

Software Engineering

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Feasibility Analysis

CAR: Course Analysis and Registration

Overview

The feasibility analysis of our project takes into account multiple aspects of technical and economic constraints and compares them with the potential benefits the project provides to the various stakeholders. As a result of the analysis, it could be realized that building this project is profitable and beneficial to the stakeholders, that is, the university administration and student community. While there are a few unknowns in terms of coding and design decisions, through the diversified expertise of the team members, they can be dealt with efficiently.

The team members' experience in fields of Computer Science, Economics, Interactive Media and Business, Organizations and Society provides a holistic outlook to construct the project. Many aspects of the project can be utilized from similar projects in the area like course management systems, integration of the Albert API to extract data, and more. The various risks associated, and possible alternatives have been laid out.

Technical Feasibility

CAR is a web-based application, running on web browsers independent of the operating system of the devices used, while being integrated with NYU's registrar portal Albert's API – Schedge for fetching data and constant updates.

The key technologies used are:

- Front-End
 - HTML 5
 - CSS 3
 - JavaScript
 - Bootstrap
- Server Implementation
 - Flask
 - Python
- Database
 - Firebase
 - SQLite

User Familiarity with Business: The application doesn't have a user-ended business model, which means that the users won't need to use any payment systems throughout the app. Users initially would be

NYUAD students who already have experience using NYU Albert and Brightspace which are course and learning management systems, so CAR's interface and features would not be puzzling.

Familiarity with Technologies: These technologies have been decided from our initial ideation and system requirement with some possible changes in the future during the development lifecycle. Liyan has experience with HTML 5, CSS 3 and JavaScript through web development projects, and Juan and Akshat have familiarity with Flask, Python and SQLite through class and research projects. New technologies to better implement the application like Bootstrap and Firebase are similar to the other technologies the team has previous experience with and plans to use free online resources to sharpen these technical skills. All the technologies are free to use and the skills can be gained and sharpened for free through online resources, leading to successful implementation of the project.

Size: The scale of the project is medium sized as compared to other standard university-based systems and applications and is manageable for the team of 3 students to be completed within the timeframe of at least 4-6 months. As planned through the development lifecycle, there would be some variables but that wouldn't delay or compromise with the quality of the application.

Compatibility: The web application will be compatible with all devices that students use on a daily basis including all major web browsers like Chrome, Safari, etc. All related information and data would be extracted from the Schedge API so the users won't need to access Albert. Overall, there is no compatibility risk.

Risks Involved

- The inaccuracy or non-functionality of Schedge API – since all the data would be extracted from the Albert API, delay or inoperability would slow or make the application ineffective
- Maintenance – our application needs to reflect any server or maintenance disruptions in the API

Potential Alternatives:

- Web Scraping – in case of the API not working, the information can be scrapped from Albert directly through data scraping operations on Flask-Python
- Backup – in case of API server maintenance and its time periods, the data can be backed up on our database, but that would increase hosting costs

Overall, moderate-high risk is involved in the application's technical aspect as it has many development-based variables.

Economic Feasibility

Our application provides value to students in terms of saving time, reducing mental stress and streamlining college academic planning.

The application's business model for profit-generation and sustenance would be through subscription to universities. The major costs would be domain and server hosting which are accounted below. The cost of development and testing is zero as we are students building the application for a project. The Business-to-Business business model leads to a subscription service for

educational institutions, but that would be implemented in the later stages. Initially, the application would be free for NYUAD students up to 500 users by utilizing **free web hosting**.

Costs	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total
Salaries	0	0	0	0	0	0	0
H/W & S/W	0	0	0	0	0	0	0
Domain & Hosting	0	0	0	0	10	10	20
Support & Maintenance	0	0	0	0	2	2	4
Total Costs	0	0	0	0	12	12	24
Benefits							
Benefits from Subscription	0	0	0	0	15	15	30
Increase in users	0	0	0	0	450	450	450
Total Benefits	0	0	0	0	15	15	30
NCF	0	0	0	0	3	3	6
CNCF	0	0	0	0	3	6	12

All numbers are in thousands of AED

NCF: Net Cash Flow

CNCF: Cumulative Net Cash Flow

H/W & S/W: Hardware and Software

Profit Margin = (Total Benefits – Total Costs)/ Total Benefits = (30-24)/30 = 0.2 = 20%

Return on Investment (RoI) = (Total Benefits-Total Costs)/Total Costs = (30-24)/24 = 0.25 = 25%

Break-Even Point (BEP) = ((period net cash flow)-(cumulative net cash flow))/period net cash flow = 3-3/3 = 0

Our break-even point is 0 as we are keeping a 20% profit margin as soon as costs start incurring, hence reducing economic risks for a university-focused project.

In the first four months, the application would be developed and open to 500 users from the university, who would be hosted for free on our database. As we build the application further, to increase users by 450, more computational and server capabilities would be needed which would increase the costs and maintenance required.

Risks Involved:

- The database Firebase hosting storage for free accounts, 10 GB, runs out with less than 500 users leading to reducing the capacity of total users for first four months
- Despite a conservative price of subscription of 15000 AED/per month at the start, the university not finding the price reasonable

Potential Alternatives:

- Considering other hosting alternatives with cheaper free or paid plans but leading to changing or updating backend development and less support and functionality
- Implementation of compression techniques to reduce file and data transfers for mitigating exceeding hosting capacity
- Reanalyzing the pricing by considering reduced costs from other hosting alternatives

Overall, seeing the profit margin, break-even point, and return on investment, and considering the application is a project self-funded by students and don't have access to capital, the application is low risk and benefits return is high as the application gets built further.