

Project 4 design

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* To easily go through changes from doc 4.1, simply search for keyword 'Changes' through this document

Overview (Christian)

Purpose and Goals

- **Description of system to be built**

AngelAlums is a website that will aid Alumni donors in finding unique and interesting projects, while also providing students with the opportunity to find financial sponsors for projects they are passionate about.

- **Key goals and purposes (What problem is being solved?)**

As MIT students, we understand that it is often a difficult and tedious task to search for funding. Conversely, as a donating alumni you want to see where your money goes and you want to know it is going to be valued and put to good use. In order to address these situations we must take the following into consideration:

- How can a student (group of students) advertise information for their project?
- How can students reach potential donors who are interested in a key area?
- How can Alumni find worthy projects to invest into?
- How will Alumni keep tabs on projects they donate to?
- How can Alumni become an integral component of a project rather than just funding?

The main goal of this application is to abstract all of these concerns. More specifically, the app aims to

- Help students get connected with Alumni in order to gain funds and advice.
- Allow alumni a way to donate to projects they feel passionate about and if they choose to, they can participate as potential mentors.

- **Motivation for product (current solutions and their deficiency)**

Current solutions:

1. Kickstarter (<http://www.kickstarter.com/>)

Kickstarter executes the goal of allowing projects to find donors. However kickstarter provides this opportunity to everyone. The relationship between users is simply project creators and donors, instead of a more complex relationship with mentorship as a possibility. We focus on a group of individuals that all share a university in common and provide the donors an opportunity to personally communicate with the project creators by providing them with links to outside contact information.

2. Smallknot (<http://smallknot.com/>)

Smallknot is another crowdfunding site however its goal is not to help individual

trying to complete a project, but rather allow communities to fund and support local businesses. Unlike kickstarter this website does focus on a community, however it does not suit our purpose because it is about funding small businesses.

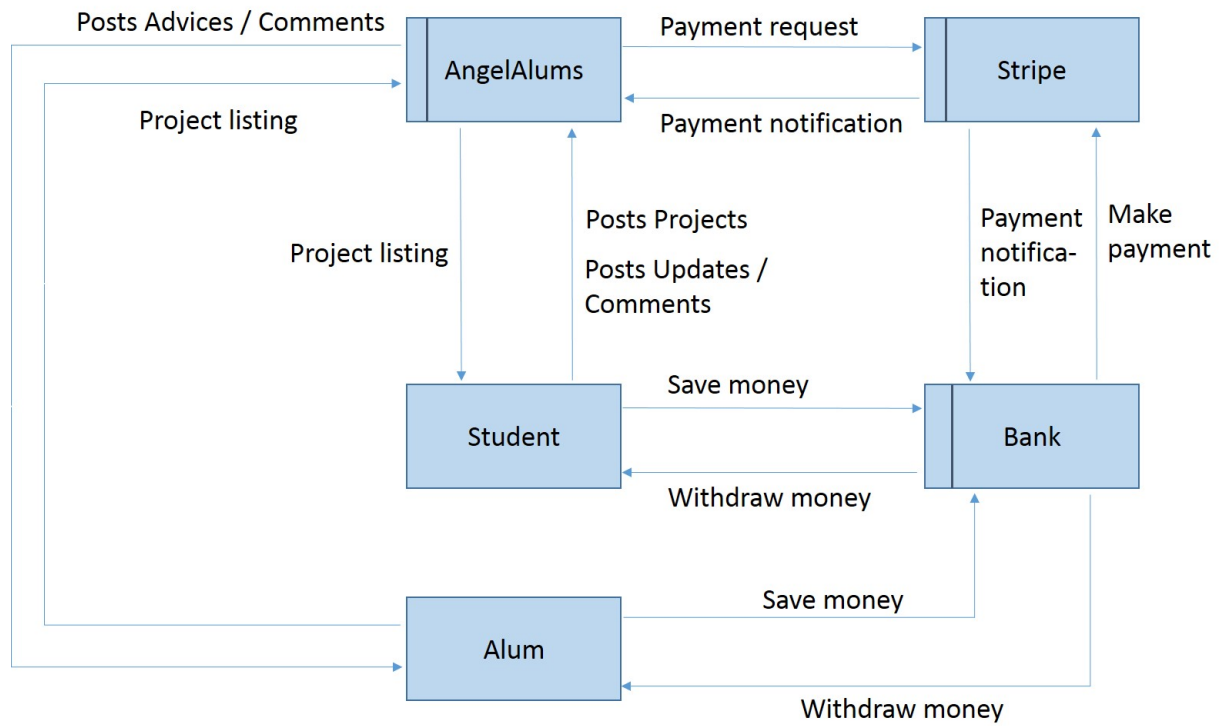
3. DonorsChoose (<http://www.donorschoose.org>)

