
Group 18

FDM Trainer Skills and Availability

**ECS506U Software Engineering
Group Project**

Problem/Domain Analysis Report

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1. Introduction

The domain analysis in this document is aimed for the creation of an application that helps manage the scheduling process of a company by allowing them to assign expert trainers to a specific course on a week-by-week basis. This application aims to increase the convenience for both the scheduling team and the trainers that use the application, but the consultants that are being trained are also expected to make use of the application. The rest of the introduction will be used to explain the domain problem, the need for a solution / motivation and the proposed solution to the problem by using research that has been gathered.

Domain Problem:

After looking at our research, we have concluded that a formal training program provides several key employee benefits as well as organizational benefits. A conceptual study done by King Saud University discovered an association between the amount of money spent on employee training and the amount of gross profit and revenue each employee earned. With companies who apply an average of \$1,575 per employee seeing up to a 24% growth in gross profit and 218% increase in revenue. Moreover, companies which provide training programs to employees also saw an increase in employee retention. In local communities, where managers gave employees professional training, had an employee turnover rate of almost 40 – 50% lower than stores that did not provide training programs to employees [1]

Aside from improving organization profit margins and employee retention rates, successful training programs have also been seen to improve employee productivity and performance. One study [2] showed that when providing training aimed at improving employee's performance to a desired level, a strong positive correlation is formed between training and employee performance at $r=233$. This shows that firms are not able to increase their returns without first improving their employee performance through training. Additionally, investing in improving employee's productivity by training their decision making, teamwork and problem-solving skills resulted in enhanced performance as well as increased organization's level of growth [3].

The benefits shown for employee training far outweigh the costs involved for most organizations. However, these results can only be seen with a successful training program, where internal problems such as scheduling and trainers forgetting to show up can result in a loss of money for firms as well as employees not getting the full benefit of a training program. Therefore, a solution is required to mitigate human errors to minimize costs while maximizing the benefits.

Need for solution and proposed solution:

The process of manually scheduling trainers for a training program can take time whereby time lags in communication can cause cancellations of a module due to a trainer being unavailable at the time or worse, forgetting to attend. If a trainer suddenly becomes unavailable for a module, the trainer must contact the scheduling team, who then needs to contact all other trainers manually to check if they're available for that week's module which can result in the cancellation of the module if they're not able to make it on time. If it is then canceled, the scheduling team then needs to contact all the consultants on that particular course whether by phone, email or post. This is inefficient and takes too much time.

Our team is going to develop an application that will mitigate these problems and improve the convenience for the scheduling team, the trainers, and the consultants. To help with the tasks of the scheduling team, our application will display the modules of each course on a week-by-week basis, where they will be able to see the details of each module for that week. They will then be able to choose from a list of available trainers which they can assign to that particular module.

To help the expert trainers, the app will notify them whenever they get assigned to a module as well as assign it to their schedule in the app which will include the module information, as well as the date and time they are expected to attend. The app will also provide reminders a day before their scheduled time to prevent attendance problems. If the trainer is unavailable for the scheduled time, they will be able to contact the scheduling team in the app to notify them.

For the consultants that are being trained, first they will be assigned to one of three courses in the app depending on which program they're on. This will enable them to only see those course's modules. They will then be able to see each week's module details, whether they're available, and the trainer assigned to the module. They will also be notified a day before each module starts to remind them to attend the module.

Our software provides a convenient platform for all users involved to improve efficiency and streamline the scheduling process for employee training for both the staff and employees.

2. Customers and users

Course Scheduling Team (Primary user): The main users of the application would be the Course Scheduling Team; their roles will include allocating the appropriate trainers a specific week of training to deliver a specific course. The Course Scheduling Team will choose from a given list of expert trainers and select specific trainers from that list which will be responsible for delivering a specific course which is again chosen from a list by a

member of the Course Scheduling Team. Since the functionalities of this user will be accomplished through a straightforward user interface, the user isn't required to have high levels of computing skills.

Course Scheduling Team Traits:

- Basic computer literacy
- Profound understanding of the system

System/Database Admin: Due to each consultant having login credentials which are used to access their account, this will be stored in a database along with other user information which requires the need for a System/Database admin. The System/Database admin will oversee maintaining the information stored about consultants on the database server. Examples of specific roles of a System/Database admin include: Install database management software, design and create a database and create user accounts and monitor activities, recovering users' login credentials in cases of emergency.

