AcademicBox: Academic file sharing repository

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Abstract. This paper summarizes the specifications for the creation of the AcademicBox project, an academic repository for course materials and student tips. In this article we highlight the main characteristics for the proposed systems, we discuss the similarities with current state of the art alternatives and we will also focus on the technical aspects and tools required for the development of the system.

1. Introduction

The need for a repository of academic archives is always visible when a new semester begins and one does not know what a new teacher's methodology is. AcademicBox is a social network and has the differential purpose for university students, where they can log in using a university domain and have access to classroom materials, tests and notes of a certain teacher.

Currently, there is a social network intended for this purpose called X, but the student must pay a subscription for unlimited access. Another disadvantage is in the user interaction, the web site is not very organized and even the process of making a search is complicated.

AcademicBox is collaborative place where students can contribute by uploading college materials to help other students within the same university. The flow is pretty simple and straightforward. Anyone can apply a university for subscription. Then, a process of moderation will take place for validation purposes. After that, students can upload materials which can be organized by professor, semester, discipline and course. Let's say, for instance, that a student took Architecture 101 with Professor Nichols. This student can upload photos of notes on the class board, solved exams and all other sorts of multimedia files. Thus, making the life of future Architecture 101 students much easier. It is also possible to get "Tips" on a discipline. Let's say that the Architecture 101 with Professor Nichols is really hard to take, so it is commonly necessary to run a studying session on a daily basis. A Professor Nichols' student can give this kind of advice about the discipline or even about Nichols himself.

AcademicBox is composed by a Web App and an Android Mobile App. On both platforms it is possible to execute all the main features, like signing up or uploading files. The only difference between them is that it is only possible to apply an university for subscription on the Web App, as this is a feature that will not be used too much. Also, on the Mobile App there is a tight integration with the device hardware capabilities. For instance, it is possible to record a class and upload the recording to the cloud right away, without even being necessary to store it first on the device file system.

As a multiplatform project, a lot of attention has been given to the tools that will be used as to achieve a high level of product quality. Considering these tools and technologies, one can highlight the following:

- *Android Studio,* it is the official IDE for Android development. The programming language used is Java alongside with XML both being standard practice in Android development.
- The *RubyMine* IDE is to be used in the development of the Web interface. The programming language used in this case is Ruby on top of the framework Rails
- *Heroku*, a cloud application platform. This will be used to deploy the Web system due to the reduced (free) costs.
- *GitHub* is the choice for version control repository. It will be used for hosting both the Web application and the Android application.

2. Main and specific aims

Academic box has as its main aim to build a new way for university students to share their course materials in order to help future students of the same course in the same subjects. This means that students will be able to access files posted by other students remotely.

Regarding the specific aims, we can highlight these two:

- improvement in the academic relationship between students from the most different semesters, as the system promotes the interaction between past and current students of a disciplina;
- a simpler and more organized way for students to have access to a variety of materials “custom made” to a certain discipline or professor;

3. Motivation

As per Moran, 2013 “We can learn being together physically and also by being connected, we can learn in the same time and rhythm, or in different times, rhythms and in different ways”. With the growth in the Information Systems area, more types of social networks were created and they quickly became part of the young people’s day-to-day lives. A social network can be defined as a representation of interpersonal relationship as well as professional ones in the form of a networking community. A social network can be responsible for the sharing of ideas, information and common interests . Likewise, academic social networks are internet groups that allow the sharing of a variety of academic materials and information such as textbooks, lecture files, pictures, videos and so on. At first, social networks had a very strong social association normally destined to the relationship among friends and people with common interests, nowadays, they have gained a wider purpose, targeting other sectors like politics, media and Education.

Currently, interest specific networks have been created in order to tighten the relationships between people. Therefore, AcademicBox is a different kind of academic social network that aims at the sharing of course materials in a free and collaborative environment.

4. Related works

A web repository for academic material in the format proposed by the AcademicBox currently does not exist. There are, however, some other tools that can be used as a repository with some important limitations.This section details some of this tools, highlighting their main characteristics as well as their drawbacks.