DonorsChoose is actually the closest website that suits our needs. it allows students to get funding from donors for school projects. The only problem is that it centers around students in primary school and thus the projects and website are all managed by the students teachers. It also enables anyone to be a donor rather than making sure the donors are people who belong to that specific school or have any relation to the students

All of these solutions, while perfect in their own specific niches, fail to satisfy the need that AngelAlums aims to fulfill, which is to connect alumni and their donations with ambitious students who need funding.

Context Diagram (Dongyoung)

Changes: Added labels between (Student, Bank), (Stripe, Bank), and (Alum, Bank)



Primary Author: Dongyoung Kim

Concepts (Christian)

*Changes are labeled with 'UPDATE'

Key Concepts

- Account

An account is a way to keep track of a user's personal profile and information such as their interests, class years, majors, and contacts. The information in the account will be visible to other users, including the personal contact information.

- Student

A student is someone who has a project they want to start and need to find funding or mentorship in order to complete said project. A student can also explore interesting projects without the need to create a project. A student needs to have a valid school email address for authentication. Students can make a non-reversible decision to change their account status into an Alumni account upon their graduation.

- Alumni

An alumni wants to donate money and search projects to invest into. An alumni should have a valid school alum email address for authentication. When users first register, they will click the checkbox whether they are a student or an alumni.

- Donation

A donation is the notion of an alumni giving their money in support of a student's project. An alumni can choose to donate more even after he or she has donated before. There are no minimum and maximum amount an alumni can give even if the donation exceeds the funding goal.

- Project

A project is an idea or plan to potentially build something, or create or fix something but which requires funding and thus a student is looking for donors to help. A student can optionally use a Youtube link to upload a video but needs to upload a project image to be presented on the dashboard. A project can optionally have an advisor such as a professor to give more credibility to alums.

- Update

An update is an optional addition to a project. It represents showing incremental steps taken in the course of completing a project and allows alumni to keep track of progress that is made. A student is able to post their expenditure to be transparent about their budget.

- Collaborators

A collaborator is a student who collaborates with a creator on the project.

The creator of the project specifies a list of collaborators and their AngelAlumns accounts in their project profile. They cannot delete projects, nor do they handle the money. However, they can post updates, edit project information, and see the list of backers. A collaborator can remove himself from the project a creator has added him for.

- **Creator**

This is a student who is the head of a project and the one that created the project on AngelAlum. A creator manages all the money transactions through donations. In contrast to collaborators, they are the main ones who will be allowed to delete projects, handle money transfers, and add collaborators. Like collaborators, they can post updates, edit project information.

UPDATE: Creators will be required to input their own individual banking information that will be the path for payment.

