CS 25-337 Ramily: Creating Community Beyond the Weeks of Welcome

Project Proposal

Prepared for

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Executive Summary

Our "CS 25-337 Ramily" project seeks to address the challenge of student integration at Virginia Commonwealth University (VCU), particularly for freshmen and transfer students. Many students face difficulties balancing their academic, professional, and social responsibilities, often feeling overwhelmed by the numerous campus resources, which leaves them disconnected and isolated.

To solve this, we are developing "RAMily," a centralized mobile app that will enhance VCU's existing platforms such as VCU Mobile and RamsConnect. RAMily will streamline access to academic resources, student groups, events, and peer-to-peer mentorship, fostering a deeper sense of belonging and community engagement for new students.

Our key design objectives include:

- Creating a user-friendly interface that integrates existing mobile platforms and introduces new features.
- Enabling students to connect with ambassadors through in-app messaging.
- Offering personalized notifications for events, campus traditions, and peer-to-peer interactions.
- Meeting accessibility standards and ensuring security through VCU eID authentication.

To achieve these goals, we are following agile methodologies and leveraging the latest trends in user experience and interface design. Our deliverables will include working prototypes of the login screen, profile creation, matching tool, and ambassador contact features. The app will be fully functional on both Android and iOS devices, with testing and feedback from current VCU students guiding development.

By simplifying access to university resources and promoting student engagement, our RAMily app aims to positively impact student retention, mental health, and academic success, ultimately building a more cohesive and supportive community at VCU.

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Section A. Problem Statement

Freshmen and transfer students at Virginia Commonwealth University (VCU) face significant challenges when trying to integrate into the university community. Many report feeling overwhelmed as they attempt to balance academic, professional, and social responsibilities during their first year. This issue is compounded by the plethora of resources available on campus, with some students naming up to 22 different mobile apps they had to download in an effort to navigate VCU's resources. Despite the abundance of available tools, students still struggle to find relevant information, resulting in increased feelings of disconnection and a lack of belonging.

This lack of connection directly impacts student retention. A significant number of freshmen who fail to complete their degree at VCU either transfer to another institution (66%) or drop out entirely (31%). The problem is widespread, with many students expressing that VCU feels "just like a school" rather than a community. These challenges are not unique to VCU; similar problems exist across higher education institutions, where incoming students often struggle to establish a sense of belonging.

The project's goal is to address this unmet need for deeper community engagement by creating a centralized, homegrown VCU mobile app, "RAMily." This app would integrate key features from existing VCU mobile platforms (e.g., VCU Mobile and RamsConnect) and introduce new functionalities designed to foster student connection and belonging. By simplifying access to academic resources, student groups, events, and peer-to-peer mentorship, the app aims to improve student engagement, mental health, and academic success, ultimately leading to higher retention rates.

The development of this app involves exploring the latest trends in user experience (UX) and user interface (UI) design, integrating AI for personalized recommendations, and testing the prototype with current students. Additionally, this project builds upon previous efforts by VCU’s da Vinci Center, which has explored ways to better prepare students for university life.

The problem is not only technical but also social, as solving it requires creating a platform that resonates with students’ real-world experiences. Ultimately, "RAMily" will create a more cohesive, supportive environment at VCU, enabling students to thrive academically and socially throughout their university experience.

Section B. Engineering Design Requirements

This section describes the goals and objectives of the project, as well as all **realistic constraints** to which the design is bound. It is meant to provide a structure that helps to formulate the problem. Design requirements are often derived from client or stakeholder needs. They may consider benchmarking against or improving on currently available solutions, providing novel techniques or design solutions, integration with existing components, systems, or equipment, required codes, and standards, general observations of the problem space, etc. Describe how the requirements provided below were researched and decided upon. Common design requirements often include considerations of the design efficacy, cost, safety, reliability, usability, and risk, among others.

Note: The design requirements should be revisited between major reports to ensure that the design objectives and constraints still accurately reflect the client's needs and project goals and to make sure that the team is on track to meet all goals and objectives.