4. 1. Github

One option commonly used is Github. Github is a version control repository system that is used mainly to store source code to a variety of applications. The use of this system as a means of storing course materials is widely spread among Computing courses due to the familiarity of the students with the platform and the availability provided by it.

To send files to the web the student needs only to execute what the system calls “a push” into the repository and the material will be available online to anyone. The disadvantages of using this technology, however, outweighs the advantages. Firstly, to be

able to push into a repository a student needs to be given special permission by the owner; the organization of the files is determined by the users which is not advisable; this technology can not easily be used by all users, regardless of their course as it is something that requires special knowledge of computer systems.

4.2. EbaH

Ebah is a social network for academic file sharing. A user can join the network by providing information about their university and course and filling in with a valid email. After finishing the sign up phase a user can share files under his username, the files can be organized into folders and the user can see how many times the file was visualized by other users.

The problems with Ebah begin in the sing up phase. Not all universities in Brazil are available and not all courses too. Another problem is that the files are associated with an user and not with a course or subject which contributes to the bad organization in the web site. In the case of AcademicBox the files will be associated with the subject, promoting a better organization and an easier access to such files. Ebah is naturally a social network while AcademicBox is a more direct approach to academic file sharing.

4.3. Passei Direto

Passei direto is a collaborative academic social network where the user can share their course materials with other users. The sign up can be done with an email address or with either facebook or gmail. Once logged in, the user selects their university and course an choose five modules to “follow”. The user receives notifications from the modules they follow.

Passei direto is the closest application to what AcademicBox proposes, but it still has some disadvantages. The first one is the access restriction, some features such as exams, book solutions and lecture notes are restricted to premium users only. Another disadvantage is the filtering options of a certain module. Modules in Passei Direto a global categories and receive update from all users that upload materials to that category. If a user wants to filter the kinds of materials they want to see, a premium account is needed. Due to this limitation the feed presented to the user is badly organized and visually polluted

4.4. Slide Share

SlideShare is a social network of file sharing specifically to slide presentation sharing. The sing up can be made through linkedin, facebook or a valid email address.Once logged, the user can view the different types of slides about a variety of subjects.

One of the advantages of this system is the fact that to download a document, one needs to firstly upload a valid document to slideshare. Unfortunately, many users simply upload files with no regard for organization, simply to finish download the file they wanted which contributes to the clogging of the system with unclassified and useless files.

Table 1 summarizes the tools discussed in this session in comparison with the main features that AcademicBox proposes. Note that not one single of them is capable of doing all of them at once.

Table 1- Comparison between the discussed tools

Tool	File sharing	Ease of filtering	Free use of all features	Relevant Categorization	User Tips
GitHub	**Yes**	**No**	**Yes**	**No**	**No**
EbaH	**Yes**	**Yes**	**No**	**No**	**No**
Passei Direto	**Yes**	**Yes**	**No**	**Yes**	**No**
Slide share	**Yes**	**No**	**No**	**Yes**	**No**

5. Method and Tools

5.1 Project Management

AcademicBox is a really large system, with features ranging from a simple login to the complex sharing and synchronization of materials in the cloud. In order to implement this large set of features, it is necessary a way to organize the development flow and to guide the development team. The method we find that best fits our needs was the SCRUM, because it allows us to deliver frequent builds of our application, send to test users and make improvements right away, which is the basic premise Agile Methodologies (JAMES, 2017).

SCRUM defines a set of roles in the application development. The main role is the PO, short for Product Owner. The PO is responsible for organizing the list of features by

priority (backlog), so the most important features are implemented first. He is also responsible for validating the implementation of the features after their development. AcademicBox has lots of PO's, since it's developed within an university full of college students which can validate our application several times during the development process. Thus, we expect to achieve a high quality useful product.

We also needed a tool for keeping track of the project issues, bugs and features. There are plenty of providers on the market, but we found Jira the one that best fits our needs. Jira is a platform that "implements" the SCRUM. Among its main features we find making the backlog, assigning features for developers, reporting bugs, checking the productivity of the individual developers and many others. In summary, it allows to organize the project development flow in a really easy and efficient way.