- **Donor**

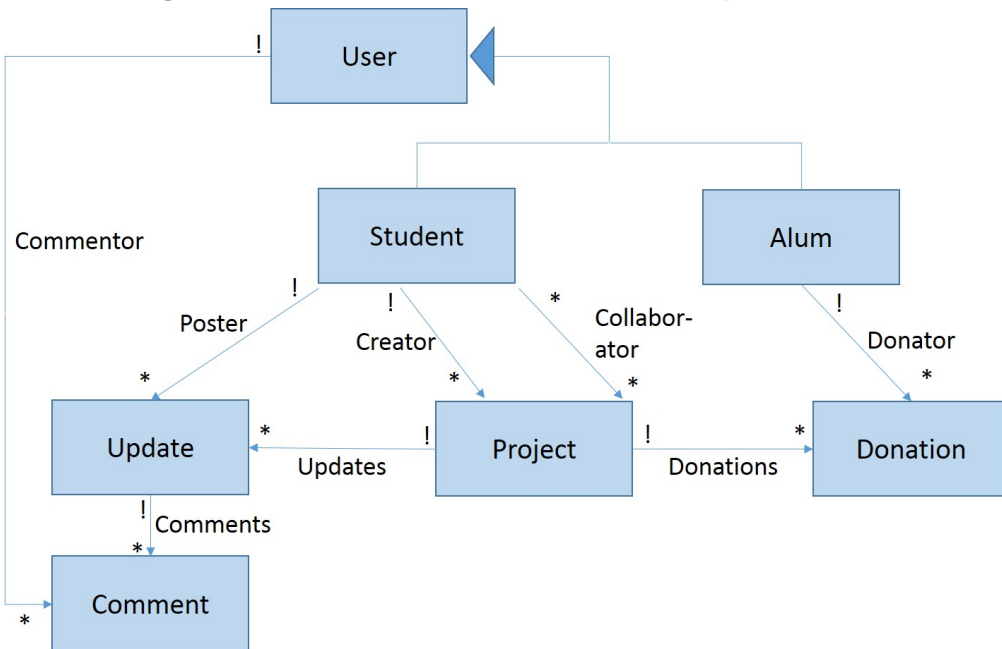
A donor refers to an alumni that has given a donation to a particular project. The list of donors will be public in the project profile page.

- **Comments**

Students and Alumni can all interact with other projects through posting and reading comments on the update pages. Comment section is the platform where alums give advice about the projects and students get feedback.

Data Model (Dongyoung)

Changes: Added the Collaborator relationship between Student and Project



- The Creator Student can designate a list of 'Collaborators' who can edit the Project as well as post Updates
- The Alum is associated with the Project through Donations

Behaviour (Christian)

Feature Description

- **Payments**

Donors can donate money through our stripe API and creators of projects will receive these payments through stripe.
- **Donation tracker**

A way to keep track of money donated from a project perspective. Allows Students and Collaborators the chance to know who and how much they donated.
- **Project Updates**

A project update is a way to communicate with the community any significant progress or milestones completed.
- **Searching/tagging**
 - Users can search for projects and students are allowed to tag their projects with predefined tags so that they are easily searchable
 - In our final implementation we hope to implement custom tags, which allows students to create their own categorization of the project such as tagging student clubs or fraternal groups to describe their project with.
 - Based on the tags and information from the users, the dashboard page shows related projects which would elicit users' attention
- **Comment section for updates**

A way for the public to put in input, ask questions and interact with projects.
- **Notification for donations and updates**

Creators and collaborators will get email notifications when they receive a new donation, and alums will get email notifications when updates are made for the projects they donated to.

Security Concerns (Ebenezer)

Changes: Added threat model

These will mainly be:

- Cross-Registered and exchange students being able to access the system since they will have the school email addresses or hackers using fake email addresses.
- Students can create fake projects to get money.
- Information about credit cards could be accessed, monitored or recorded.
- A hacker could modify or read the database using javascript and also by reading the urls and the data they send.
- CSRF attacks especially since we will require users to be giving us a link to videos and their social network profiles.

Threat model:

Since AngelAlums is mainly a fundraising site for student projects we assume the attacker is mainly trying to get money by either using a fake project or not finishing a project but still keeping the money raised for the project.

Another situation is an attacker hacking into the system(probably by breaking into a user account) to redirect money to themselves by changing the back account information for where money for a project should go. This could even occur by a creator leaving their account open on a computer and leaving the computer unattended. The attacker could also use the session cookies of the creator if they got their hands on that.

An attacker might also be trying to discredit another project by messing with the project profile or corrupting existing updates or upload bad updates for a project. In this case the attacker could even be a collaborator or someone unknown to the creator.

