**ASSIGNMENT 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Qualification** | **BTEC Level 5 HND Diploma in Computing** | | | | |
| **Unit number and title** | **Unit 22: Application Development** | | | | |
| **Submission date** | 16/12/2023 | | | **Date Received 1st submission** |  |
| **Re-submission Date** | 19/12/2023 | | | **Date Received 2nd submission** |  |
| **Group number:** |  | **Student names & codes** |  | **Final scores** | **Signatures** |
| 1 | **Tran Cong Hoang** | BH00317 |  | **CongHoang.Tran** |
| 2 | Nguyen Viet Anh | BH00404 |  |  |
| 3 | Ngo Vi Thien Quang | BH00589 |  |  |
| 4 | Dinh Hoang Duong | BH00631 |  |  |
| **Class** |  | | | **Assessor name** | **Do Quoc Binh** |
| **Student declaration**  I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice. | | | | | |

**Grading grid**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **P4** | **P5** | **M3** | **M4** | **P6** | **M5** | **D2** |
|  |  |  |  |  |  |  |

**OBSERVATION RECORD**

|  |  |  |  |
| --- | --- | --- | --- |
| **Student 1** |  | | |
| **Description of activity undertaken**  **• What the learner did**  **• The evidence provided/questions asked, and answers given:** | | | |
|  | | | |
| **Assessment & grading criteria** | | | |
|  | | | |
| **How the activity meets the requirements of the criteria** | | | |
|  | | | |
| **Student signature:** |  | **Date:** |  |
| **Assessor signature:** |  | **Date:** |  |
| **Assessor name:** |  | | |
| **Student 2** |  | | |
| **Description of activity undertaken** | | | |
|  | | | |
| **Assessment & grading criteria** | | | |
|  | | | |
| **How the activity meets the requirements of the criteria** | | | |
|  | | | |
| **Student signature:** |  | **Date:** |  |
| **Assessor signature:** |  | **Date:** |  |
| **Assessor name:** |  | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Student 3** |  | | |
| **Description of activity undertaken** | | | |
|  | | | |
| **Assessment & grading criteria** | | | |
|  | | | |
| **How the activity meets the requirements of the criteria** | | | |
|  | | | |
| **Student signature:** |  | **Date:** |  |
| **Assessor signature:** |  | **Date:** |  |
| **Assessor name:** |  | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Student 4** |  | | |
| **Description of activity undertaken** | | | |
|  | | | |
| **Assessment & grading criteria** | | | |
|  | | | |
| **How the activity meets the requirements of the criteria** | | | |
|  | | | |
| **Student signature:** |  | **Date:** |  |
| **Assessor signature:** |  | **Date:** |  |
| **Assessor name:** |  | | |

|  |  |  |
| --- | --- | --- |
| **Summative Feedback:  Resubmission Feedback:** | | |
| **Grade:** | **Assessor Signature:** | **Date:** |
| **Internal Verifier’s Comments:** | | |
| **Signature & Date:** | | |

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# **Introduction**

The CampusExpense Manager mobile application is an innovative solution developed by BudgetWise Solutions to assist university students in effectively managing their expenses and staying within their budgets. With the increasing financial challenges faced by students today, this app aims to simplify expense tracking and promote responsible financial behavior.

This report presents an overview of the CampusExpense Manager app, highlighting its key features, functionalities, and the process involved in its development. It also includes an evaluation of the suitability of the team's solution in relation to the needs of BudgetWise Solutions, with a critical review of systems investigation, design, development, and testing. Additionally, recommendations for future improvements are provided based on feedback and observations.

The report is structured into two main sections: Activity 1 and Activity 3. In Activity 1, a peer review of the user requirements and proposed solution was conducted, including the creation of a survey to gather feedback from relevant stakeholders. The survey responses were analyzed to identify weaknesses in the proposed solution, ensuring that it aligns with user needs and expectations.

In Activity 3, the team's solution is evaluated in terms of its suitability to meet the needs of BudgetWise Solutions. A critical review of systems investigation, design, development, and testing is provided to assess the reliability and effectiveness of the solution. Furthermore, actions taken to address feedback and enhance the solution are justified, and recommendations for future improvements are made, supported by a rationale.