Keeping in mind the agile development we used Slack for the team communication. Slack allows the creation of channels for public conversations and also private conversations. We can create, for instance, a channel for each feature, which allows all the team to keep track of what is going on every time on every feature. Slack also integrates with Jira and Github, which makes the team even more aware of the project progress.

5.2 Technologies and other Tools

As we previously said, we use Github as our code repository. Github is almost a mandatory tool in software development. Alongside with the Git versioning control software, we have a really powerful combination to manage our source code.

Other important aspect in every mobile and web applications are the deliverance of push notifications. We do not intend to implement that from the scratch, so we integrated our system with the OneSignal platform to handle most of the hassle of push notifications. Once again, we made this decision thinking about agile development.

And maybe the most important platform to which we integrated our system to was the Amazon S3. As we storage images, videos, audios and all other sort of multimedia files, we need a lot of storage space. The cloud system that we use to host our code, Heroku, does not provide that amount of space for a reasonable price. Thus, Amazon S3 was our choice due to its low cost.

And finally, it is important to highlight the programming languages and Frameworks we used. On the mobile side, we used Java to build our Android App in Android Studio. To

speed up the development process we also used libraries like Retrofit and Sugar to handle most of hassle of HTTP requests and database, respectively. On the server side we used Ruby on Rails for the backend. For the frontend we used HTML5, CSS3, Javascript and jQuery. Both backend and frontend were implement on the Jetbrains Ruby Mine IDE.

6. Main Features

So far we discussed superficially about some the many features of AcademicBox. Now it is time to present them in more detail, so it is possible to understand the main differences between our platform and the others we presented in Section 4.

6.1 University subscription and administration

First of all, an university must exist in the AcademicBox. Thus, this is the very first step to use our platform. This is a feature that we classify as a "admin feature"; this sort of feature will only exist on the web platform, as it is something that will be used for only a small part of the users.

Anyone can go to the website, fill in the form and subscribe a university. However, every subscription will pass by a moderation process. The administrators of AcademicBox will basically check for the existence of that university. If everything is fine, the subscribed university will be created in our system and the user who made the subscription will be assigned the role of administrator.

An administrator of a university has very broad permissions and privileges. This person is responsible for creating the app's structure for that university, i.e. creating courses, classes, disciplines and professors. A good management strategy is to add two or three moderators for each course of that university. Another important responsibility of administrator is to moderate the content that users upload, because as AcademicBox is a collaborative app, some users will most likely make duplicate posts or even post inappropriate content, what makes necessary a report button for the users to be able to warn administrator about any problem.

6.2 Students sign up

Assuming that a university was previously created on the AcademicBox, any student can sign up to that university. On both web and mobile platforms students can sign up via

traditional email/password form or via Facebook. It's mandatory that every new registered user select at least one university where he/she belongs to. However, to join an university varies depending on the university setup, as administrator can put constraints, for instance, to moderate the entrance of new users. It is also possible for administrators to evict users at any time.

6.3 Upload of materials

Being subscribed to a university means that it is possible to manage college materials. Assuming that the administrators have created the records (e.g., courses, disciplines and professors), one can, for instance, check and upload materials of the discipline Linear Systems ministered on the morning shift by Professor Kursch on the Computer Engineering course .

The materials are classified according to 3 categories: Class, Test and Discipline. The first type are the materials for specific classes of a discipline. For instance, one can upload the audio of the class that took place on July 17th on the discipline Theoretical Aspects of Computing. It is also possible to set a short description for materials, so this kind of material could have, for example, set as its description the topic that was given that day. Images of the board of a class can also be classified as a Class material.

In the second kind, Test, are materials related to tests of a discipline. For example, one can upload images of a solved test of a discipline, so future students can get a clue on the style of tests of a certain professor. Videos and audios teaching how to solve tests will also fit well in this category.

In the last type, Discipline, stands everything else that can be somehow useful when taking a discipline. For instance, one can upload a pdf file containing a manual for solving the exercises of a Calculus 2 book. Basically, anything minimally related to a discipline is a potential fit for this category.