In order to prevent these and other problems we may not have foreseen, these are the measures we will be taking:

- We decided to use an email confirmation system where after the person signs up they have to confirm it from their email account. Also we decided to include exchange students and cross-registered students as part of our definition of students.
- Creators of projects will have the option of adding advisors and collaborators so that alums can do their own background checks to make sure that the projects are legitimate.
- We will be using Stripe to handle money transactions. Stripe has measures to mitigate issues with the credit card information and payment. <https://stripe.com/help/security>
- We will be checking the user logged in and make sure that they are authorized to make whatever actions they try to do by using the “before_action” method. Also we will not be exposing data in the url unless it is the user sending it in.
- CSRF will be dealt with by using rails “protect_from_forgery”.
- We decided to use “strip_tags” method in rails to prevent injection attacks.
- Also, passwords will be encrypted before putting in the database just in case the

database is breached.

- We will ask for password when users want to change their bank/credit card information

User Interface (Richard)

Changes: Added Search Result Page and changed application flow

- Initial Page

The diagram illustrates the layout of the 'Angel Alums' sign-up page. It features a central form box with a title 'Angel Alums' at the top. Below the title, the form contains input fields for 'Email', 'Password', 'Password Confirmation', and 'Username'. There are two checkboxes labeled 'Student' and 'Alum'. A 'Sign Up' button is positioned below the form, and a link 'Log in if you already have an account' is located at the bottom. The entire form is centered within a larger rectangular frame, with diagonal lines connecting the corners of the frame to the corners of the form box.

Angel Alums

Email
Password
Password Confirmation
Username

☐ Student ☐ Alum

Sign Up

Log in if you already have an account

- Alum Dashboard

logo

Richard

Profile

Log Out

Bob is from your frat

Energy-efficient Buildings for Vietnam

By

Bob'16 and Ben'16

\$1,500 Funded

tag1

tag2

View

Projects You Donated

<div> <div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div> </div>	<div> <div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div> </div>	<div> <div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div> </div>
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Find Projects by Tags

[Tag1](#)
[Tag2](#)
[Tag3](#)
[Tag4](#)
[Tag5](#)
[Tag6](#)
[Tag7](#)
[Tag8](#)
[Tag9](#)
[Tag10](#)
[Tag11](#)
[Tag12](#)
[Tag13](#)
[Tag14](#)
[Tag15](#)

- Search Result Page

logo

Q

tag1tag2

Richard

Profile

Log Out

tag1tag2

<div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div>	<div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div>	<div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div>
<div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div>	<div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div>	<div>Project Name</div> <div>By</div> <div>Username'16 and Username'16</div> <div></div>

- Student Dashboard

Projects You Created

<div>Delete</div> <div>Project Name</div> <div>By Username'16 and Username'16</div> <div></div>	<div>Delete</div> <div>Project Name</div> <div>By Username'16 and Username'16</div> <div></div>	<div>Delete</div> <div>Project Name</div> <div>By Username'16 and Username'16</div> <div></div>
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Projects You Collaborated

<div>Remove Me</div> <div>Project Name</div> <div>By Username'16 and Username'16</div> <div></div>	<div>Remove Me</div> <div>Project Name</div> <div>By Username'16 and Username'16</div> <div></div>	<div>Remove Me</div> <div>Project Name</div> <div>By Username'16 and Username'16</div> <div></div>
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Find Projects by Tags

Tag1 Tag2 Tag3 Tag4 Tag5 Tag6 Tag7 Tag8 Tag9 Tag10 Tag11 Tag12 Tag13 Tag14 Tag15

- Project Page

logo

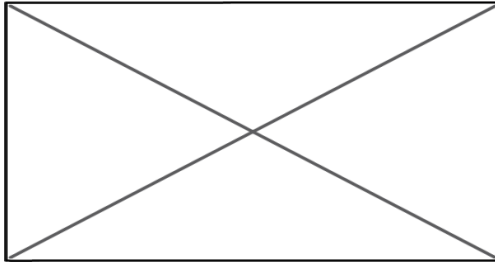
search

Richard



Energy-efficient Buildings for Vietnam

By Bob'16 and Ben'16



30 Backers
\$ 1,500



Raised of \$ 5,000

Donate to This Project

tag1 tag2

Project Title

Update

Backers

Project Description

- Project Creation Page

logo

search

Richard

Create New Project

Project Title	<input type="text"/>
Collaborator	<input type="text"/>
Advisor	<input type="text"/>
Project Image	<input type="text"/>
Project Video	<input type="text"/>
Tags	<div>Tag List</div>
Project Description	<div></div>
Funding Goals	<input type="text"/>
Payment	<input type="text"/>

