimbursement data. This will reduce the burden of manual input and repetitiveness on users. The trained model will be considered a success if it can achieve an accuracy rate of at least 85%.

3 Stretch Goals

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4 Challenge Level and Extras

4.1 Challenge Level: General

The general challenge level comes from the project requiring to create multiple complex features such as real-time ledger tracking, modular receipt submissions, multi-level approval workflows, and automated notifications all while creating a well-designed user interface that allows users to immediately find and use these features. Another challenge also comes from integrating TypeScript and Next.js with existing MES applications. This must be done while maintaining stability and performance.

4.2 Extras

1. Useability Testing
   Conduct formal usability testing with a variety of stakeholders (students, financial staff) to refine the interface and ensure a smooth user experience.

2. User Documentation
   Create comprehensive user documentation in the form of written docu-

mentation and video tutorials that guides end-users through every step of submitting expenses, reviewing budgets, and navigating the platform.

Appendix — Reflection

1. What went well while writing this deliverable?
   Omar, muhammao, 400325041
   What went well for this deliverable were the team meetings we had throughout the project. These meetings helped me understand what was needed for the project as a whole and for the deliverable itself. The assistance provided by my teammates also helped me overcome issues with Git, which smoothed out the process.

   Housam Alamour, 400317089
   I believe this deliverable was instrumental in organizing the team structure and ensuring that everyone knows their roles in the team and what is expected of them. What went really well was being able to establish a consistent line of communication with all the group members and having the first encounter where we all together well. We would each work on some part of the deliverable then receive valuable feedback to continue to fix it. This has set a very solid foundation for collaborating on the rest of the project.

   Sufyan, motalas, 400307042
   While writing this deliverable, we decided on first writing down all the information in Google Docs and then have a person push the changes that should be added to the LaTeX document. This allowed us to completely avoid conflicts and saved us a lot of time. We co-authored commits to properly credit everyone's work.

   Rachid, khneissr, 400300627
   We decided to work on this deliverable in person together and quickly realized that we need to set up our development environment to compile LaTeX into pdf documents. We worked together to get it working and quickly solved problems anyone had. This greatly minimized time spent setting up and allowed us to spend more time completing the work.

   Taaha, Atif, 400322524
   For this deliverable, we successfully divided the tasks evenly and efficiently among all group members. This enabled everyone to start working simultaneously without interfering with each other's progress. Additionally, our communication was strong, allowing us to quickly assist one another whenever someone encountered challenges.

2. What pain points did you experience during this deliverable, and how did you resolve them? (Done as group)
   The pain points for this deliverable were the issues encountered while installing LaTeX on VSCode. We all agreed that the entire team faced the

following errors. We faced some errors with my environment settings, and setting it up took longer than we would have liked. Another challenge was finding the correct information from the lectures that was needed for each section of work (environment). However, once we found the relevant sections, the work was completed smoothly. Another pain point was ensuring everyone understood their role and were working on different parts of the project to ensure there was not duplicated effort. Upon encountering these issues, our team was able to discuss and resolve them in a way that ensures that they will never happen in the future, saving us time and effort later on.

3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)? (Done as group)
   We adjusted our goals by ensuring that the scope of the project was not too large. The MES covers a broad range of tasks that the project could have included, but we took into account everyone's schedules and what our project supervisor wanted to achieve with our capstone project. Using this information, we accepted a level of work that we found suitable for our team. This work included only agreeing to work first on including "Streamlining reimbursement requests, Payment requests, Intramural funding applications". We also agreed that once these initial, baseline features had been implemented we could move to tackling the other parts of the project.