Lecture Feedback System

CS39440 Major Project Report

Commented [NT1]: Change this for your module.

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22nd April 2019

Commented [NT2]: Update with the date for the current version of your document.

Version 1.0 (Draft)

This report is submitted as partial fulfilment of a MEng degree in Software Engineering (With Integrated Year In Industry) (G601)

Commented [NT3]: Change as appropriate.

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Declaration of originality

I confirm that:

- This submission is my own work, except where clearly indicated.
- I understand that there are severe penalties for Unacceptable Academic Practice, which can lead to loss of marks or even the withholding of a degree.
- I have read the regulations on Unacceptable Academic Practice from the University's Academic Registry (AR) and the relevant sections of the current Student Handbook of the Department of Computer Science.
- In submitting this work, I understand and agree to abide by the University's regulations governing these issues.

Name Morgan Jones

Date 22/04/2019

Consent to share this work

By including my name below, I hereby agree to this project's report and technical work being made available to other students and academic staff of the Aberystwyth Computer Science Department.

Name Morgan Jones

Date 22/04/2019

Acknowledgements

I’d like to thank my supervisor Chris Loftus for his guidance and patience and those who helped me by trying out the system.

Abstract

The purpose of my project is to create an application for students of the university that they can use to provide anonymous feedback throughout the course of a lecture or workshop. The staff presenting these lectures can then use the system to respond to feedback either during or after a lecture.

This report details my process of the design, building and testing of this system along with an evaluation of that process and of the solution I have produced. I attempt to evaluate the requirements I have outlined and how well those requirements have been met.

Commented [MJ[4]: Include an abstract for your project. This should be approximately 300 words.

The abstract is an overview of the work you have done. Highlight the purpose of the work and the key outcomes of the work.

Contents

1. Background, Analysis & Process

1.1. Background

The aim of this project is to build a responsive web application that will allow students in the university to give feedback and ask questions anonymously throughout a lecture or workshop.
The idea being that the students would connect to the system by entering a 6-digit code that would be read out at the start of the lecture, the lecturer taking the session could then respond to the feedback and questions as they are provided by perhaps explaining things further or re-visiting misunderstood material.
Any data given would be recorded by the system for review by a lecturer at some point in the future enabling the lecturer to easily see a summary of the feedback and adjust future content delivery accordingly.

1.1.1. Motivation

The project interested me because it presented opportunity for me to learn and gain more experience with web development and in particular the use of a web framework technology, this was something I had struggled with in the past despite having an interest in and knowing that the ability to develop using a full-stack web framework is a valuable, if not essential, skill in the world of web development.

I was also inclined to take the project because of the accessibility of the problem domain. I myself have been a student for years therefore the transition of starting to think like my end users (students) was an easy one.

1.1.2. Research

During my research I started recording all activity, links and ideas in a project diary that was heavily used during the first few weeks of the project and continued to be used for some weeks into the project.

I knew I wanted to use a web framework approach because my product was to be a web app. The main three I considered were Ruby on Rails [1], Laravel and Django [2] because all three are popular and well established/supported tools. I chose Django in the end despite having previous experience with Ruby on Rails because I am most competent with the python programming language (Django being the web framework for python). This did mean I had to learn Django from scratch, but that learning experience was one of the reasons I chose the project in the first place.

There were many options for my choice of IDE because the standard approach was simply to use a text editor alongside folder/file navigation. The most common editors I saw used in the various Django tutorials I watched were either “Sublime Text 3” [3] or “atom” [4] text editors. I chose “atom” because it has all the functionality of sublime text but with the added benefit of being open source and therefore having many plugins available that I could make use of during the project; I installed a command line console plugin [5] that allowed me to run the server and access the database directly without having to switch desktop windows and a beautify plugin [6] that auto-formatted my HTML and python code.

I knew the system would have to be responsive because most student users would access it through their mobile phones during a lecture. My CSS skills are limited and therefore chose to use a CSS library to assist in this aspect of the project. Bootstrap was my choice of technology for assisting with the responsive design because the purpose of the technology is to “Build responsive, mobile-first projects on the web” [1]. I have also had some experience with older versions of it so had a feel for how it was used already.

The application will need to store data in a database. I had previous experience with MySQL, SQLite3 and PostgreSQL. I chose PostgreSQL [8] because it has the most advanced features and is therefore the most flexible, there is a lot supporting tutorials for using it with Django and it is the database technology I am most competent with having used it all throughout my year in industry.

I wanted to have the feedback display in a visual way and had previous experience using JavaScript along side the HTML canvas to produce client-side graphics; it was my aim at the beginning of the project to use these skills to produce some form of visualisation of feedback in graphs or charts.

As inspiration for my system I looked at a quiz system produced by a student (NAME HERE) as a major project in a previous year. It was a good place to start as it showed me the type of style and quality I should be aiming for. The simplistic style of the site and the way he presented data visually stood out to me as something I would want in my app. I also discussed with my supervisor the means of authenticating staff using a login and connection over LDAP to a university server, this was how the student achieved the staff login functionality on his project; a functionality I too would need to implement.
As result of this I tried reading the LDAP RFC specifications and investigated the use of a python library (ldap3) [9]that would function as an LDAP API for my Django application. My supervisor also forwarded me an email that was provided to (NAME HERE) with instructions on how to connect and process the data returned by the application level protocol (LDAP).
I then read the tutorials on writing a custom authentication backend to accommodate for my authentication via LDAP, this would still allow me to use Django’s built-in authentication system.

The system was to be used by the university. Every other web service the university provides is available in both Welsh and English because the university is bilingual. It seemed appropriate that my app should also be available in Welsh and English.

1.2. Analysis

After the above-mentioned background preparation, the project direction was decided. The system was to be built in python following the Django web framework using a customised version of the atom text editor as an IDE. JavaScript was to be used to add some form of data visualisation and Bootstrap was to be used to ensure responsive design.

Sessions for lectures would only be managed by members of university staff this would be made possible by a user login functionality that utilised authentication over LDAP to a university server. Feedback would only be provided by those with an active 6-digit session code given out by a member of staff at the start of a lecture.

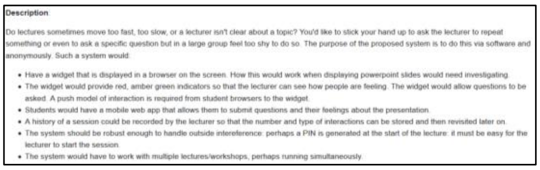
Commented [MJ5]: Taking into account the problem and what you learned from the background work, what was your analysis of the problem? How did your analysis help to decompose the problem into the main tasks that you would undertake? Were there alternative approaches? Why did you choose one approach compared to the alternatives?

There should be a clear statement of the objectives of the work, which you will evaluate at the end of the work.

In most cases, the agreed objectives or requirements will be the result of a compromise between what would ideally have been produced and what was determined to be possible in the time available. A discussion of the process of arriving at the final list is usually appropriate.

As mentioned in the lectures, think about possible security issues for the project topic. Whilst these might not be relevant for all projects, do consider if there are relevant for your project. Where there are relevant security issues, discuss how they will this affect the work that you are doing. Carry forward this discussion into relevant areas for design, implementation and testing.

1.2.1. Changes of Project Title



Description

Do lectures sometimes move too fast, too slow, or a lecturer isn't clear about a topic? You'd like to stick your hand up to ask the lecturer to repeat something or even to ask a specific question but in a large group feel too shy to do so. The purpose of the proposed system is to do this via software and anonymously. Such a system would:

- Have a widget that is displayed in a browser on the screen. How this would work when displaying powerpoint slides would need investigating.
- The widget would provide red, amber green indicators so that the lecturer can see how people are feeling. The widget would allow questions to be asked. A push model of interaction is required from student browsers to the widget.
- Students would have a mobile web app that allows them to submit questions and their feelings about the presentation.
- A history of a session could be recorded by the lecturer so that the number and type of interactions can be stored and then revisited later on.
- The system should be robust enough to handle outside intereference: perhaps a PIN is generated at the start of the lecture: it must be easy for the lecturer to start the session.
- The system would have to work with multiple lectures/workshops, perhaps running simultaneously.

Figure 1 Original project suggestion description

The original project title was "Lecture traffic lights and feedback system" because it was thought the feedback would be in the form of Green, Red and Amber responses. In discussion with my supervisor it was mentioned that those responses may not be that useful because they tell little about what was positive or negative. I therefore expanded the feedback to include a rating on multiple lecture aspects. Below are the options I chose to present to student users:

- Delivery Speed
    - Very Slow
    - Little Slow
    - Just Right
    - Little Fast
    - Very Fast
- Content Complexity
    - Very Easy
    - Slightly Easy
    - Normal
    - Slightly Difficult
    - Very Difficult
- Content Presentation
    - Very Well Presented
    - Well Presented
    - Not Well Presented
- Level of Engagement
    - Very Engaging/Interesting
    - Engaging/Interesting
    - Not Engaging/Interesting
- Overall Feedback
    - Good
    - Bad
    - So-So

1.2.2. Requirements (Feature List)

Shortly after my initial research and learning I produced a feature list; as is process convention in an FDD project. I broke the problem down into functionally valuable features and separated these features into four feature sets with estimated weeks for each feature set.