BackCreate

- Update Page

Project Title UPDATE

[Back To Project](#)

Update Title
Update Date
Update Image
Update Video
Update Description

Comments

Comments

Username1	Comment1	CommentTime
Username2	Comment2	CommentTime
Username3	Comment3	CommentTime
Richard	<input type="text"/>	<input type="button" value="Create"/>

Update Title
Update Date
Update Image
Update Video
Update Description

Comments

- Update Creation Page

logo

Richard

Create UPDATE

Project Title	Project Title
Update Title	<input type="text"/>
Update Image	<input type="text"/>
Update Video	<input type="text"/>
Update Description	<div></div>

BackCreate

- Profile Page

logo

Richard

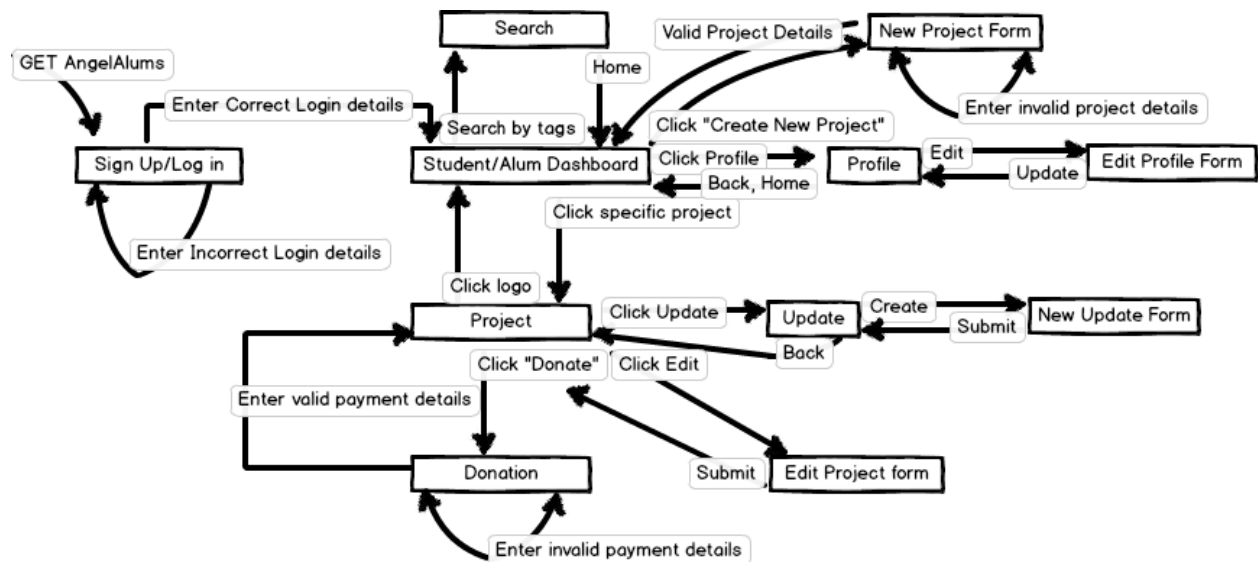
Profile

[Go to Project Listing](#)

Username	Richard
Class Year	<div>Class Year List▼</div>
Major	<div>Major List▼</div>
Introduction	<div></div>

BackUpdate

Application Flow



Challenges and risks(Ebenezer)

Questions we have to contend with with regards to our design and solutions we decided on are:

Changes: - Added Code Design Challenges

- Other changes in design are labeled with 'UPDATE'

- **How much access and what actions should differentiate a creator from a collaborator of a project?**

- Options:

- i. We can provide creators and collaborators equal access and rights to all projects
- ii. We can limit deleting and money handling to only creators, and allow all to update/change things.

- Analysis:

We chose option number 2. While it might have been convenient to provide everyone with the same amount of access we feel that the right to delete projects, had to many repercussions to allow multiple people the access, and that it would be easier for a team to keep track of a budget with only one person involved in the money transactions.