Prerequisite for System/Database admin:

- Substantial computer literacy
- Usage of DB tools
- Relational DBMS knowledge
- Basic understanding of the system

Expert Trainers: This user is responsible for delivering the training of a given week to the consultants. Each trainer will be given a schedule, within the schedule contains all information required for the training provided such as date/time of which course they will be teaching, to which trainee(s). Trainers can view the progress of each trainee they are currently coaching. Expert trainers will also use the system to view the date of times of when they have training to deliver to a group of consultants, again since the functionalities of this user are achieved through a straightforward user interface, there aren't any requirements for programming skills or intense computing literacy.

Expert Trainer Traits:

- Profound Knowledge within their course of teaching.
- Management capability

Consultant: This user will fall into three categories, the category in which they are in will also be used to allocate each individual to a specific program on the FDM Trainer Skills and Availability Application. The three categories for this user are Graduates which will enter the Graduate programme, Individuals returning to work following the return-to-work programme and finally, Ex forces who will enter the Ex-forces programme. The role of all consultants regardless of the programme they undertake are to view a calendar containing all of their training sessions providing date and time. The consultants will follow a programme broken into three consecutive sections: Recruit, Train, Deployment model.

Consultant Traits:

- Fall into one of three categories mentioned in the paragraph above
- Basic user interface experience

3. The environment

Existing timetable scheduling applications are mainly found on desktop/mobile devices or accessed online through a web browser. Web-based applications allow for viewing schedules from any device as long as it has internet browser support. However, viewing a schedule on a web browser can sometimes be difficult as the formatting can become disarranged and causes confusion, this is due to different devices not being able to display the website in the same way. Furthermore, using a web browser will require the use of internet access to view the schedule which can be a problem when there is no access to the internet at the time. Whereas desktop/mobile applications will store a local copy which can provide offline access meaning a schedule can be viewed anywhere and at any time, even without access to the internet, this can be helpful if the schedule needs to be viewed but has not been changed yet. Although mobile applications have their benefits, they also have drawbacks which include mobile phones having smaller screens which can make it difficult to view and handle tasks, compared to desktop applications which have larger screens.

Our scheduling application will be made for desktop devices using the Microsoft Windows platform. The reason for choosing a desktop application would be due to the numerous advantages it provides. A desktop application would make it easier to manage the scheduling timetables for the course scheduling team, this is because they can easily use the application's GUI to arrange different trainers onto specific courses, unlike a mobile application which can prove to be troublesome when arranging many schedules at once due to compactness of the device. Furthermore, the desktop application's schedule can be linked with the built-in calendars on mobile phones to

support viewing the schedule on mobile devices. This subscribing calendar feature is already integrated into the iOS and Android platforms, which can be beneficial as it allows the users to receive reminders when their scheduled time is near and prevents them from missing it. The desktop application can be implemented with more advanced features such as filtering, rather than a basic timetabling application on mobile devices. Moreover, a desktop application will be more optimised for the device, unlike a web-based application, meaning it can provide better performance as it will not have to be updated all the time when loading the schedule since it stores a local copy in the memory.

4. Tasks and procedures currently performed

Our system's main aim is to assist the course scheduling team by allowing them to create courses with available trainers and alert the trainers when they are scheduled to run a particular course. The system will also allow expert trainers and consultants to log in and view details about their course and view their schedule. System and Database admins will be in place to monitor and maintain the system and have high level permissions to authorize and verify certain tasks, such as user log-in details, data integrity and ensure the software is fully functional.

System/Database Admin:

Add/Remove Users: There sometimes may be errors, or mistakes when a user signs up to get a log in for the system. Therefore, there must be a way for an admin to add user accounts to the database. There also may be the case where an account may have to be deleted, in which only someone with high permissions, in this case the system admin, should be able to do.

Verify Course Scheduling Team Member: For a new member of the course scheduling team to be added, someone with admin privileges on the system must check if the person is an actual member of the course scheduling team.

Expert Trainers:

View Consultant Progress: Expert trainers can view the progress of their students, such as their assessment results, background information, and strengths and weaknesses.

Contact Course Scheduling Team: If the trainer is unavailable for the scheduled time, they will be able to contact the course scheduling team in the app which will

immediately notify the course scheduling team so they can assign a different trainer to that session.