This system of categorization is useful for organizing the materials in a way that students can easily find them without the hassle of having to make long searches. Of course, this assumes that a moderation process is always present, as it is really easy for the materials to get out of control and students post tons of duplicate materials.

6.4 Tips on disciplines

AcademicBox will also provide a place for students to debate over disciplines and professors. Any student can go to a discipline or a professor record and post a Tip, which is a report of experiences that a student had. Thus, the Tips are categorized in Discipline and Professor. A Discipline Tip would be, for instance, to indicate a certain part of a book to focus on, the common amount of time to study for a discipline and so on. A Professor Tip would be telling about the fairness of the test corrections of a professor, how he is used to calculate the averages etc. Basically, anything that can help anyone in taking a discipline is a good Tip.

7. Results

The development of the system happened in three sprints of two weeks in each. Below there is a summation of what was produced in each sprint. It is important to note that the aim of these sprint were not to complete the whole system, but to develop a sample part in order to validate the project's idea.

Sprint	Aim
1	Login in feature
2	Material upload feature
3	Feed of posts feature

At the end of each sprint a meeting was made in order to develop the next sprint and to discuss the results achieved. The system as developed firstly using the IOS system, which was not planned at the initial states of the project but proved to be a lot more challenging than expected. The backed was then changed to Firebase due to its ease of use and simplicity so we could concentrate on the more important part, the APP.

Some of the difficulties encountered during the development of the project were: the IOs being available to development only at the Institute due to the availability of Mac computers; the design skills required to develop a beautiful app; the learning curve for firebase and its NoSQL database.

Some of the learning outcomes from the experience were: learning more IOS skills, something that part of our time did not have; learning of modern BaaS services; learning to decrease the scope of an application in order to fit the timeframe available.

Figure 1 a-d shows some of the screens developed during the project.

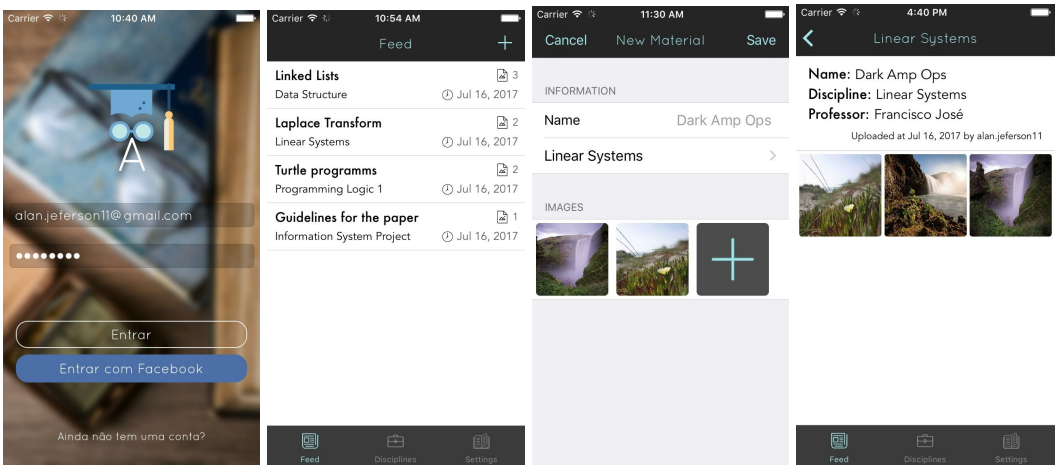

Figure 1 a - d

8. Conclusion and future works

Finally, the need for such system is real and the aforementioned characteristics are state of the art when considering the currently existing systems. The use of both a Web and a mobile platform contributes to a widespread use of the system as it can tackle most students within a university. The tools that will be used are some of the newer in the market which indicates a good support and the languages used have a good community which is very important in the development process. The AcademicBox system represents a new opportunity in the field of academic file sharing and academic information sharing.

As future work, we propose to develop the Android app to reach more college students. Another important point will be the development of new features for the application, as well as the improvement of possible bugs. FInally we intend to move the backend out of Firebase and develop our own backend in rails as it was planned at the beginning of the project.

8. References

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