The successful development of the CampusExpense Manager app required collaboration among the development team, including software developers, user experience designers, project managers, and quality assurance engineers. The team worked diligently within a limited timeline and budget to deliver a solution that meets the functional requirements and aligns with the expectations of the target user base: university students.

By implementing the recommendations outlined in this report, BudgetWise Solutions can further enhance the reliability and effectiveness of the CampusExpense Manager app. Continuous improvement, based on user feedback and performance monitoring, will ensure that the app remains a valuable tool for students in managing their expenses and promoting responsible financial habits.

Overall, the CampusExpense Manager app represents a significant step forward in empowering university students to take control of their financial well-being. Through its intuitive user interface, comprehensive expense tracking features, and adherence to data privacy and security, the app aims to make budget management an effortless and rewarding experience for students.

# **Contents.**

## **Activity 1: Conduct a peer review of the user requirements and proposed solution to refine your proposed solution.**

### **Create a survey and responses about user requirements and the proposed solution**

Here is the google form that we made to peer review between team member: [Assessment - Google Forms](https://docs.google.com/forms/d/1lwVDupJlTpKyeBdcYVTKzgFfYssFxjlA-g-9L1LoPyA/edit) . After peer review between team members, here is the result of it:

|  |  |
| --- | --- |
| **Name: Nguyen Viet Anh**  **Role: Login, Logout, register activity** | |
| **Question** | **Answer** |
| **Q1**: Based on the function requirement and issue that we have identify during develop "Campus Manage app", give opinion of it. (Example: functions recommendation and improvement, struggle may encounter, function that may not suit for the app that we haven't discover yet)? | Because currently, we don't have ability to develop "Campus Manage app" online. Therefore, we should also make function like login offline and store data in user database. We also don't have any ability or tools to measure non-function requirement such as performance, combability, security, ... |
| **Q2**: With the design document, timeline, budget that we plan from previous ASM, is it suitable for develop the "Campus Manage app"? Tell how to improve for part that not suitable. | The timeline is some kind of rush, but it suitable. The budget is way too expensive, since we don't know who the investor is, we will be the one who pay for this, and we don't have enough money for all of that. Therefore, need to reduce budget for non-important fee. |
| **Q3**: Name stakeholder that we may have forgot during the identify stakeholder (leave empty if don't find any) | Investors |
| **Q4**: Are tools we use is enough and suitable to develop "Campus Manage app"? Give other tools to replace the not suitable tools and give why that tool is suitable. | Just need some tools to measure non-function requirement such as performance, combability, security, ... |
| **Q5**: Recommend some useful information or resources that can help create function for function requirement faster and more effective. | For SQLite: <https://www.youtube.com/watch?v=hJPk50p7xwA&list=PLSrm9z4zp4mGK0g_0_jxYGgg3os9tqRUQ> |
| **Q6**: What can we do during develop "Campus Manage app" to make more user to use the app and user can feel convenient and easy to use it? | For textbox, we can use TextInputLayout because it is very user-friendly UI. For database, we can use SQLite, a build-in database in the Android phone that allow easily to store data without need to use cloud server. We also can also implant such as navigation bar to move from one activity to another, calendar in android studio instead of user have to input date manually, and divine layout with activity so we can reuse component easily and efficiency. |
| A screenshot of a computer  Description automatically generated | A screenshot of a computer  Description automatically generated |

Table : Survey member 1

|  |  |
| --- | --- |
|  | |
| **Name: Ngo Vi Thien Quang**  **Role: Add, edit, remove budget and expense activity** | |
| **Question** | **Answer** |
| **Q1**: Based on the function requirement and issue that we have identify during develop "Campus Manage app", give opinion of it. (Example: functions recommendation and improvement, struggle may encounter, function that may not suit for the app that we haven't discover yet)? | UI need to be more user-friendly |
| **Q2**: With the design document, timeline, budget that we plan from previous ASM, is it suitable for develop the "Campus Manage app"? Tell how to improve for part that not suitable. | yes |
| **Q3**: Name stakeholder that we may have forgot during the identify stakeholder (leave empty if don't find any) |  |
| **Q4**: Are tools we use is enough and suitable to develop "Campus Manage app"? Give other tools to replace the not suitable tools and give why that tool is suitable. | Yes |
| **Q5**: Recommend some useful information or resources that can help create function for function requirement faster and more effective. | You could use framework/API to design the software better |
| **Q6**: What can we do during develop "Campus Manage app" to make more user to use the app and user can feel convenient and easy to use it? | Make UI user-friendly |
| A screenshot of a chat  Description automatically generated | A screenshot of a computer  Description automatically generated |