The four feature sets were:

- Authentication
- Lecture Management
- Session Management
- Providing Feedback

The content of these feature sets evolved throughout the project and were not all ordered by dependency; especially between the last two I found my self frequently jumping from working on Session Management features to working on Feedback features and visa-versa.

The authentication feature set started with only one feature which was LDAP authentication, this was because at the time I was unsure on the difficulty of the feature I later included internationalisation in this feature set due to feature being easier to implement than first expected.

The motivation for having sperate Lecture Management and Session Management came from the idea that a single lecture may be given many times to different classes.

Lecture Management is more basic CRUD functionality which expanded throughout the project to include search query functionality and functionality to work with PDF uploads.

Session Management is more to do with managing live sessions through a control panel style page this made use of JavaScript, jQuery and AJAX. This feature set also included the feature for visually displaying feedback data.

Providing Feedback was meant to be the simpler UI as it was intended for use by students on mobiles. It required connecting to an active session and maintaining user data through use of a session on the server.

1.3. Process

I originally intended to follow a personalised version of feature-driven development (FDD) as my engineering process. I chose FDD because it is recommended when building a project which is well defined and would allow me to get a lot of design out of the way during the first three FDD process steps (AKA iteration zero). This approach worked well at the start of my project as it resulted in me producing a range of high-level design diagrams to model the system which served as a useful starting point to which only incremental updates were necessary throughout the project. I also produced an ordered feature list that functioned as a requirements specification and reference point for noting my own progress.

As the project progressed, I found that my progress tracking to be unaligned with FDD because my iterations did not follow the standard 6 FDD iterative milestones. I was working through the features on my feature list but was writing code, updating design and tests at the same time. This hinted at my adoption of XP-style iterations and caused me to abandon my attempts at maintaining an FDD progress tracking report.

Into the second half of the project I found that I was almost entirely writing code and unit tests with very little updates to the formal test or design. This apparent decrease in discipline was due I think to my attempt to make unplanned changes that I was often unsure of and resulted in failures/rollbacks or minor advancements. It is for this reason I have kept this report in the structure of a plan-based project because from an honest perspective the project structure now reflects that with investment in design, implementation and testing in that order.

2. Design

2.1. Overall Architecture

Towards the start of the project I produced several high-level UML designs to model the system; these diagrams were updated as the project progressed. I used Visual Paradigm community edition to produce the diagrams.

2.1.1. Behavioural Diagrams

My behavioural diagrams display the system functionality and detail the intended user workflow. I used a use-case diagram to brainstorm the functions of the system both the staff and student users would want to access.

Commented [MJ[6]: Use case here

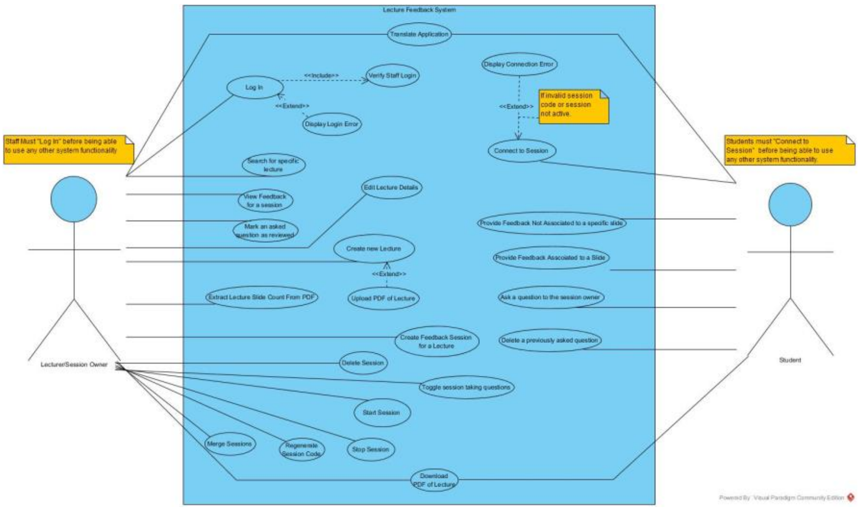

Lecture Feedback System
Translate Application
Log In
<<Include>>
Verify Staff Login
<<Extend>>
Display Login Error
Display Connection Error
<<Extend>>
If invalid session code or session not active.
Connect to Session
Staff Must "Log In" before being able to use any other system functionality
Students must "Connect to Session" before being able to use any other system functionality.
Search for specific lecture
View Feedback for a session
Mark an asked question as reviewed
Edit Lecture Details
Create new Lecture
<<Extend>>
Upload PDF of Lecture
Extract Lecture Slide Count From PDF
Provide Feedback Not Associated to a specific slide
Provide Feedback Associated to a Slide
Ask a question to the session owner
Create Feedback Session for a Lecture
Delete a previously asked question
Delete Session
Toggle session taking questions
Start Session
Merge Sessions
Regenerate Session Code
Stop Session
Download PDF of Lecture
Lecturer/Session Owner
Student
Powered By: Visual Paradigm Community Edition

Figure 2 Use-Case Diagram

I used activity diagrams to describe in detail the set of actions and decisions users would take when using the application. There is one activity diagram describing typical student workflow and another describing typical staff workflow.

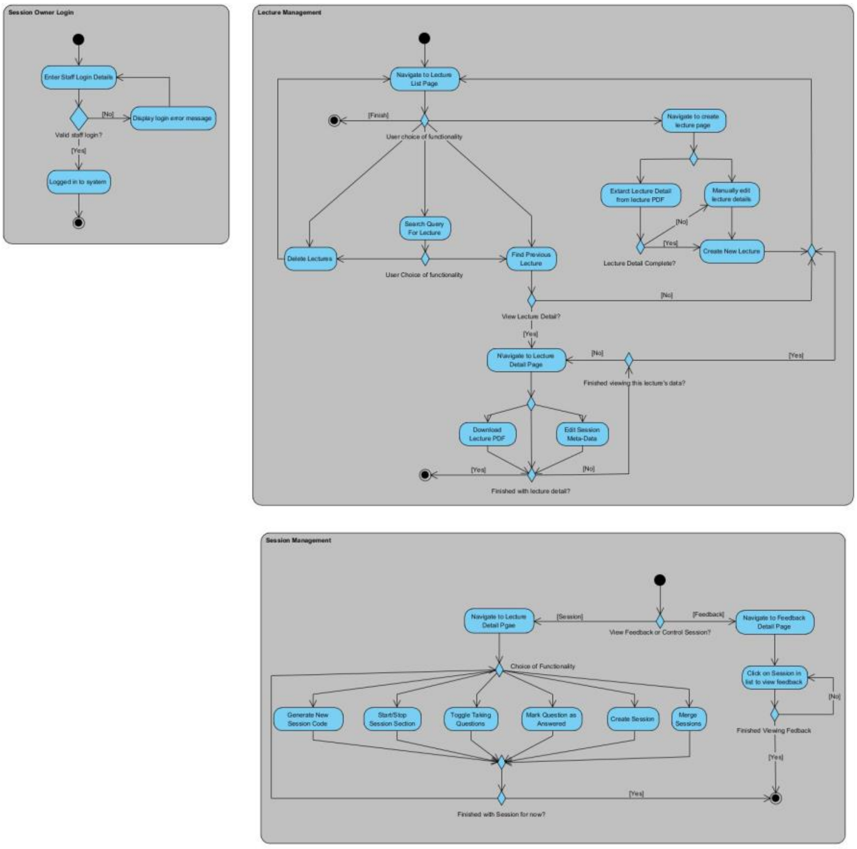

Session Owner Login
Enter Staff Login Details
[No]
Display login error message
Valid staff login?
[Yes]
Logged in to system
Lecture Management
Navigate to Lecture List Page
[Finish]
User choice of functionality
Navigate to create lecture page
Extarct Lecture Detail from lecture PDF
Manually edit lecture details
[No]
[Yes]
Create New Lecture
Lecture Detail Complete?
Search Query For Lecture
Delete Lectures
Find Previous Lecture
User Choice of functionality
[No]
View Lecture Detail?
[Yes]
Navigate to Lecture Detail Page
[No]
[Yes]
Finished viewing this lecture's data?
Download Lecture PDF
Edit Session Meta-Data
[Yes]
[No]
Finished with lecture detail?
Session Management
Navigate to Lecture Detail Pgae
[Session]
[Feedback]
View Feedback or Control Session?
Navigate to Feedback Detail Page
Choice of Functionality
Click on Session in list to view feedback
[No]
Generate New Session Code
Start/Stop Session Section
Toggle Taking Questions
Mark Question as Answered
Create Session
Merge Sessions
Finished Viewing Fedback
[Yes]
[Yes]
Finished with Session for now?