Note: The codes and standards section is not required for the Project Proposal, but is required for all subsequent reports. This section should be comprehensive and thorough, requiring a significant research effort.

B.1 Project Goals (i.e. Client Needs)

Describe the overall goals of the project from the point of view of the customer or client. Goals should be derived from the specified needs of the project and *do not explicitly describe what the design will do*. They should be short, concise, and achievable. Bulleted lists are a good way to present key points and draw the reader's attention to those points. Note that a few sentences should be included at the beginning of any section using a bulleted list to introduce the content of the section and lead into the upcoming list. Some general examples of project goals are as follows:

- **Empower Students with Choice:** Enable students to select or change mentors and peer ambassadors to ensure a better match for their needs and preferences.
- **Facilitate Connections:** Enable seamless communication between Rambassadors (student mentors) and incoming students, including both freshmen and transfer students, to foster personalized guidance from the point of admission.
- **Promote Campus Engagement:** Increase student participation in campus activities and traditions to strengthen the sense of belonging within the VCU community.
- **Centralize Resource Access:** Provide a single platform that consolidates access to student clubs, academic services, and other campus resources, reducing the need for multiple apps.

- **Support Community Building:** Encourage peer-to-peer interactions, mentorship, and involvement in social and extracurricular activities to improve student engagement and satisfaction.

B.2 Design Objectives

List the key objectives of the design that you will produce. Objectives describe *what the design will do*, not how it should do it. Objectives should be SMART – Specific, Measurable, Achievable, Realistic, and Time-bound. Each objective will ultimately be linked to a design specification/constraint during the design process. Again, lists are nice if applicable.

- **Facilitate Connections:**
  Enable seamless communication between Rambassadors (student mentors) and incoming students, including freshmen and transfer students, through an in-app messaging feature. The messaging system will be live and accessible upon admission to ensure timely guidance and support.

- **Promote Campus Engagement:**
  Increase student participation in campus activities and traditions by providing interactive challenges with location-based check-ins and photo submissions. The engagement tracking system will launch by the start of the fall semester, with participation monitored through a point-based reward system.
- **Centralize Resource Access:**
  Develop a single platform that integrates features from RamsConnect, allowing students to easily register for clubs, academic services, and other resources. Integration with eServices and seamless search functionality will be completed before the next academic semester to simplify access.
- **Support Community Building:**
  Encourage peer-to-peer interactions and mentorship by enabling students to sign up for events and publicize their attendance within the app. The event registration and social interaction features will launch within the first month of the app's deployment to foster early engagement.

B.3 Design Specifications and Constraints

- The app must be fully functional on both Android and iOS devices.
- The app must allow users to login via VCU eID authentication.
- The app must have a block/report system to report inappropriate conduct during any interactions, with reports being reviewed and processed by admin teams.
- The app should have an option to enable notifications for any key updates not limited to, but including messages, tradition mission progress, and new matches.

- The app must adhere to accessibility standards which will ensure usability for individuals with disabilities.

B.4 Codes and Standards

- IEEE Standard No. 830-1998 – The application must provide guidelines for documenting the software requirements to ensure consistency and testability.
- ISO Standard No. 27001 – Application must follow guidelines managing sensitive user data to ensure information security, privacy and confidentiality.
- ISO Standard No. 40500:2012 – The application must adhere to accessibility standards, ensuring the user interface is navigable and usable by individuals with disabilities.
- NIST Standard No. 800-63 – The app must have secure digital identity verification, including multi-factor authentication and secure login mechanisms using VCU eID.
- FERPA – The app must comply with FERPA regulations to protect the privacy of student education records and contact information.
- VCU Privacy Policy and Data Protection Standards – The app must adhere to VCU's internal privacy policies for handling personal student data and communication preferences.
- Rehabilitation Act of U.S. Federal Code Section 508 – All digital applications, including mobile apps, must be accessible to individuals with disabilities.