Course Scheduling Team:

Create Course: This feature would allow the course scheduling team to create courses for the three consultant groups (Graduates, Returners to work, Ex-forces)

Edit Course: The course scheduling team must create the best possible course experience for the consultants; therefore, they must be able to alter the training courses to make improvements.

Verify Trainer: A trainer must fit certain requirements to be teaching consultants, so the course scheduling team must check these requirements when a trainer signs up to use the application. Once a member of the course scheduling team verifies a trainer, then they will be allowed to log into the system and be assigned to teach training programmes.

Verify Consultant: Like the trainer, the consultant must also be verified to check certain requirements. On verification, they will also be allowed to log in and use the system and will be placed in one of the three training programmes (Graduate Programme, Returners to work, Ex-forces) depending on their work status.

Assign Trainer: The course scheduling team must assign trainers to specific modules and programmes that they are confident to teach. This can be automated, so that the first available trainer found for that region and module, can be assigned to a session.

Remove Trainer: If the trainer is unavailable for the scheduled time, then the scheduling team must be able to remove the trainer, so they can assign another trainer before the session.

Assign Consultants: Consultants must also be assigned on a course that fits their needs, for example, the course must be in an academic center that they are able to travel to. They must also be put on a course that fits one of the three programmes the academy has to offer.

Shared Tasks:

View course (Consultant, Course Scheduling Team, Expert Trainers): The consultant, course scheduling team and the expert trainers will all have to view the course, but for different reasons. The consultant will be able to view the course to see what they are studying, and who their trainer is. The course scheduling team will be able to view all details about the course, such as who is taking the course. The trainers

would be able to view the course content, so they can prepare material for training the students.

View Schedule (Consultant, Course Scheduling Team, Expert Trainers):

Consultant and expert trainers will be expected to arrive at the academy to teach/learn at given dates and times, therefore both these users will need a schedule for them to know when to arrive at the academy for their lesson.

Login (Consultant, Course Scheduling Team, Expert Trainers): Since the application will handle data for consultants and trainers, they must be protected using a login function. This will allow only users with a login to use the system. Each of the three users have different permissions, since there are certain tasks that a course schedule manager can carry out, like account verification, that trainers and consultants shouldn't be able to do. Having a user login means that each account has an access level, so they can only access the content they are allowed to see.

Sign Up (Consultant, Course Scheduling Team, Expert Trainers): When either a member of the course scheduling team, a consultant or an expert trainer first use the system, they are a non-registered user. For a user to use the system, they must make an account. The sign-up function allows accounts to be created. However, a member of the course scheduling team must verify if the account is valid before the user is allowed to use the system. If the user signs up for the course scheduling role, then the system administrator must verify the account.

5. Competing software

The following software consists of applications with scheduling features. We mostly used the customer reviews as well as the main websites of these companies to get the advantages and disadvantages as well as offered services, this way we can see the view of customers that have been using this software for a decent amount of time as well as the view of customers that have the premium version.

QMUL +

This is an app that we have more experience with that has to do with scheduling lecturers, exams assignments, created for the university of QMUL, is a software used for students and professors. QMUL+ is available as a website and has a native app on android and iOS. It has a play store score of 3.4/5 of 10K downloads [4] (3/5 rating on the app store) [5] and having in mind that it has "31,000 students on degree

programmes and close to 4,500 members of staff.” [6] suggest that is a solid way to manage the data and schedule of thousands of students.

On top of that it has other services like QMplus Media, QMplus Hub, QMplus Archive [6] that helps to make it very easy for the students in this university to find all kinds of information and promote themselves in any area they are studying in.

Competitive Advantages

- Easy to use
- Colour coding depending on where your lessons are in
- Available widgets such as “To do list”, “Upcoming events”, “Noticeboard” and “Assignments”, [6] this makes it easier to be more organized.
- Contains Emails of professors making it easy to email them.
- Time conversion “Local Start” and “Local End” gives you your local times where the lectures will start and finish as well as “London Start” and “London End”
- Location of the lectures (room number).

Disadvantages

- The app is not fluid and is better to use the web version.
- “Application sometimes refuses to even load so the whole thing is a bit pointless.” [4] this and other comments like “This app is pointless. The timetable does not work, and they only show the London campus. Not ideal for MBBS Malta students...” [4] makes a clear point that the app is not optimized for a smartphone.
- It was specifically made for the university so no one else can use this scheduling system
- Little to no notifications when assignments are due or lecture changes.
- “I just wish this app had a more pleasant UI to it. The whole feel feels sluggish and like it was made for 2010. Definitely needs updating.” [4]

Calendly

“Calendly is your hub for scheduling meetings professionally and efficiently, eliminating the hassle of back-and-forth emails so you can get back to work.” [7] This is the main vision of this scheduling software, with a 4/5 rating on the play store [8] (with +100K downloads) and 4.8/5 in the app store [9].