Figure 3 Staff User Activity Diagram

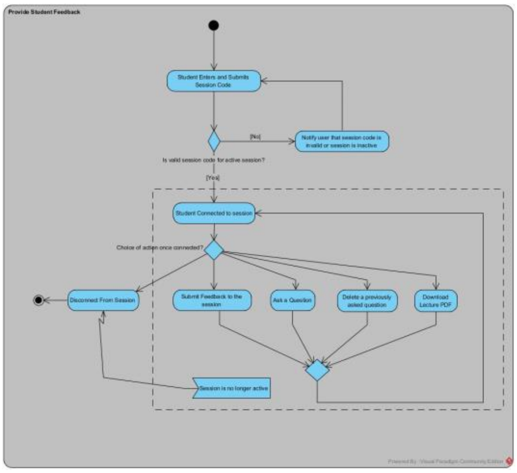

Provide Student Feedback
Student Enters and Submits Session Code
[No]
Notify user that session code is invalid or session is inactive
Is valid session code for active session?
[Yes]
Student Connected to session
Choice of action once connected?
Disconnect From Session
Submit Feedback to the session
Ask a Question
Delete a previously asked question
Download Lecture PDF
Session is no longer active

Figure 4 Student User Activity Diagram - Providing Feedback

Commented [MJ[7]: Activity diagrams here

2.1.2. Structural Diagrams

I started with an entity relationship diagram describing the underlying data the system would need to store in the database. Focusing on data was recommended to me by my tutor during my year in industry.

I had to redesign the database in the middle of the project to reduce redundant data, make the addition of extra functionality easier and allow the use of more Django conventions.

- I made use of relations produced by Django's authentication contribution therefore removed attributes from the lecture relation.
- Added a 'Time' relation allowing feedback sessions to be re-started by introducing multiple start and end times.
- Shifted attributes from the Lecture relation to the Session relation resulting in more flexibility of the functioning of the application.
- Removed my 'enum' relations for the type of feedback options available by instead using a simple varchar type attribute on the feedback table which was restricted only by the hard-coded values supplied to a ChoiceField on a Django model class. This is more conventional for fixed drop-down options in Django.

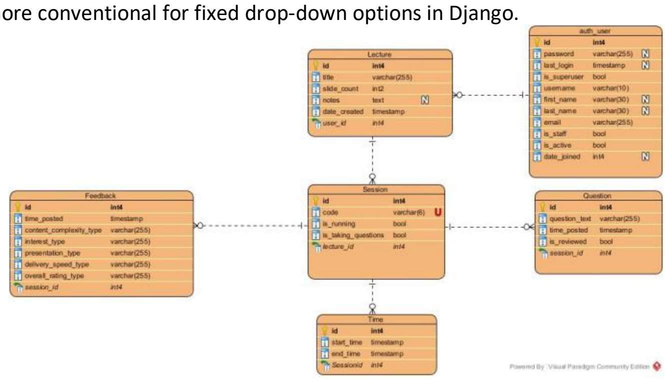


Figure 5 Entity Relationship diagram describing the structure of my applications database

The component architecture of the system is quite basic, I had originally intended to write a desktop program to go along with the system but that feature never got implemented. The exclusion of this feature plus the removal of unnecessary articles on the diagram is the reason for the final diagram's simplicity.

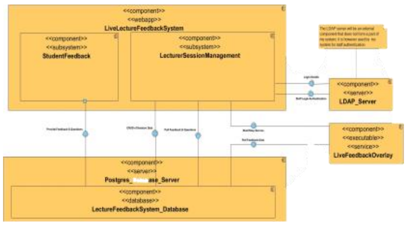


Figure 6 Original Component Diagram

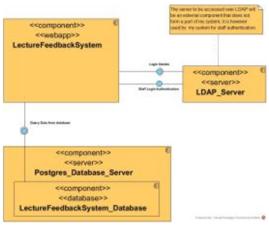

<<component>>
<<webapp>>
LectureFeedbackSystem
This server to be accessed over LDAP will be an external component that does not form a part of my system, it is however used by my system for staff authentication
Login Details
Staff Login Authentication
<<component>>
<<server>>
LDAP_Server
Query Data from database
<<component>>
<<server>>
Postgres_Database_Server
<<component>>
<<database>>
LectureFeedbackSystem_Database

Figure 7 Final Component Diagram

2.2. Detailed Design

I found detailed design difficult and delayed it for most the project. My original goal was to auto-generate it using some tool, I tried to use the pygraphviz python package to do this however ran into an issue to do with missing C libraries that I could not resolve.

There was a general lack of documentation for the standard of how to model Django applications I think due to that fact that the code you write into a Django application is mostly not class structured albeit the MVC framework is.

A common recommendation for low-level design was to describe the Object-Relational mapping classes with a class diagram. This is only obvious aspect of the code requiring a class diagram of its own since all ORM in Django is always defined in classes.

This in my opinion does not as that much value as it is close to structure described in the database, as it would be considering these classes are used to build the migrations that in turn build the database.

Below is the class diagram describing the ORM classes from my applications models.py file. These are the model part of the MVC design pattern on which Django framework is built.

Commented [MJ[8]: Class diagrams here

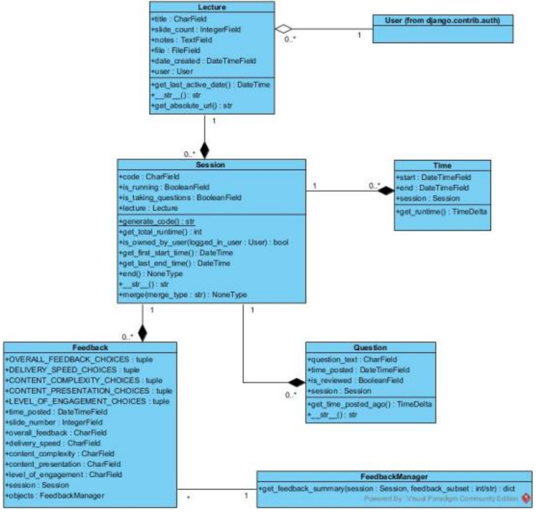

Lecture
+title : CharField
+slide_count : IntegerField
+notes : TextField
+file : FileField
+date_created : DateTimeField
+user : User
+get_last_active_date() : DateTime
+__str__() : str
+get_absolute_url() : str
0..*
1
User (from django.contrib.auth)
1
0..*
Session
+code : CharField
+is_running : BooleanField
+is_taking_questions : BooleanField
+lecture : Lecture
+generate_code() : str
+get_total_runtime() : int
+is_owned_by_user(logged_in_user : User) : bool
+get_first_start_time() : DateTime
+get_last_end_time() : DateTime
+end() : NoneType
+__str__() : str
+merge(merge_type : str) : NoneType
1
0..*
Time
+start : DateTimeField
+end : DateTimeField
+session : Session
+get_runtime() : TimeDelta
1
0..*
1
0..*
Feedback
+OVERALL_FEEDBACK_CHOICES : tuple
+DELIVERY_SPEED_CHOICES : tuple
+CONTENT_COMPLEXITY_CHOICES : tuple
+CONTENT_PRESENTATION_CHOICES : tuple
+LEVEL_OF_ENGAGEMENT_CHOICES : tuple
+time_posted : DateTimeField
+slide_number : IntegerField
+overall_feedback : CharField
+delivery_speed : CharField
+content_complexity : CharField
+content_presentation : CharField
+level_of_engagement : CharField
+session : Session
+objects : FeedbackManager
Question
+question_text : CharField
+time_posted : DateTimeField
+is_reviewed : BooleanField
+session : Session
+get_time_posted_ago() : TimeDelta
+__str__() : str
*
1
FeedbackManager
+get_feedback_summary(session : Session, feedback_subset : int/str) : dict
Powered By Visual Paradigm Community Edition

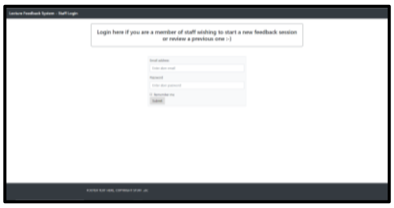
Figure 8 Class Diagram describing structure of ORM classes in models.py

2.3. User Interface Design

During my research and while learning Bootstrap I build mock UI designs of how I imagined different pages of the site would look. This allowed me to have a talking point with my supervisor and others about the look of the site it also allowed me to have a detailed starting point for my HTML templates.

Commented [MJ[9]: May need to move this to Design Section, with more detail and a comparison of original design and final design below it???

The design of the UI evolved over time as the exact functionality of the pages became clearer. Below is a comparison between the original UI design and the final result.