- **How do students receive the money?**

- Options:

1. Give the money straight to the student
2. use the school as a means of dispensing the funds.

- Analysis:

We chose option 2. While providing students with money directly would help them get the money quicker. Option 2 would make accountability to the donors easily because they might trust the school authorities more in their discretion than the students themselves.

* **UPDATE:** We had initially chosen option 2 but after more work on the application we realized that while accountability is important our applications focus is to ease the transactions between alumni and students, and by using the school or ourselves as the middle man we complicate the monetary transfers.

- **How much information about donations should be public versus private?**

- Options:

1. make donors name and amount public
2. only show donors name
3. or none and only show the total donation amount(without individualizing)

- Analysis:

We went with Option 2 and 3. We decided to show just the names of donors and the total amount of money accrued by a project and also give donors

an option to be anonymous. We decided that showing a Donor's name by default would help provide credibility for donors. However we understand that people like to keep donations private so we will not be showing amount and allow donors to hide their names if they so choose.

- **How and if to implement private communication between alumni and students?**

- Options

1. create our own messaging system
2. direct donors and such to existing means of communication

- Analysis:

We chose option number 1. Even though we thought it would be cool to be able to have our own private messaging system, due to the time scope of the class we decided to have users give links to their public profiles. It could be mobile contact, google plus, email or something else and with this users could find each other outside of system and communicate privately with each other.

- **How to implement tagging of projects?**

- Options:

1. Only allow predefined tags
2. Allow users to create tags

- Analysis:

We decided to do both. The decision to use predefined tags was easy to make because we think it is important to be able to group projects and also it would make it easy to search projects. The problem with allowing students to customize tags for their projects is that they could be spelling mistakes or repeated tags or wrong labeling. In regards to the issues with custom tags we decided that the advantages of having customized tags outweighs the disadvantages and also to help with it we will be putting up an email for users to email us with issues including wrongly tagged projects.

- **How to implement videos on website?**

- Options:

1. Allow users to upload videos
2. Use youtube to display videos

- Analysis:

We decided to do 2. This an important feature for updates about projects and describing projects. We did not want to have to store too much data in our database thus decided to use outside sources. We will require the students to submit a youtube link to a video describing their project and we will just embed that video.

- **How to send notifications to users?**

- Options:

1. Have a separate notification page in the app
2. Send emails about the relevant notification

- Analysis:

We decided to do 2. The main reason was that, since it is mandatory to

provide email information to sign up for our app, emails would be an effective channel to communicate with users. Also, the application would be too UI-heavy if we incorporated a notification platform into our site, which might turn users away. To make sure the users' inbox doesn't get spammed from our website, we only send important notifications.

Code design challenges are :

- **How to implement User, Student and Alumni table relationships?**

- Options:

1. Single Table Inheritance (one table for all users)
2. Polymorphic Association (multiple tables)

- Analysis:

Since a majority of the difference between user types is simply user access and this project is small scale the, cons of using a single table (waste of space, inefficient) are minute, and thus we implemented STI in order to save time, since we were advised that polymorphic associations requires too much time.

- **How to implement Donate button?**

- Options:

1. Create an amount field and donate button on the same page
2. Make an amount field and donate button on different pages

- Analysis:

We need specific amount to charge a credit card through stripe. Thus, we can either do AJAX to put in donation amount from the amount field on the same page with donate button into which the amount parameter should be passed, or we can create another page for donate button after getting donation amount. We decided to go with option 2 since we want to only make donation button visible on the project so that alums do not have to think about donation amount before they decide to donate and we can put other important information such as disclaimer for donation on another page.

- **How to implement Tags?**

- Options:

1. Using Serialized Array in the database as a column for the projects
2. Using a single table to store tags and what projects they belong to.
3. Using two tables to store the different tags and then a joint table linking the projects to the tags.

- Analysis:

We choose 3. This is because with the serialized array we would still need a way to keep track of tags that are possible. Also with the second option a different tag or repeated tags will be present and it will be had to keep track of tags already created though it would facilitate users being able to add their own tags. The last options gave us the most flexibility of being able to make users add their own tags and also separating the creation of tags from the assignment of tags.