Section C. Scope of Work

The project scope defines the boundaries of the project encompassing the key objectives, timeline, milestones, and deliverables. It clearly defines the responsibility of the team and the process by which the proposed work will be verified and approved. A clear scope helps to facilitate understanding of the project, reduce ambiguities and risk, and manage expectations. In addition to stating the responsibilities of the team, it should also explicitly state those tasks which fall *outside* of the team's responsibilities. *Explicit bounds* on the project timeline, available funds, and promised deliverables should be clearly stated. These boundaries help to avoid *scope creep* or changes to the scope of the project without any control. This section also defines the project approach, the development methodology used in developing the solution, such as waterfall or agile (shall be chosen in concert with the faculty advisor and/or project sponsor). Good communication with the project sponsor and faculty advisor is the most effective way to stay within scope and make sure all objectives and deliverables are met on time and on budget.

C.1 Deliverables

The project deliverables are those things that the project team is responsible for providing to the project sponsor. They are the things that are to be produced or provided as a result of the engineering design process. Some deliverables might include a specific number of alternative designs, required analyses to prove the design meets specifications, detailed machine drawings, functional diagrams or schematics, required computer code, flow charts, user manuals, desktop models, and functioning prototypes. A design "proof of concept" is not specific and should be more clearly defined. Academic deliverables include the team contract, project proposal, preliminary design report, fall poster and presentation, final design report, and Capstone EXPO poster and presentation. Provide a bulleted list of all agreed upon project deliverables.

In order to mitigate risks associated with the completion and delivery of the project deliverables, provide an outline of the most potentially disruptive, foreseeable obstacles. Some important issues to discuss with the design team, sponsor, and faculty advisor include the following:

- What deliverables require access to campus? Which/how many students regularly access campus and are physically available to complete tasks?
- What work can be done remotely? What resources might be needed in order to ensure that remote work can be completed effectively (e.g. software licenses, shared drives/folders, etc.)?
- What deliverables require ordering from third-party vendors? Will any components potentially require extended lead times? What can the team do in order to mitigate potential supply chain disruptions?

Fall 24

1. Team Contract
2. Project Proposal
3. Preliminary Design Report
4. Fall Poster and Presentation
5. Final report
6. Spring Poster and Presentation
7. Login screen working prototype
8. Profile Creation working prototype
9. Matching tool working prototype
10. Rambassadors contact working prototype
11. VCU traditions working prototype
12. Documentation
13. Installation Manual
14. Test Cases for each module
15. Slide for “Fall expo”
16. Provost Presentation

Spring 24

-Still some unknown

1. Senior Capstone Expo Poster and Presentation

C.2 Milestones

Milestones are major project phases or tasks that need to be completed in order to ensure the project deliverables. They may include, among other things, completion of calculations, the development of a computational model, completion of an analysis, set-up of an experiment, completion of data acquisition, purchasing of hardware, assembly of a prototype, completion of testing procedures, development of required code, completion of wiring, post processing, etc.

A good rule of thumb is to break the project down into tasks of no larger than 2-3 weeks in length. These can be individual or group tasks. Breaking down the project into tasks/milestones gives the team and the advisor/sponsor a realistic understanding of what can be done in the allotted time. In an agile development approach, later tasks are expected to be adjusted (or changed) as the team works with the earlier developed tasks.

The amount of time it will take to accomplish each milestone and the approximate date that each milestone will be completed should be considered. Do not underestimate the time that it takes to write and prepare major reports and presentation materials. All deliverables and milestones should be included in the project timeline found in Appendix 1. Provide a summary table of all project milestones including required times and completion dates here.

Note: While the project scope, deliverable, and milestones are not intended to change throughout the project, this section should be revisited between major reports to ensure that it still accurately reflects the expectations and requirements of the project team, client, and faculty advisor. Any changes to the project scope, deliverable, and milestones should be thoroughly discussed and mutually agreed upon by all parties. Any changes to this section should be documented and justified in detail.