Login here if you are a member of staff wishing to start a new feedback session or review a previous one :-)

Figure 9 Login Page Original

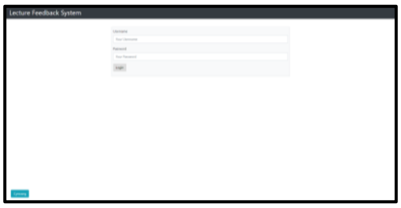
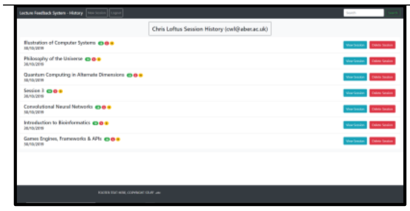


Figure 10 Login Page Final



Chris Loftus Session History (cwl@aber.ac.uk)

Illustration of Computer Systems
Philosophy of the Universe
Quantum Computing in Alternate Dimensions
Session 3
Convolutional Neural Networks
Introduction to Bioinformatics
Games Engines, Frameworks & APIs

Figure 11 Lecture List Page Original

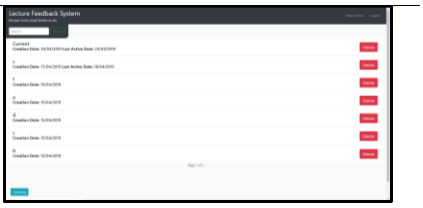


Figure 12 Lecture List Page Final

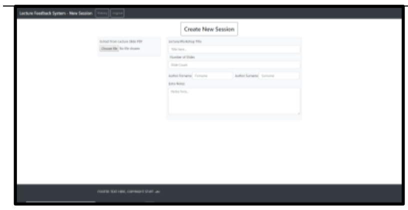


Figure 13 New/Edit Lecture Page Original

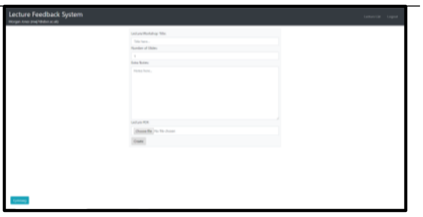


Figure 14 New/Edit Lecture Page Final

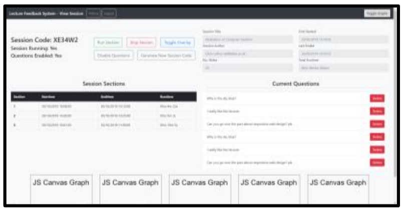


Figure 15 Lecture Detail Page Original

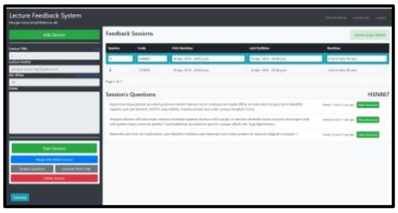


Figure 16 Lecture Detail Page Final

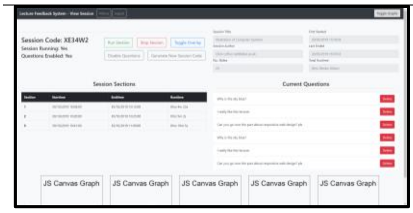


Figure 17 Lecture Detail Page (Canvas Graphs at bottom) Original

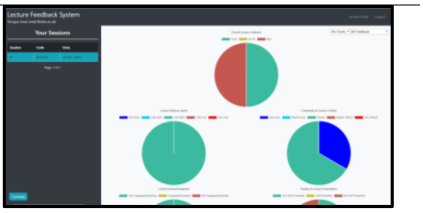


Figure 18 Feedback Detail Page Final

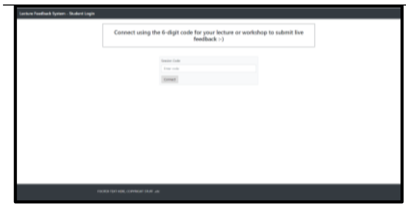

Connect using the 6-digit code for your lecture or workshop to submit live feedback :-)

Figure 19 Connect Page Original

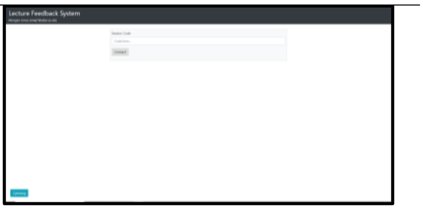


Figure 20 Connect Page Final

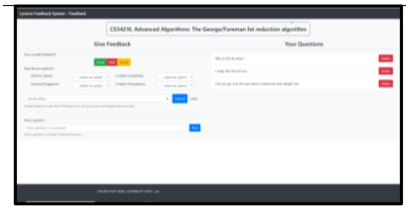

CS34210, Advanced Algorithms: The George/Foreman fat reduction algorithm
Give Feedback
Your Questions

Figure 21 Feedback Page Original

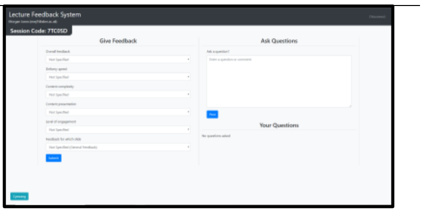


Figure 22 Feedback Page Final

One of the main changes between my original design and the final design is the simplification of the interface, which is mainly achieved through removing unneeded text and separating sections more clearly.

I read Steve Krug's book "DON'T MAKE ME THINK" to revise what to focus on when thinking about a web user interface. Making things concise, visually hierarchical structured and as clear/explicit as possible were all mentioned in the book that influenced my design of the layout.

3. Implementation

Commented [MJ[10]: The implementation should discuss any issues you encountered as you tried to implement your design. During the work, you might have found that elements of your design were unnecessary or overly complex; perhaps third-party libraries were available that simplified some of the functions that you intended to implement. If things were easier in some areas, then how did you adapt your project to take account of your findings?

It is more likely that things were more complex than you first thought. In particular, were there any problems or difficulties that you found during implementation that you had to address? Did such problems simply delay you or were they more significant?

You can conclude this section by reviewing the end of the implementation stage against the planned requirements.

3.1. Implementation tools

During implementation my code was debugged using the pdb interactive source code debugger [10] on the command line; the pdb module is part of the python standard library. I created a python virtual environment [11] for my project to have only the dependencies required for the project to run. I used pip to install and manage the project dependencies [12]. The requirements.txt file in my project directory is a file that can be used by pip to install all the python packages my project depends upon at once by use of the 'pip install -r requirements.txt' command.

I tried out my system in google chrome on my desktop and mobile device. I used chromes developer tools to debug my JavaScript and view the page style and HTML DOM.

I used git and GitHub for version control and backup during the project. I used a master branch for working commits, a development branch for regular commits and a learning branch for trying out new ideas and spike testing.

3.2. Feature Set 1 – Auth & i18n

I used the ldap3 python package to communicate over the Lightweight Directory Access Protocol (LDAP) to the university's server (ldap.dcs.aber.ac.uk). I connected to the server with credentials entered into a login form and then ran a search query for the entry of the logged in user. I parsed the resulting entry for the 'gecos' field which the university uses to represent user type.

Example gecos field - [ABSM]:

- AB – Aberystwyth Campus
- SM – Staff User

I used Django's user authentication system with a custom authentication backend that used LDAP for authenticating staff as described above. The database relations for the user were therefore created by the django authentication contribution code and not by me. Some of the attributes in these relations are used by my application but not all therefore the database does store some data that is not needed for the application to run.

During development I allowed undergraduate users to log in because I didn't have a staff account, I only know it works as intended for staff users because my supervisor has tried it out. It would have been better if I could have got a temporary staff account from IS to use while doing the project that way I wouldn't have to change the code at the last minute to prevent undergraduates logging in also I wouldn't have to have my password littered throughout the unit tests.

For making the application available in Welsh and English I used Django's LocaleMiddleware. Use of the "djano-admin makemessages" command would create a .po file listing all string in the code that are marked for translation. I would then go through this file and translate the strings to welsh manually. The "django-admin compilemessages" command was then used to compile messages into a .mo file for use by the middleware. I translated the strings using google translate manually, to save time I could have automated this process by making a small program to use google cloud's translation API [13].

3.3. Feature Set 2 – Lecture Management

Getting to grips with CRUD, pagination and search query on Django

I created an Object-Relational-Mapped class inside my models.py file for lecture objects this was to be mapped to the 'Lecture' relation in my PostgreSQL database. Attributes and attribute restrictions are defined in this class. I used SQL migrations generated as result of the code in my django models to create my database. I found using migrations useful because I didn't have to switch to write SQL often and all database migrations were saved in order so I could easily switch between different versions or undo incorrect changes.

I started by writing all view code in my app's view.py file as simple function-based views. The views relating to lecture management mostly only covered the Creation, Retrieval, Updating and Deleting (CRUD) of lecture resources so I later changed them to use slightly customised generic class-based views this is highly recommended as it reduces the amount of code and improves the quality of code. The generic views are inherited from with customisations made in the form of a select few overwritten methods.

The class-based views use a multiple inheritance approach for combing view functionality. These classes are called 'mixins' and can be brought into a view through inheritance to provide functionality to multiple views without having to repeat code; this keeps the code DRY which is a principle of Django and other web development frameworks. In my application users have to be logged in to access the views so my class-based views make use of the 'LoginRequiredMixin' to ensure lecture resources are only accessed by logged in users. For other views that are still function-based I have used the @login_required decorator to prevent access if not logged in.