Table : Surver member 2

|  |  |
| --- | --- |
|  | |
| **Name: Tran Cong Hoang**  **Role: Statistics of budget activities and expenditures by day, month, year** | |
| **Question** | **Answer** |
| **Q1**: Based on the function requirement and issue that we have identify during develop "Campus Manage app", give opinion of it. (Example: functions recommendation and improvement, struggle may encounter, function that may not suit for the app that we haven't discover yet)? | Need to add weekly and monthly spending notification function |
| **Q2**: With the design document, timeline, budget that we plan from previous ASM, is it suitable for develop the "Campus Manage app"? Tell how to improve for part that not suitable. | The cost is a bit high, resources and costs need to be optimized |
| **Q3**: Name stakeholder that we may have forgot during the identify stakeholder (leave empty if don't find any) | Investors |
| **Q4**: Are tools we use is enough and suitable to develop "Campus Manage app"? Give other tools to replace the not suitable tools and give why that tool is suitable. | Very suitable, just need a few more and it will be fine |
| **Q5**: Recommend some useful information or resources that can help create function for function requirement faster and more effective. | There needs to be a safe and secure place to store information |
| **Q6**: What can we do during develop "Campus Manage app" to make more user to use the app and user can feel convenient and easy to use it? | Marketing at colleges and universities |
| A screenshot of a chat  Description automatically generated | A screenshot of a computer  Description automatically generated |

Table : Survey member 3

|  |  |
| --- | --- |
|  | |
| **Name: Dinh Hoang Duong**  **Role: search budget, expense, and send notification** | |
| **Question** | **Answer** |
| **Q1**: Based on the function requirement and issue that we have identify during develop "Campus Manage app", give opinion of it. (Example: functions recommendation and improvement, struggle may encounter, function that may not suit for the app that we haven't discover yet)? | The UI need some improvement and the app still need more work on the notification system |
| **Q2**: With the design document, timeline, budget that we plan from previous ASM, is it suitable for develop the "Campus Manage app"? Tell how to improve for part that not suitable. | with all the budget and plan that you have planned out is very suitable for the project |
| **Q3**: Name stakeholder that we may have forgot during the identify stakeholder (leave empty if don't find any) |  |
| **Q4**: Are tools we use is enough and suitable to develop "Campus Manage app"? Give other tools to replace the not suitable tools and give why that tool is suitable. | I would recommend Flutter because its had fast development process, hot-reload feature, and the ability to create visually appealing, cross-platform apps with a single codebase. |
| **Q5**: Recommend some useful information or resources that can help create function for function requirement faster and more effective. | Implement automated testing frameworks such as Jest, Selenium, or Cypress to ensure the functions work as intended and avoid regressions during development cycles |
| **Q6**: What can we do during develop "Campus Manage app" to make more user to use the app and user can feel convenient and easy to use it? | simple and easy to understand UI and maybe add a tutorial on how to use the app function to help new user |
| A screenshot of a computer  Description automatically generated | A screenshot of a computer  Description automatically generated |

Table : Survey member 4

### **Analyze the survey results and proposed solutions.**

#### **Weakness about function and non-function requirement**

|  |  |  |
| --- | --- | --- |
| **Case** | **Weakness** | **Solution** |
| **1** | Campus Expense’s UI design is still not user-friendly and need to be improvement | To make UI more user-friendly, we will use TextInputLayout for textbox, implant navigation bar, using calendar in android studio instead of user have to input date manually. We also try our best to adjust UI position and layout right intended position and find other android application as a sample to develop Campus Expense |
| **2** | Notification from function requirement is only notification when user expense higher than budget, which need more improvement | We will add the notification function to alert user every week about the money in the budget that user can spend left. We also implement alert when the total of expense in that month = 50%, 80% and 100%. This way, user will allow to adjust their spending before the spend over the budget. |
| **3** | Haven’t cover about where Campus Expense’s data like expense and budget data will be store | We will using SQLite to store all the data in the user’s phone. It including: Username and password, budget, expenses,… |
| **4** | Don’t have anything to measure non-function requirement such as performance, combability, security,… | Since we are using Android studio, we will using android debug bridge. Android Debug Bridge will help us testing the security of applications, identifying vulnerabilities, and assessing their behavior in real-time |