Sep 6. Team Contract (Complete)

Oct 11. Project Proposal

Login Screen Prototype

Nov 15. Fall Design Poster

Profile Creation Prototype

Test Cases

Slide for “Fall expo”

Provost Presentation

Dec 9. Preliminary Design Report

Matching Tool Prototype

Test Cases

Rambassadors Prototype

Test Cases

VCU traditions prototype

Test Cases

Add documentation

Installation manual for 3rd party apps

Time to practice final presentation for Expo

March 28. Abstract and Poster file for Expo

April 5.FINAL REPORT/COMPLETED PROJECT DUE

April. Senior Design Expo

C.3 Resources

Resources needed for project completion should be listed at the proposal stage. These resources can either be purchased within the Project Budget, or provided by the project sponsor. Some examples are hardware such as HPCs or servers, software such as IDEs, data analysis platforms, or version control systems. Access to cloud computing services may also be necessary to scale certain procedures. Additionally, databases containing operational data for testing, as well as libraries or APIs relevant to predictive analytics and machine learning may be required.

Purchased Items

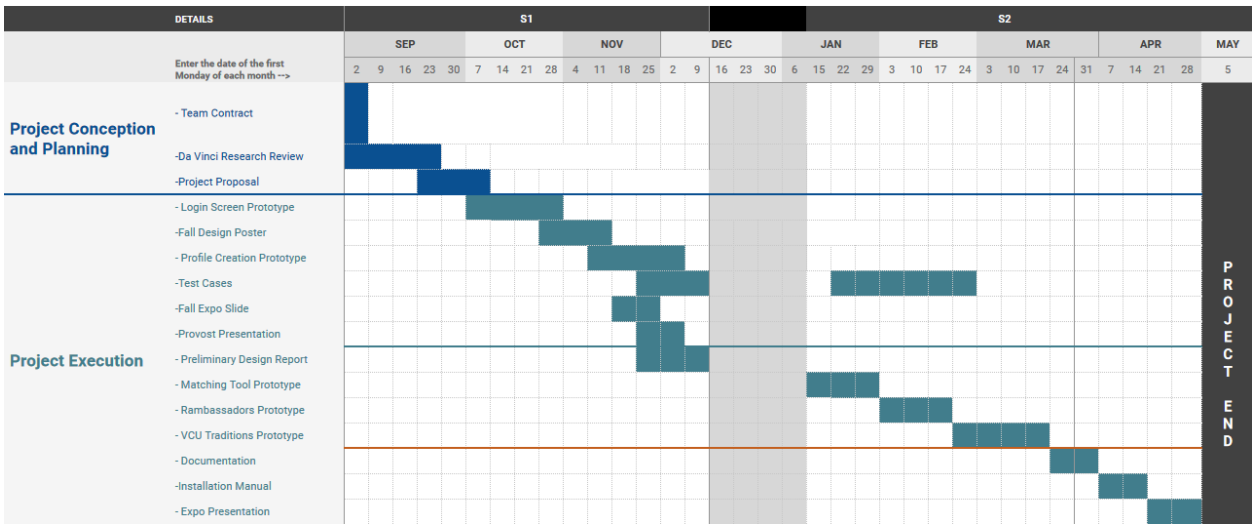
1. Mobile Device: The team will require a mobile device for both testing and displaying our working prototype of the app.
2. Charging cable: If the phone purchased does not have one included, a cable will be required for charging and data transfer

Non-Purchased Items

1. Database: In order to store user information, the team will require an external database
2. Flutter: This is the language the team will use to build the Ramily app

Appendix 1: Project Timeline

Provide a Gantt chart of similarly composed visual timeline showing the start and end dates of all completed tasks and how they are grouped together, overlapped, and linked together. Include all senior design requirements including design reports and Expo materials (i.e. Abstract, Poster, and Presentation). All major milestones should be included in the timeline.



Appendix 2: Team Contract (i.e. Team Organization)

Contents

Step 1: Get to Know One Another. Gather Basic Information.

Task: This initial time together is important to form a strong team dynamic and get to know each other more as people outside of class time. Consider ways to develop positive working relationships with others, while remaining open and personal. Learn each other's strengths and discuss good/bad team experiences. This is also a good opportunity to start to better understand each other's communication and working styles.