If an unauthorized user attempts to access a view that requires the user to be logged in the user is redirected to the login page with a parameter 'next' holding the original URL attempt. Upon successful login the user will be redirected to the page they previously tried to access. Both the login_required decorator and the LoginRequiredMixin class are provided by Django's authentication app (django.contrib.auth).

Later in the project I updated the code so each lecture can have an associated PDF file that can be downloaded by students as a convenience functionality. The PDF can be uploaded when creating or editing a lecture resource and is stored locally on the server in the media/documents/ directory. I used a custom validator to only allow PDF files to be uploaded. My approach was to associate feedback to specific slides so there is a field for entering the number of slides a lecture has. It occurred to me that users may not know the slide count of their lecture so I added a functionality where users can have that information extracted from the PDF file they have uploaded. I use the python package pyPDF2 to extract this detail. At the start I extracted the title, author and page number but in the end only made use of the page number since that was the only thing users may be unsure of.

Lectures are listed after login on the 'Lecture List' page. On this page I have implemented pagination and a search functionality for ease of use. The lectures can be searched by either name or date. Search queries and current page are added to the URL as query strings for easy bookmarking and navigation.

3.4. Feature Set 3 – Session Management

More focus on client-side heavy features requiring jQuery and AJAX.

I wanted to allow for each lecture to have multiple feedback sessions so created a Session model and linked it to the Lecture model. My idea was that feedback would not be provided to the lecture but to a feedback session run for that lecture, this way a lecture could be ran on multiple different occasions each having its own session.

I planned the 'Lecture Detail' page to be a form of control page where the staff users could view the lecture data and control sessions for that lecture. My layout for this page is shown below, left side has location of the session management buttons and the lecture details and right side is split with session list at top and question list for the selected session at bottom.

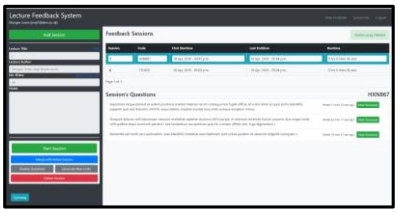


Figure 23 Lecture Detail Page Layout Example

At first I only allowed sessions to be created if there was not a session running and every session was automatically started upon creation. This approach meant only having one session running for one lecture at a time. I felt this was restrictive and my supervisor recommended providing flexibility in use when unsure of exactly what should be the user workflow. I changed the design so any number of sessions could be created and started or restarted at any time. The implementation of this required the addition of another relation to keep track of a session start times and end times which could then be used to sum the total runtime for a session.

The sessions are displayed in a sessions table which is paginated to show only five sessions at a time. I previous had questions paginated as well but as more functionality was added this became an issue so question pagination was removed. This will mean the page will get longer and although not too professional it isn't really an issue because it is assumed a lecturer would answer the questions in the order they are asked (from the top down) anyway.

There are buttons to control sessions that are displayed on the right, when a session row is clicked on it is highlighted in blue and the options for that sessions are displayed. This functionality was implemented using the jQuery library to manipulate the page HTML by copying across hidden buttons in the table rows to a sperate <div> for display. I use JavaScript local storage to save which session is currently highlighted between page reloads.

I used jQuery to make AJAX calls to refresh session and question data every second without the user having to reload the page. I made sub templates in my Django app for the session list and the question list and included them in the lecture_detail.html template. The AJAX calls would then query the HTML for these sub templates every second and replace the HTML content in the DOM. My AJAX calls return HTML where I would have ideally wanted to return JSON because this less data to transfer from the server. I did not use JSON because that would have required more code in the JavaScript, and I was struggling with maintaining the client-side code already.

Sessions display runtime and questions display time ago posted both of these are timedelta objects calculated in the model code. Django templates do not have python code embedded into the HTML because the template code should be about display not logic therefore to better represent the timedelta object I created custom template filters that I then registered for use in my templates. I also created a custom template tag that allowed continuous numbering of sessions (1^{st}-n^{th}) across my session list pagination.

I had an issue with users being able to access resources that do not belong to them. I solved this by writing custom decorators that I could attach to view functions to ensure that users could only access the lectures, sessions or questions that they owned. The decorators act as function wrappers that take in the function they are attached to as a parameter and only allow the function to be called if the target resource is owned by the logged in user. If not owned the decorators raise a PermissionDenied exception and a 403 error is returned to the client. I then went on to overwrite the templates used for 404 (page not found) and 403 (forbidden/permission denied) errors so users could easily navigate away from an error page on my application. These templates are the 404.html and 403.html files respectively.

To display feedback data on the feedback detail page I planned to use vanilla JavaScript to draw on the HTML canvas. When I came to implement this feature, I found an easy to use JavaScript library called chart.js that can build good quality responsive charts. I used this library to create the bar and pie charts in my application. Use of this library saved me having to write and test a lot of code.

Feedback data is provided to the feedback_detail.html page through a jQuery AJAX call that interacts with an API on the server that returns subsets of the feedback data associated with the selected session as JSON. The JavaScript then destroys and recreates the charts using the new data. The collation of this feedback data on the server requires access across multiple feedback instances therefore I wrote a FeedbackManager class to extend the functionality of the default manager used by my Feedback model class. This is the preferred way to add table-level functionality to a Djano model; it also tidied up my model code by placing a relatively large method in its own class.

3.5. Feature Set 4 - Providing Feedback

Focus on being simple, accessible by mobile and made use of Django session middleware.

Student users are not logged in so to implement state I made use of Django's session middleware. There is a relation in the database holding each user's session key, encrypted session data and the expiry date of the session. The three pieces of session data I stored for connected student users are described below:

- **connected_session_id**
    - Stores the id of the active session the student is connected to
    - Used to associate feedback with correct session
- **questions_asked**
    - Stores a list of IDs of all the questions the student has asked
    - Used so students can view their asked questions and delete them

- **slides_with_feedback**
  - Stores a list of slide numbers for which the user has provided feedback
  - Used so that providing feedback to a slide more than once will overwrite the old feedback not keep adding new feedback (makes accidentally double clicking the submit button an idempotent operation)

Questions/Comments that are asked by students are listed so the student can delete them if they wish. This question list content reloads every second using AJAX this works the same way as implemented in the lecture_detail.html page (described in the previous section).

When testing this feature set I found that, although functioning well, the application was not notifying users very well. I found this was true for most of my application. To fix this I used Django's messaging framework to easily provide application alerts between views. I replaced all my own messages provided to template contexts with either success, warning or error messages provided to Django's messaging class. The messages could then easily be displayed with the same section of reusable template code.

4. Testing

4.1. Overall Approach to Testing

For testing I built up a set of unit tests and test cases throughout the project. I then planned to run individual user usability tests to gather feedback on the application. The plan was to do a full documented run through of all the test cases before usability tests and then a full run through of test cases after implementing the changes inspired by the usability test results.

4.2. Unit Testing

My python code was unit tested according to Django's built in testing framework. As is convention in Django I have structured my unit tests inside a /tests folder with each file of implementation code having a corresponding file of test code. The test file matches the name of the code file with 'test_' prepended to the file name. Django's unit tests use a Python standard library module: unittest. This module defines tests using a class-based approach therefore every class or function of code in my project has an associated unit test class to test it.

I ran the tests through the command line using the 'python manage.py test' command.

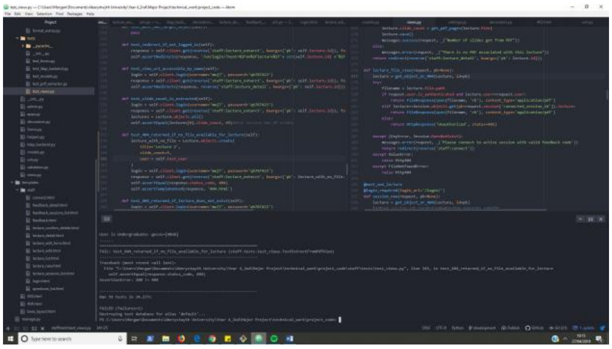


Figure 24 Example of unit testing project through command line while developing inside atom text editor

4.3. System Testing

The test cases for this system are included in appendices.

Every feature on the feature list has a corresponding test scenario; all test cases for a given scenario collectively test a feature has been implemented correctly. Testing is mapped to requirements by each feature in the feature list having a test scenario ID from the test case table.

4.4. User Testing

I performed supervised user testing of the system with six individuals. The document for this testing is in the appendices.

Commented [MJ[11]: Detailed descriptions of every test case are definitely not what is required in this section; the place for detailed lists of tests cases is in an appendix. In this section, it is more important to show that you adopted a sensible strategy that was, in principle, capable of testing the system adequately even if you did not have the time to test the system fully.

Provide information in the body of your report and the appendix to explain the testing that has been performed. How does this testing address the requirements and design for the project?

How comprehensive is the testing within the constraints of the project? Are you testing the normal working behaviour? Are you testing the exceptional behaviour, e.g. error conditions? Are you testing security issues if they are relevant for your project?