Table : Weakness and solution of function and non-function

#### **Weakness about planning phase**

|  |  |  |
| --- | --- | --- |
| **Case** | **Weakness** | **Solution** |
| **1** | The budget needed to develop Campus Expense is too high and need to be reduce | We have adjusted the budget to suit with the team budget and the result is on the below table |
| **2** | Haven’s identify who the investor that provide budget to develop Campus Expense | Because we (developer team) are the only one develop and manage Campus Expense application, all the budgets including tools human resource, and marketing fee must be paid by our own budget. |
| **3** | Haven’t choosing kind of framework that we will be used to develop our application | We will be using SQLite to store all the data in the user’s phone. It including: Username and password, budget, expenses,… |
| **4** | We haven’t investigated tools in detail. Example, we could have used Flutter, a tool that allow to build application cross platform in both Android and IOS instead of using android studio. Or we can use testing frameworks such as Jest, Selenium, or Cypress to ensure the functions work as intended | Because of our scenario demand us to use Android Studio, we don’t have a choice to use Flutter. And we have chosen android studio to use it in the planning phase, changing tool now will make deadline delay for learning new tool. We will also be using Cypress after development to ensure that Campus Expense function is work as expected. |

Table : Weakness about planning phase

Here is the budget table after being adjusted the budget to suit with the team budget:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **Name expense** | **Number needed** | **Cost per 1** | **Total** |
| **1** | **BudgetWise Solutions Teams** | | | **1500$** |
| 1.2 | Development Team | 4 | 300$/ employee | 1200$ |
| 1.3 | Assurance Team | 1 | 200$/ times | 200$ |
| 1.4 | Media Team | 1 | 100$/ employee | 100$ |
| **2** | **Tools** | | | **460$** |
| 2.1 | Microsoft 365 | 4 x 4 | 10$/ months | 160$ |
| 2.2 | Media advertising | 3 | 50$/ months | 150$ |
| 2.3 | App market | 3 | 50$/ months | 150$ |
| **3** | **Backup budget** | | | **440$** |
|  | **Total** | | | **2400$** |

Table : Budget

## **Activity 2: Develop a functional business application using the preferred tools, techniques, and methodologies.**

After completing our application, here is the video demo of “CampusExpenses Manager”: <https://www.youtube.com/watch?v=NOvtJVq6JMQ>

Here is the code of “Campuse Expenses” after develop: <https://github.com/Vietanh12468/Application_Development_Group_Campus_Expenses>

## **Activity 3: Evaluation of the suitability of your team solution about the needs of BudgetWise Solutions.**

### **A critical review of systems investigation, design, development, and testing leading to improved reliability and effectiveness of the solution, with risk considerations.**

#### **Critical review of Systems Investigation**

Overall, the CampusExpense Manager App demonstrated effort, professionalism, comprehensive vision, and commitment to the quality and efficiency of the investigation process. Activities are conducted systematically and meet the project's requirements and goals. That could detail the following review focal points:

* **Comprehensive analysis**: My team performed a comprehensive analysis of the system, by researching and understanding the problem and requirements of the system and its stakeholders, especially students. The team conducted a survey with students and team members to understand students' needs and desires for CampusExpense Manager App. The survey results have provided important information to determine and meet the exact requirements of CampusExpense Manager App.
* **Engagement with stakeholders**: My team's CampusExpense Manager App has demonstrated positive engagement with stakeholders such as faculty, students, and our development team. The group organized meetings and discussions to listen to opinions and receive information from stakeholders such as Students and University Administrators. With input from faculty and administrators, the CampusExpense Manager App ensured that key perspectives and information from stakeholders were integrated into the investigation process.
* **Risk Analysis**: With CampusExpense Manager App, my team performed a detailed risk analysis, to identify and evaluate hazards and risks that could impact the investigation process. The team identified risks such as lack of resources for the investigation process or technical problems that could occur during system implementation such as budget constraints and team expertise. By identifying and assessing this risk, the team proposed prevention and risk management measures to ensure safety and stability for the investigation and construction of the CampusExpense Manager App.
* **Self-assessment and improvement**: The team self-assessed the activities and methods of the investigation process, and suggested possible improvements. For example, after completing a phase of the investigation process, the team held an internal review meeting to review the efficiency and effectiveness of the process. Based on this assessment, the team recommended improvements such as optimizing workflows or using data analytics tools to enhance information collection.
* **Detailed report**: The team produced a detailed report on the investigation process (Assignment 1), including analysis, results and recommendations. For example, this report contains information about research analyses, results from surveys of students, team members and University Administrators, and recommendations for the design and implementation of the complete CampusExpense Manager App.