Team Member Name	*Strengths each member bring to the group*	*Other Info*	*Contact Info*

DaJuan Hackett	*Creativity, Various coding languages experience, hard driven*	*I've completed numerous projects with Java, C, pyret, HTML, python, etc with ranging from intermediate to advanced knowledge of them.*	*hackettdc@vcu.edu* *540-940-9528* *Discord:da119*
Tariq Gafar	*being Proactive , offer new suggestions, application experience*	*I've worked on web applications using react and Node JS, and have experience with working full stack and the process behind it*	gafarta@vcu.edu 804-502-5185
Raleigh Norris	Planning, strategy.problem-solving,	Experience in SQL, Java, C.	norrisrp@vcu.edu 804-898-8692 Discord: sirralenburg
Ziad Kashef	Able to Work well with a team, Communication, Strategy/problem-solving, creativity, and Really enjoy learning new things.	• Experience with Java , JavaScript, HTML, CSS some python, and C • Experience with project management and agile methodologies in industry • As well as Industry experience within consulting helping my strategy and problem solving skills	Kashefze@vcu.edu 703-939-2740 Discord: ziadkashef

Other Stakeholders	***Notes***	***Contact Info***

Lukasz Kurgan		*lkurgan@vcu.edu*
Manjari Kumarappan		kumarappanma@vcu.edu

Step 2: Team Culture. Clarify the Group's Purpose and Culture Goals.

Task: Discuss how each team member wants to be treated to encourage them to make valuable contributions to the group and how each team member would like to feel recognized for their efforts. Discuss how the team will foster an environment where each team member feels they are accountable for their actions and the way they contribute to the project. These are your Culture Goals (left column). How do the students demonstrate these cultural goals? These are your Actions (middle column). Finally, how do students deviate from the team's cultural goals? What are ways that other team members can notice when that culture goal is no longer being honored in team dynamics? These are your Warning Signs (right column).

Resources: More information and an example of Team Culture can be found on the Biodesign Student Guide "Intentional Teamwork" page (webpage | PDF)

Culture Goals	***Actions***	***Warning Signs***
Taking responsibility for assigned tasks.	- *Meeting project deadlines* - *Seeking help from other group members and advisors if needed*	- *Missed deadlines* - *Lack of communication*

Respect and valuing other team members' ideas and contributions	*- Acknowledgment of other team members' ideas* *- Active listening*	*- No engagement and dismissal of ideas*
Encouraging open collaboration	*- Offering support to other members* *- Regularly sharing project updating*	*- Frequent isolated work* *- Missing Meetings* *- Reluctant to ask for help*

Step 3: Time Commitments, Meeting Structure, and Communication

Task: Discuss the anticipated time commitments for the group project. Consider the following questions (don't answer these questions in the box below):

- What are reasonable time commitments for everyone to invest in this project?
- What other activities and commitments do group members have in their lives?
- How will we communicate with each other?
- When will we meet as a team? Where will we meet? How Often?
- Who will run the meetings? Will there be an assigned team leader or scribe? Does that position rotate or will the same person take on that role for the duration of the project?

Required: How often you will meet with your faculty advisor advisor, where you will meet, and how the meetings will be conducted. Who arranges these meetings?
See examples below.

Meeting Participants	***Frequency*** ***Dates and Times / Locations***	***Meeting Goals*** ***Responsible Party***

Students Only	*As Needed, SMS messaging*	*Update group on day-to-day challenges and accomplishments*
Students Only	*Every Monday and Wednesday* *3pm on Google meet*	*Actively work on project, discuss work to be done individually*
Students + Faculty advisor	*Every Tuesday before Lecture at 5:00 PM online on Google Meet*	*Update faculty advisor and get answers to our questions* *(Create a list of questions/concerns in Tuesday meeting before)*
Project Sponsor	*Every Tuesday before Lecture at 5:00 PM online on Google Meet*	*Update project sponsor and make sure we are on the right track (Create a list of questions/concerns in Tuesday meeting before)*

Step 4: Determine Individual Roles and Responsibilities

Task: As part of the Capstone Team experience, each member will take on a leadership role, ***in addition to*** contributing to the overall weekly action items for the project. Some common leadership roles for Capstone projects are listed below. Other roles may be assigned with approval of your faculty advisor as deemed fit for the project. For the entirety of the project, you should communicate progress to your advisor specifically with regard to your role.