Have you tested your system on "real users"? For example, if your system is supposed to solve a problem for a business, then it would be appropriate to present your approach to involve the users in the testing process and to record the results that you obtained. Depending on the level of detail, it is likely that you would put any detailed results in an appendix.

Whilst testing with "real users" can be useful, don't see it as a way to shortcut detailed testing of your own. Think about issues discussed in the lectures about until testing, integration testing, etc. User testing without sensible testing of your own is not a useful activity.

The following sections indicate some areas you might include. Other sections may be more appropriate to your project.

A list of tasks was performed by my volunteers some tasks as staff users and some tasks as student users. While the volunteers were performing user tasks I was acting as a staff member to control sessions. While the volunteers were performing staff tasks I was acting as a student user to provide feedback.

The tasks chosen were a selection of standard system use-cases. Every volunteer got the same tasks in the same order I did not vary the tasks between volunteers because I wanted to be able to easily compare and collate their feedback.

I had half my volunteers run through tasks using a desktop and half run through the tasks using a mobile. I didn't have all volunteers use both mobile and desktop because once they had used the system once they would already know its layout and that felt like cheating.

The feedback for usability of the application was fairly consistent across all participants. Aside from the general need for more notification and clarity of the various system functions the least usable part of the system was the session management, when accessing through a mobile device workflow was not obvious and parts of the visual ques were hidden from view.

The easiest to use part of the application was the student feedback on both desktop and mobile with little to no issues being raised during those tasks. The changing of locale between Welsh and English was also found very easy by the users however none of my users were Welsh speakers so flaws may have been not pointed out if any were there.

There was a notable comment made by one of my volunteers during testing, he said that it would be better to move all controls to a top section that was consistent across the pages and the content below would change based on what you are working on. I would imagine this would be more like a single page application; something I was considering myself half way through the project.

5. Critical Evaluation

Commented [MJ[12]: Examiners expect to find a section addressing questions such as:

- Were the requirements correctly identified?
- Were the design decisions correct?
- Could a more suitable set of tools have been chosen?
- How well did the software meet the needs of those who were expecting to use it?
- How well were any other project aims achieved?
- If you were starting again, what would you do differently?

Other questions can be addressed as appropriate for a project.

The questions are an indication of issues you should consider. They are not intended as a specification of a list of sections.

The evaluation is regarded as an important part of the project report; it should demonstrate that you are capable not only of carrying out a piece of work but also of thinking critically about how you did it and how you might have done it better. This is seen as an important part of an honours degree.

There will be good things in the work and aspects of the work that could be improved. As you write this section, identify and discuss the parts of the work that went well and also consider ways in which the work could be improved.

In the latter stages of the module, we will discuss the evaluation. That will probably be around week 9, although that differs each year.

5.1. Technical Evaluation

5.1.1. Requirements & Design Evaluation

Session and lecture being separate (should just be session) confuses users. this was a bad design decision.

More time should have been spent figuring the project requirements and what users would expect from such a system more research of similar style systems would have helped with this.

The high-level design for the system was, in my opinion, adequate. I do think that the low-level design was slightly lacking but that was due to my uncertainty with the convention when modelling a django project.

The layout of the UI was good for the simpler pages but the layout of the lecture_detail.html page and the feedback_detail.html page could have been much better I think more time should have been spent redesigning the UI for these pages because they have the most features in. The approach for building these pages was sort of ad-hock and the application could benefit from a more uniform layout of controls between both these pages; this was something suggested during user testing.

The layout for the page to provide feedback is simple and clear. I think it also works well mobile and the feedback I got from users was pretty good all round.

I wrote a function to merge two sessions allowing all questions and feedback for the sessions to be combined. In the current version of my system a session can only be merged with the immediately previous or next session this was by design originally but now sessions can be restarted so it makes more sense to allow merging of any arbitrary pair of sessions. I did not have enough time to make this update.

Improvement to feedback would be allow multiple session feedback to be viewed as one.

5.1.2. Process & Implementation Evaluation

As the project went on my focus on updating design, tests and balancing other aspects of the project decreased. This lack of discipline in my engineering process is something that makes the project weak when compared to the standard of a professional software project. I believe the decrease in discipline stems from an uncertainty with the requirements, technologies used to implement them and general lack of experience working on large projects. This is something that comes in time and this project has done nothing but help by providing me with a valuable learning experience.

On reflection I may have benefited from making use of a build tool during implementation to automate the process of readying the system for review. The below tasks are things I had to ensure were done before trying out the system:

- Make migrations
- Migrate database
- Make messages
- Translate messages (could be automated by using google translate API)
- Compile messages
- Run tests
- Run server

Automating some of the above would have added to the professionalism of the project and perhaps saved me some time.

5.1.3. Testing Evaluation

Testing of the system was not extensive although a lot of the system is covered. I think if testing was made more a priority throughout perhaps through the adoption of a TDD strategy maybe this would not be the case.

User testing was very useful clearly highlighting the good and bad points of the UI layout. I did not have enough time to implement many changes as a result of these tests but if I did the system would probably be improved considerably. Next time I would ensure I allocated more time to make changes as result of this testing, I would also change the testing itself to use a larger set of tasks and included a few welsh speaking users.

5.2. Work to Extend the Project

The addition of a desktop python program that could display feedback data to a lecturer without the browser having to be open may add value to the system. This program would make use of a web API of my application which could be implemented by use of the Django REST framework.

My program has feedback options that I have defined myself. This is limiting as the feedback that can be given is pre-restricted. It would be an improvement if users running feedback sessions could define their own feedback forms that the application would use allowing each member of staff to tailor feedback options to their individual needs.

5.3. Alternate Approach If Redoing the Project

The most difficult aspect of my project was getting the functionality I wanted on the client side. I ran into multiple issues due to an increase in the amount of JavaScript and jQuery I had to add to the project. In the end I stripped away functionality to get it to a good enough working state.

These problems would not have been an issue if I had taken a different approach with the technologies I had used. I found myself trying to develop two pages that were themselves needing to be more like control panel style single page apps with heavy use of jQuery code and AJAX calls.

The functionality I wanted could be developed much easier if using a client-side view framework instead of fixed templates build on the server-side. I invested time during the project attempting to fix this by trying to learn and integrate react.js into my project. I found it difficult to get working and due to already falling behind my self-set targets decided to discard my changes and continue with my original plan of using Django templates.

If doing the project again I would almost certainly start using react.js integrated with Django from the get-go. I would convert the Django app into a pure web API using the Django REST framework to serialise all data into JSON; then use react.js as an API client to dynamically build and reload components of the UI.

In the final weeks of the project I have been reading about vue.js a client-side framework similar to react but far easier to get started with for beginners due to less initial configuration being required. If I had discovered it earlier, I could have added vue.js into my project for use on the two pages that are client-code heavy; which could have improved the quality of my project considerably.

5.4. Overall Evaluation

I think the project went well overall. I had to refactor continuously throughout as I learnt better ways to implement things using more advanced topics of the Django framework. I learnt about problems I was not aware of at the start and ways to solve them using new techniques and technologies.

The project gave me more exposure to web development and in that respect was a success. In my opinion the application is functional as a web application and meets the requirements of a basic feedback system. I think the project in its current state would serve as a good starting point for developing a more robust and advanced system if I could start again taking what I have learned and my reflections into consideration.

6. Annotated Bibliography

[1] “Ruby On rails Guides,” [Online]. Available: https://guides.rubyonrails.org/. [Accessed 26 January 2019].

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[10] “Documentation of pdb module,” [Online]. Available: https://docs.python.org/3/library/pdb.html. [Accessed 28 04 2019].

[11] “The Django Project,” [Online]. Available: https://www.djangoproject.com/. [Accessed 2019 04 27].

[12] “Get Bootstrap,” [Online]. Available: https://getbootstrap.com/. [Accessed 27 April 2019].

7. Appendices

Commented [MJ[13]: The appendices are for additional content that is useful to support the discussion in the report. It is material that is not necessarily needed in the body of the report, but its inclusion in the appendices makes it easy to access.

For example, if you have developed a Design Specification document as part of a plan-driven approach for the project, then it would be appropriate to include that document as an appendix. In the body of your report you would highlight the most interesting aspects of the design, referring your reader to the full specification for further detail.

If you have taken an agile approach to developing the project, then you may be less likely to have developed a full requirements specification. Perhaps you use stories to keep track of the functionality and the 'future conversations'. It might not be relevant to include all of those in the body of your report. Instead, you might include those in an appendix.

There is a balance to be struck between what is relevant to include in the body of your report and whether additional supporting evidence is appropriate in the appendices. Speak to your supervisor or the module coordinator if you have questions about this.

A. Third-Party Code and Libraries

Django – This is the framework I have used to build my application. It is open source and available from the Django Software Foundation [10]. The framework is released using a BSD license. The framework was used without modification.