Calendly eliminates the need to manually schedule appointments, calls, interviews etc.

It has over “10,000,000 users worldwide” [7] and is paired with companies like Dropbox and eBay. They are the “#1 scheduling platform” [7] and on top of the 10,000,000 users [7] they also have “50,000 companies using Calendly”, this makes this software sound very promising and on top of that it has nearly 10 years from being founded.[7]

Competitive Advantages

- Very good rating on the play store, app store and “Thousands of 5-star reviews from happy customers”,[7] this means it has a solid base plus good innovative features that no other software can bring to the table
- You can “Open your schedule only to the days and times that work for you.” [7], this allows you to get more stuff done by spreading it throughout your week.
- “Meetings are scheduled without calendar conflicts, reminders go out automatically, and rescheduling is a breeze for everyone.” [7] automatic reminders with pop up notifications makes it a reliable piece of software.
- The software allows the user to check whether the team is available or not and automated email reminders and follow-up.
- After the client or colleague chooses a date, it automatically updates it in the calendar.
- You can easily create an account using your Office 365, Google, or Outlook accounts [7].
- You don't have to sign up to use the platform, you can use it as a personal schedule organizer.

Disadvantages

- Email support is available for the premium version of Calendly.
- It can connect to only one calendar per account. Meaning that if your world on other jobs or want to use this as a personal life calendar you will have to create a separate account
- “Default setting to American date/spelling format and no way to change for TROTW, Sunday as first day of week, no 24-hour clock.” [8] comments like this suggest there should be a way to personalize the app, so it is just right for you.
- “Biggest feature I want to see natively in the app is the availability config” [9].

Acuity Scheduling

“All you need to do is show up at the right time. Your online assistant, working 24/7 to fill your schedule” [10], this is the first image you get when visiting their website. Acuity Scheduling offers scheduling solutions to users who need to access their availability in real-time and make appointments depending on their pre-planned schedule. It has 4 plans depending on what features you want. It goes from “Freebie” to “Powerhouse Player” [10], from \$0/month to \$50/month, this makes it a usual app depending on what type of business you are running.

It has over +100K [11] downloads on the play store and with a score of 4.6/5, this is high for an app that offers so much. (4.8/5 on the app store) [12]. With comments like “I’ve been using Acuity for my yoga studio since 2017 and am still impressed by the functionality of this platform.” [12] to “I use this booking system for my business and it’s a seamless process. Super easy to use and very adaptable.” [11] makes it a solid choice for someone that wants to organize their business.

Competitive Advantages

- Easily customizable depending on the needs of the user
- Acuity Scheduling allows sharing your calendar on social media, including Facebook and Twitter. It can also be shared through email and embedded on a website so people can book their own appointments.[10]
- Easy integration with other calendar tools such as iCal, Zapier and Squarespace [10].
- Secure paying methods such as PayPal and Stripe [10].
- It has a very easy booking process, the clients themselves can reschedule or even cancel an appointment.
- Notifications are nearly immediate, it lets you know if an appointment is booked, rescheduled, or canceled.