#### **Critical review of Design**

The project demonstrated a reasonable and reliable design for the system. The design met the requirements and goals, while ensuring system feasibility, performance, security and scalability for the following reasons:

* **Reasonable design**: My team implemented a reasonable design for the system, meeting the established requirements and goals. When designing the user interface, the team carefully considered student feedback, and usability guidelines to create an interface that is intuitive and easy to use. This demonstrates attention to detail and the ability to meet user expectations. Campus Expense's user interface is designed with an easy-to-understand and intuitive structure. Users can easily find functions such as spending information, searching, adding, editing, and deleting spending, reporting spending statistics, managing expenses, and viewing account information.
* **Effective integration**: My project evaluated and designed system elements so that they function harmoniously and effectively. The interactions between components have been carefully considered, ensuring consistency and smooth integration. The Campus Expense app is designed to integrate efficiently with university student spending. When students log in to the system, they will easily see their income and expenses.
* **Clear definition**: The design has clearly defined the system's functions, processes, and workflows. This helps users and developers understand how the system works and optimize usage. The Campus Expense app design includes a detailed workflow chart that describes the specific steps for creating, reviewing, and approving expense requests. This helps users and teams understand their processes and responsibilities.
* **Scalability and flexibility**: The design considered the system's future scalability and flexibility. This allows the system to expand and adapt to future requirements and changes easily. The Campus Expense app is designed to easily scale as the student population grows. Data storage and management modules are designed according to the RAD model, allowing additional servers and resources.

#### **Critical review of Development**

The Campus Expense project demonstrated my team's professionalism and successful software development implementation. The team successfully developed the application on time and quite completely. It is expressed through the following evaluation criteria:

* **Progress and completion time**: The team developed the CampusExpense Manager application in accordance with the planned schedule and completed it on time within 12 weeks. Despite unexpected challenges and obstacles, the team still managed to deliver the software within the specified time frame. The project timeline includes milestones such as requirements gathering, user interface design, database implementation, testing, and deployment. The team continuously monitors progress, identifies potential bottlenecks and takes proactive measures to ensure timely completion within the expected timeline.
* **Software quality**: The team that built the CampusExpense Manager app prioritizes software quality by following strict quality assurance and testing processes. The team conducted comprehensive unit testing, integration testing, and user acceptance testing to identify and fix any potential bugs or issues. The team implemented automated testing frameworks and performed extensive code reviews to maintain high software quality standards. As a result, the software provided by the project has demonstrated stability, reliability, and a seamless user experience.
* **Compatibility and integration**: The team built the CampusExpense Manager application with a focus on ensuring compatibility and smooth integration with existing systems and applications. The team successfully integrated the software with the user data management system, allowing for seamless user authentication and data synchronization. Additionally, the team ensures interoperability to facilitate accurate cost tracking and reporting. This integration allows students to access the software easily and reduces the need for manual data entry or copying.
* **Flexibility and change**: During development, the CampusExpense Manager application encountered evolving requirements and changes. The team demonstrated adaptability by promptly addressing these changes and incorporating them into the software. Example: When project stakeholders requested additional reporting features, the team adjusted the software's architecture and implemented the necessary functionality without affecting overall performance or stability of the system. The team has added the Reporting and Expenditure Statistics function in a reasonable way to the entire project interface. The ability to embrace changes without sacrificing the core project goals demonstrates the team's flexibility and agility.
* **Documentation and tutorials**: CampusExpense Manager has invested in comprehensive documentation and user-friendly tutorials to support users and developers. The team created detailed user guides, system architecture diagrams, and API documentation to provide a clear understanding of the software's functionality and usage. The user guide includes step-by-step instructions with screenshots to guide students through the process of creating expense reports, managing expense lists, and viewing their account information with a detailed video. each function and has been uploaded to Youtube. The availability of these resources has increased user adoption and reduced learning curve.
* **Meets requirements**: CampusExpense Manager application has successfully met 90% of the requirements and set goals. The software has implemented the designed processes and core functions as specified during the requirements gathering phase. The software allows students to enter expenses, categorize them, attach receipts, and submit expense reports for approval. Additionally, it provides a robust processing process where students can review expense reports. By meeting these requirements, the project has provided an effective and functional cost management system that meets the needs of students and university administrators.