Bootstrap – This is a CSS framework used to add style and responsive design to my application. It is open source and available the Bootstrap Core Team [12]. The framework is released under the MIT License. The framework was used without modification.

jQuery – This is a JavaScript Library used for DOM manipulation and event handling on the client-side. It is open source and available from the jQuery Foundation [15]. The library is released using the MIT License. The library was used without modification.

Django-autofixture – This is a python package written by Gregor Müllegger for use with the Django framework that allows me to generate random data which I used while testing the system. It is open source and available from the Python Software Foundation [16]. The library is released using the BSD License. The library was used without modification.

Django-bootstrap3– This is a python package written by Dylan Verheul for use with the Django framework that allows bootstrap to work better with Django. It is open source and available from the Python Software Foundation [16]. The library is released using the BSD License. The library was used without modification.

Ldap3– This is a python package written by Giovanni Cannata it provides a ldap API to my system that is needed for authentication. It is open source and available from the Python Software Foundation [16]. The library is released using the GNU Lesser General Public License. The library was used without modification.

Psycopg2 – This is a python package written by Federico Di Gregorio it is PostgreSQL database adapter that allows my application to use a PostgreSQL database. It is open source and available from the Python Software Foundation [16]. The library is released using the GNU Library or Lesser General Public License. The library was used without modification.

PyPDF2 – This is a python package used in my application to extract meta data from uploaded pdf files. It is open source and available from the Python Software Foundation [16]. The library is released using the BSD License. The library was used without modification.

Chart.js – This is a JavaScript library used to create responsive pie and bar charts in my application. It is open source and available from GitHub [15]. The library is available under the MIT License. The library was used without modification.

B. Ethics Submission

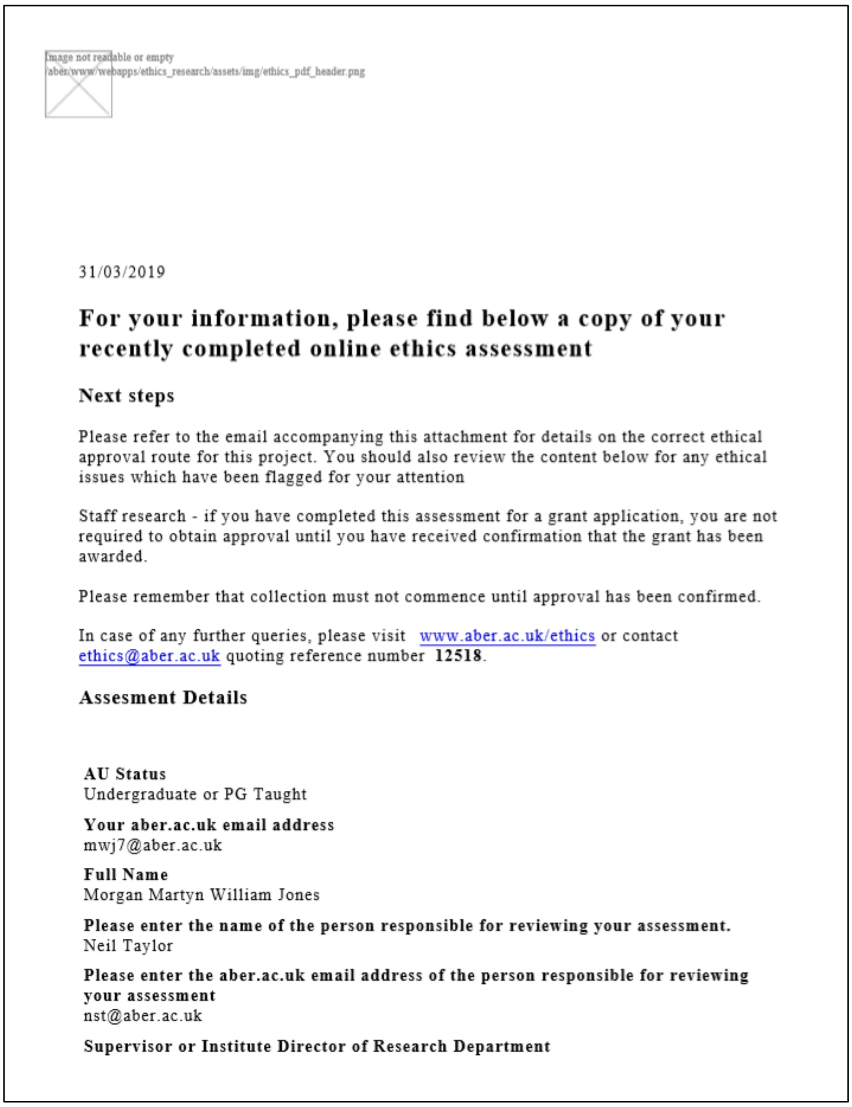


Image not readable or empty
/aber/www/webapps/ethics_research/assets/img/ethics_pdf_header.png

31/03/2019

For your information, please find below a copy of your recently completed online ethics assessment

Next steps

Please refer to the email accompanying this attachment for details on the correct ethical approval route for this project. You should also review the content below for any ethical issues which have been flagged for your attention

Staff research - if you have completed this assessment for a grant application, you are not required to obtain approval until you have received confirmation that the grant has been awarded.

Please remember that collection must not commence until approval has been confirmed.

In case of any further queries, please visit www.aber.ac.uk/ethics or contact ethics@aber.ac.uk quoting reference number **12518**.

Assesment Details

AU Status
Undergraduate or PG Taught

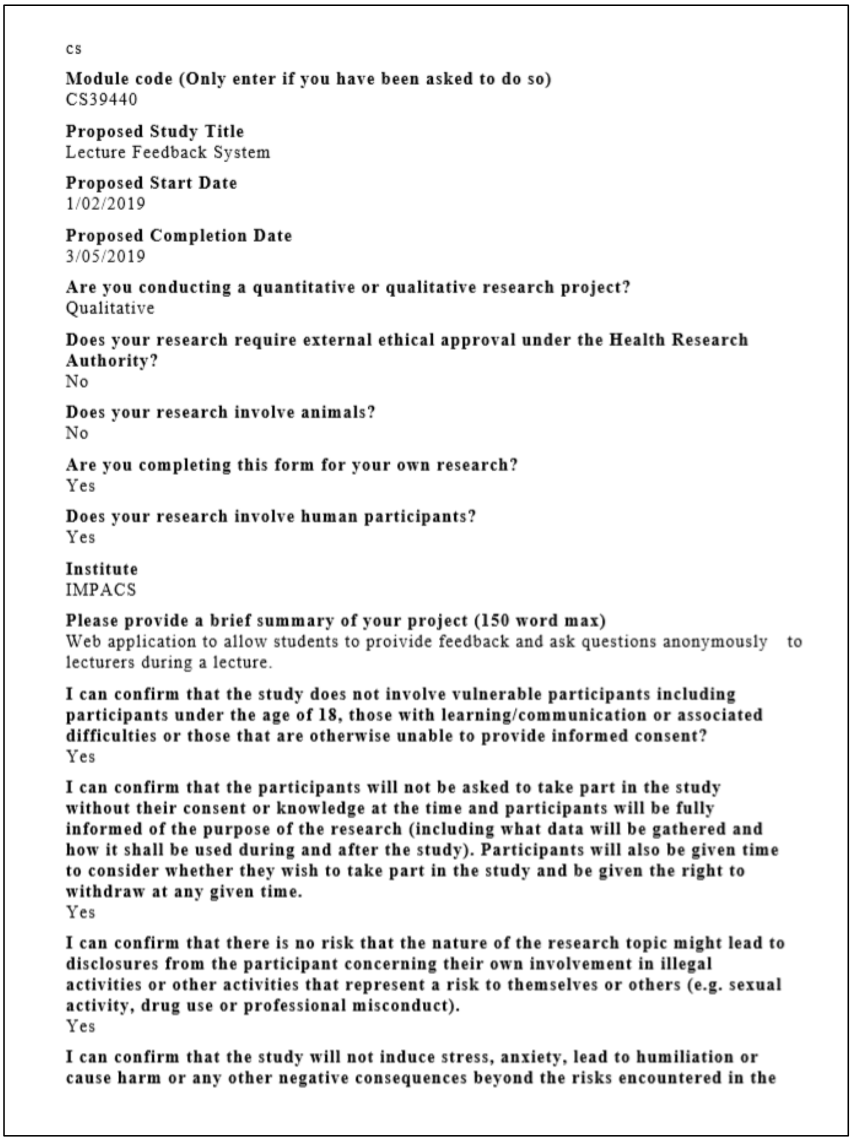
Your aber.ac.uk email address
mwj7@aber.ac.uk

Full Name
Morgan Martyn William Jones

Please enter the name of the person responsible for reviewing your assessment.
Neil Taylor

Please enter the aber.ac.uk email address of the person responsible for reviewing your assessment
nst@aber.ac.uk

Supervisor or Institute Director of Research Department



cs

Module code (Only enter if you have been asked to do so)
CS39440

Proposed Study Title
Lecture Feedback System

Proposed Start Date
1/02/2019

Proposed Completion Date
3/05/2019

Are you conducting a quantitative or qualitative research project?
Qualitative

Does your research require external ethical approval under the Health Research Authority?
No