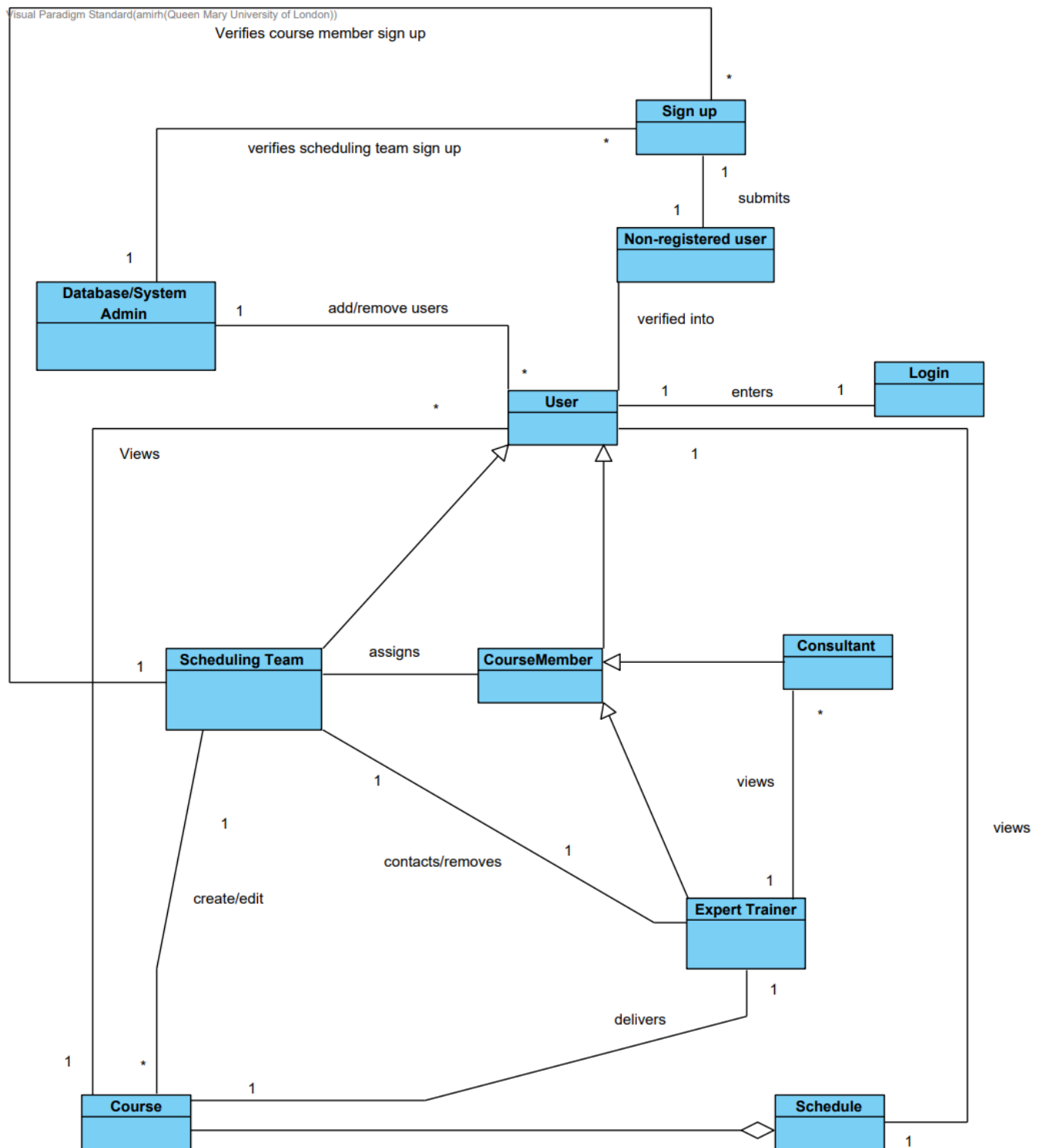
Disadvantages

- Comments like “duplicate an appointment type to set up a new class. Difficult to work out how to get to different functions” [11] means that this software is hard for newcomers.
- There is no phone support, meaning that the only way to contact customer service is via email that can take a long time to receive a response for [12].
- It has a bit of a steep learning curve for beginners, the good thing is that there are online resources and videos that can help you using this software [11].

	<u>Competitive Advantages</u>	<u>Disadvantages</u>
QMUL +	<ul style="list-style-type: none"> - Easy to use - Colour coding - Time conversion 	<ul style="list-style-type: none"> - App not fluid as web version - Little to notifications
Calendly	<ul style="list-style-type: none"> - Put the days that only works for you - Check who is available - Link to other accounts - Can use without creating an account 	<ul style="list-style-type: none"> - Only one calendar per account - Not many configurations
Acuity Scheduling	<ul style="list-style-type: none"> - Easily customizable - Sharing your calendar is easy - Secure paying methods - Notifications are immediate 	<ul style="list-style-type: none"> - Can't duplicate calendar - No phone support just email support - Hard to learn at the beginning

In conclusion, most, if not, all the top scheduling software have android/apple apps along with desktop support and the highest rated ones have notifications that work immediately and customisation that works depending on the user's needs. Easy integration with other calendar tools, simple rescheduling process and immediate notifications are some of the features we would like to use in our program. Although we are aiming for a desktop application, further functionality could include a mobile companion app for user convenience.

6. Domain Model



7. References

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