- **Before meeting with your team**, take some time to ask yourself: what is my "natural" role in this group (strengths)? How can I use this experience to help me grow and develop more?
- **As a group,** discuss the various tasks needed for the project and role preferences. Then assign roles in the table on the next page. Try to create a team dynamic that is fair and equitable, while promoting the strengths of each member.

Communication Leaders

Suggested: Assign a team member to be the primary contact for the client/sponsor. This person will schedule meetings, send updates, and ensure deliverables are met.

Suggested: Assign a team member to be the primary contact for faculty advisor. This person will schedule meetings, send updates, and ensure deliverables are met.

Common Leadership Roles for Capstone

1. **Project Manager:** Manages all tasks; develops overall schedule for project; writes agendas and runs meetings; reviews and monitors individual action items; creates an environment where team members are respected, take risks and feel safe expressing their ideas.
   Required: On Edusourced, under the Team tab, make sure that this student is assigned the Project Manager role. This is required so that Capstone program staff can easily identify a single contact person, especially for items like Purchasing and Receiving project supplies.
2. **Logistics Manager:** coordinates all internal and external interactions; lead in establishing contact within and outside of organization, following up on communication of commitments, obtaining information for the team; documents meeting minutes; manages facility and resource usage.
3. **Financial Manager:** researches/benchmarks technical purchases and acquisitions; conducts pricing analysis and budget justifications on proposed purchases; carries out team purchase requests; monitors team budget.
4. **Systems Engineer:** analyzes Client initial design specification and leads establishment of product specifications; monitors, coordinates and manages integration of sub-systems in the prototype; develops and recommends system architecture and manages product interfaces.
5. **Test Engineer:** oversees experimental design, test plan, procedures and data analysis; acquires data acquisition equipment and any necessary software; establishes test protocols and schedules; oversees statistical analysis of results; leads presentation of experimental finding and resulting recommendations.
6. **Manufacturing Engineer:** coordinates all fabrication required to meet final prototype requirements; oversees that all engineering drawings meet the requirements of machine shop or vendor; reviews designs to ensure design for manufacturing; determines realistic timing for fabrication and quality; develops schedule for all manufacturing.

Team Member	***Role(s)***	***Responsibilities***
Ziad Kashef	*Project Manager*	• *Manages all tasks* • *Develops overall schedule for project* • *Writes agendas and runs meetings;* • *Reviews and monitors individual action items* • *Creates an environment where team members are respected, take risks and feel safe expressing their ideas*

Raleigh Norris	Systems Engineer	● Outline product specifications into workable steps ● Manage integration and debugging
Tariq Gafar	financial manager	● researches/benchmarks technical purchases and acquisitions; ● conducts pricing analysis and budget justifications on proposed purchases; ● carries out team purchase requests; monitors team budget.
DaJuan Hackett	Test Engineer	● Oversee experimental design, test plans, and procedure ● Acquire any needed data acquisition equipment and software

Step 5: Agree to the above team contract

Team Member: Ziad Kashef *Signature: Ziad Kashef*

Team Member: Tariq Gafar *Signature: Tariq Gafar*

Team Member: DaJuan Hackett *Signature: Da Juan Hackett*

Team Member: Raleigh Norris *Signature: Raleigh Norris*.

References

Provide a numbered list of all references in order of appearance using APA citation format. The reference page should begin on a new page as shown here.

[1] VCU Writing Center. (2021, September 8). *APA Citation: A guide to formatting in APA style.* Retrieved September 2, 2024. https://writing.vcu.edu/student-resources/apa-citations/
[2] Teach Engineering. *Engineering Design Process*. TeachEngineering.org. Retreived September 2, 2024. https://www.teachengineering.org/populartopics/designprocess