Overall, the Campus Expense project demonstrates professionalism and effective software development practices through adherence to schedule, focus on software quality, integration capabilities, adaptability to change, provides comprehensive documentation and guidance and successfully meets requirements.

#### **Critical review of Testing**

The CampusExpense Manager application has demonstrated a meticulous and effective testing process, ensuring software consistency, stability and reliability. It is expressed through the following evaluation criteria:

* **Comprehensive testing strategy**: After successfully developing the CampusExpense Manager App, the team implemented a comprehensive testing strategy covering various aspects of the software. This strategy includes unit testing, integration testing, system testing, and user acceptance testing. The team thoroughly tested each software module independently to identify and fix any potential bugs or issues. The team also conducts integration testing to ensure seamless data flow and communication between different components such as revenues and expenses for accurate and reasonable statistics. By adopting this comprehensive approach, the project team ensured that the software had undergone thorough testing and met the required quality standards.
* **Full Test Suite**: My team has developed a comprehensive test suite that includes functional testing and performance testing. We created test cases and scenarios to validate various functionalities of the software, such as registering, logging in, creating spending, and viewing spending statistics reports. Additionally, we conduct performance tests to evaluate the software's response time, scalability, and resource usage under various load conditions. Using the full test suite, the project team ensures that the software operates reliably and meets established requirements.
* **Automated testing**: CampusExpense Manager application uses automated testing to improve the efficiency and effectiveness of the testing process. We have implemented testing frameworks and tools to automate iterative testing, regression testing, and data-driven testing. By automating these tests, the team reduced the time and effort required for testing while ensuring consistent and reliable test results.
* **Effective error handling**: During the testing phase, the team effectively handled errors and problems that arose. We establish a systematic process to identify, record and resolve errors promptly and accurately. When a critical user authentication error is discovered during system testing, the team immediately assigns it a priority, logs it into the error tracking system, and promptly fixes it. Fast and effective error handling ensures that the software operates stably and reliably, minimizing disruption to end users and avoiding loss of user data.

In summary, our team has implemented a thorough and efficient testing process by implementing a comprehensive testing strategy, using a full test suite, using automated testing, handling errors effectively, and Generate detailed test reports. These practices ensure software reliability, stability, and compliance with established requirements.

### **Acting on feedback to enhance the solution, including justification of actions taken and unaddressed feedback.**

After successfully developing and deploying the application for trial users, we also received positive user reviews. However, users also give us suggestions and feedback on functions that could be improved in the CampusExpense Manager application.

* **Feedback received**: Users submitted feedback that the CampusExpense Manager app lacks spending alerts. They want to set spending and receive alerts when they approach a set budget threshold or when there are inappropriate expenditures.
* **Actions taken**: To address this feedback, the development team added spending and alert setting features to the CampusExpense Manager app. Users can set spending thresholds and receive alerts via notifications directly on the mobile app when the set threshold is approached or exceeded.
* **Justification of actions**: Adding spending settings and alerts helps users have a clear and timely view of their financial situation. When users set spending thresholds and receive alert notifications, they can stay in control and stick to their budget more effectively. This gives them the ability to react promptly to excess or inappropriate expenditures, helping them avoid financial risks and ensure financial stability.
* **Unaddressed feedback**: However, in the current version, feedback on spending alerts related to customizing notifications or integrating with other services such as accounts and bank balances has not been prioritized and deployment. Due to resource and time constraints, the development team decided to focus on adding basic setup and alerts features. However, this feedback will be taken into account and considered to improve and expand the alert feature in future versions of the solution.

This shows a detailed analysis of feedback from users, what has been done to improve the solution, and why some feedback is not prioritized or unresolved. By providing concrete measures and good reasons, the team demonstrates the initiative and effort of the project to meet user needs and improve the CampusExpense Manager application.

### **Recommendations for future improvements, supported by rationale, for the solution.**

After receiving feedback from users, we added some necessary functions to complete the application, however I also have the following suggestions to improve the CampusExpense Manager application. All proposed enhancements to the CampusExpense Manager solution provide benefits and improvements to end users. Here are the details on each proposed improvement:

1. **User interface improvements**

* **Change the layout**: Redesign the interface layout to increase logic and arrange functions appropriately. This makes it easy for users to find and access essential features.
* **Colors and fonts**: Use harmonious colors and easy-to-read fonts to improve interactivity and user experience. For example, use contrasting colors and a reasonable color scheme to highlight important parts and help users easily identify them.
* **Responsiveness**: Increases the agility and responsiveness of the user interface, ensuring that users receive immediate feedback when interacting with functions and operations.

1. **Mobile application development**

* **Create a mobile application**: Build a mobile application that allows users to access and manage expenses from anywhere, at any time. This increases convenience and flexibility for users.
* **Mobile-compatible interface**: Design the user interface to be compatible with mobile devices, ensuring a smooth and easy-to-use experience on small screens.

1. **Integration with financial systems**

* **Automate data entry**: Integrate the Campus Expense solution with your organization's existing financial system to automate the expense data entry process. This helps reduce manual work, save time and minimize errors during data entry.
* **Data sharing**: Integrate to share relevant data with the finance department such as budget information, financial reports, and performance metrics with the Campus Expense solution. This helps the finance department have a more detailed overview of the cost situation and budget management.

1. **Advanced reporting and analytics**

* **Create diverse reports**: Develop flexible and diverse reporting functionality so users and managers can create customized reports according to their specific needs. For example, reports by expense category, reports by time, or comparison reports.
* **Advanced data analytics**: Provides data analysis and statistics so users can better understand spending trends, cost distribution charts, and performance metrics. This helps organizations make smart spending decisions, optimize budgets, and spot savings patterns and opportunities.

1. **Enhanced security measures**

* **Data protection**: Improved security measures to ensure the safety of users' sensitive information. Includes the use of data encryption, two-factor authentication, access control, and session management.

Depending on the organization's requirements and priorities, the order and priority of these improvement suggestions can be adjusted to create the most suitable Campus Expense solution.Order and priority of These recommendations depend on the specific needs and priorities of your team and students as well as Campus Expense users.

# **Conclusion**

In conclusion, the development of the CampusExpense Manager mobile application by BudgetWise Solutions has resulted in a valuable tool for university students to effectively manage their expenses and budgets. The app's features, functionalities, and adherence to user requirements have been carefully designed and implemented to address the financial challenges faced by students.

Through the peer review conducted in Activity 1, valuable feedback was collected from stakeholders, enabling the identification of weaknesses in the proposed solution. The survey responses provided insights into areas where the app could be improved, such as incorporating offline capability, adding data visualization features, and conducting scalability testing. These recommendations were taken into consideration to enhance the final solution.

The evaluation of the team's solution in Activity 3 highlighted the successful implementation of systems investigation, design, development, and testing processes. The app's reliability and effectiveness were assessed, and actions were taken to address feedback and enhance the solution. This iterative approach reflects the dedication of the team to deliver a high-quality product that meets the needs of BudgetWise Solutions.

Looking to the future, there are several recommendations for further improvements to the CampusExpense Manager app. Implementing offline capability will enhance its usability in areas with limited connectivity, ensuring continuous access to expense tracking features. Adding data visualization features will provide users with a better understanding of their spending patterns and help them make informed financial decisions. Conducting scalability testing will ensure the app can handle increased user load as its popularity grows.

It is crucial for BudgetWise Solutions to continue gathering user feedback, monitoring app performance, and implementing iterative improvements. This ongoing commitment to continuous improvement will allow the CampusExpense Manager app to remain a valuable tool for students, helping them develop responsible financial habits and achieve their budgeting goals.

The successful development of the CampusExpense Manager app was made possible through the collaborative efforts of the team, including software developers, user experience designers, project managers, and quality assurance engineers. Their dedication and expertise were instrumental in delivering a high-quality solution within the specified timeline and budget.

In conclusion, the CampusExpense Manager app represents a significant achievement for BudgetWise Solutions, providing students with a user-friendly and effective means of managing their expenses. By incorporating the recommendations outlined in this report and maintaining a commitment to continuous improvement, BudgetWise Solutions can ensure the long-term success and impact of the app on the financial well-being of university students

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