Does your research involve animals?
No

Are you completing this form for your own research?
Yes

Does your research involve human participants?
Yes

Institute
IMPACS

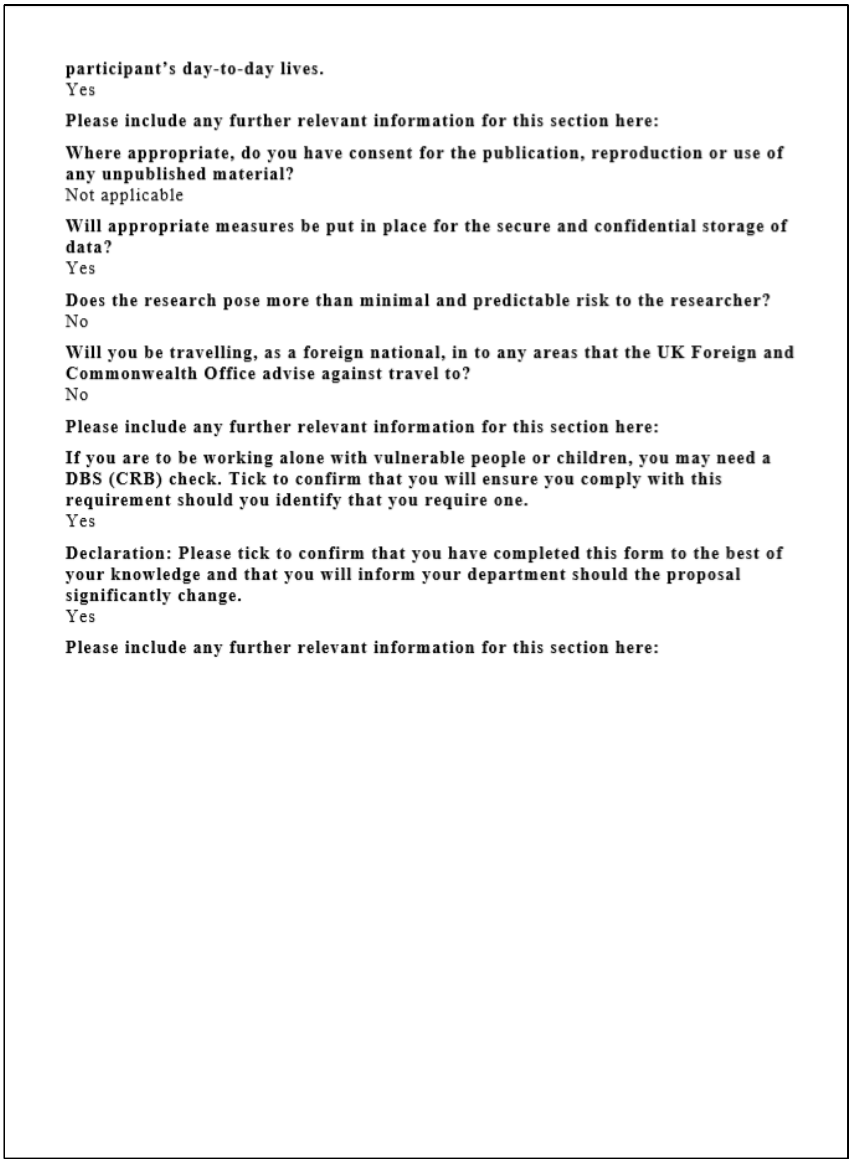
Please provide a brief summary of your project (150 word max)
Web application to allow students to proivide feedback and ask questions anonymously to lecturers during a lecture.

I can confirm that the study does not involve vulnerable participants including participants under the age of 18, those with learning/communication or associated difficulties or those that are otherwise unable to provide informed consent?
Yes

I can confirm that the participants will not be asked to take part in the study without their consent or knowledge at the time and participants will be fully informed of the purpose of the research (including what data will be gathered and how it shall be used during and after the study). Participants will also be given time to consider whether they wish to take part in the study and be given the right to withdraw at any given time.
Yes

I can confirm that there is no risk that the nature of the research topic might lead to disclosures from the participant concerning their own involvement in illegal activities or other activities that represent a risk to themselves or others (e.g. sexual activity, drug use or professional misconduct).
Yes

I can confirm that the study will not induce stress, anxiety, lead to humiliation or cause harm or any other negative consequences beyond the risks encountered in the



participant's day-to-day lives.
Yes

Please include any further relevant information for this section here:

Where appropriate, do you have consent for the publication, reproduction or use of any unpublished material?
Not applicable

Will appropriate measures be put in place for the secure and confidential storage of data?
Yes

Does the research pose more than minimal and predictable risk to the researcher?
No

Will you be travelling, as a foreign national, in to any areas that the UK Foreign and Commonwealth Office advise against travel to?
No

Please include any further relevant information for this section here:

If you are to be working alone with vulnerable people or children, you may need a DBS (CRB) check. Tick to confirm that you will ensure you comply with this requirement should you identify that you require one.
Yes

Declaration: Please tick to confirm that you have completed this form to the best of your knowledge and that you will inform your department should the proposal significantly change.
Yes

Please include any further relevant information for this section here:

C. Feature List

Feature	Done?	Test Scenario
Authenticating User – Feature Set – 1 Week – (20th-27th February)		
Login form for staff with authentication through use of LDAP server via python LDAP API	Done	TS01
Add I18n with Welsh localisation	Done	TS02
Lecture Management – FS– 2 Weeks – (27th-13th)		
Create new lecture	Done	TS03
List & delete any/all lectures • Only those created by the currently logged in user	Done	TS04
View each lecture data	Done	TS05
Edit each lecture data	Done	TS06
Search the list of lectures for a lecture with a specific title or date	Done	TS07
Have download PDF functionality for students and staff on the app	Done	TS08
Extract the meta-data of a lecture/workshop • Number of Slides	Done	TS09
Session Management – FS – 1 week – (13th – 22nd March)		
Start a feedback session for a lecture	Done	TS10
Generate the 6-digit code for a session	Done	TS11
View the questions of a session as they are asked	Done	TS12
Stop a feedback session for a lecture	Done	TS13
Delete a feedback session	Done	TS14
Mark an asked Question as Answered	Done	TS15
Toggle Questions for a session	Done	TS16
Merge a session with the immediately previous session	Done	TS17
Merge a session with the immediately next session	Done	TS18
Use AJAX to update page data with having to reload page	Done	------
Graphically display the feedback of a session using JavaScript and canvas on separate page	Done	TS19
Providing Feedback - FS – 2 weeks– user Testing Upon Completion		
Connect the users to a session • Only if they have the session code and the session is active	Done	TS20
Associate Feedback to a specific lecture slide or provide overall feedback	Done	TS21
Change feedback for a specific lecture slide	Done	TS22
Ask a question to the person running the session	Done	TS23
Delete a previously asked question	Done	TS24

D. Test Cases

Test Scenario ID	Test Scenario	Test Case ID	Test Case Name	Test Steps	Test Data	Expected Outcome
TS01	Check Staff Login	TC01	Check staff login with correct data	1. Go to http://localhost:8000/login/ 2. Enter Username 3. Enter Password 4. Click Login	username = mwj7 password = <my_password> *(Currently allowing me to login as staff)*	User should be redirected to Lecture List page (http://localhost:8000/en/lectures/) User name and email should be displayed in the left of the navigation bar
		TC02	Check staff login with invalid data	1. Go to http://localhost:8000/login/ 2. Enter Username 3. Enter Password 4. Click Login	username = mwj7 password = wrong123	User should be redirected http://localhost:8000/en/login/ and there should be a red message box appear below the login form with the text "Invalid Staff Login Details"
		TC03	Check undergraduate valid data cannot login	1. Go to http://localhost:8000/login/ 2. Enter Username 3. Enter Password 4. Click Login	username = mwj7 password = <my_password>	User should be redirected http://localhost:8000/en/login/ and there should be a red message box appear below the login form with the text "Invalid Staff Login Details"
		TC04	Check login with required data missing	1. Go to http://localhost:8000/login/ 2. Miss out either or both the username and passwords fields 3. Click Login	N/A	Should display prompt next to first empty field with text "Please fill in this field"
		TC05	Check Redirect to login page when attempting URL navigation to another part of staff site without being logged in	1. Go to any or all of the possible site URLs	See Possible Site URLs above	Should redirect to http://localhost:8000/en/login/ with a GET parameter next in the URL set to the URL you attempted to navigate to.
			Check alerts user when trying to login if already logged in	1. Login as described in TC01 2. Navigate to URL /login/	N/A	• Should display blue alert with text "You are already logged in" • Should also display "Lecture List" and "Logout" links in the right side of the navigation bar. • Should display name and email at the left side of the navigation bar
		TC06	Check logout	1. Login as described in TC01 2. Click 'Logout' in the navigation bar	N/A	Should Redirect to /en/login/ page and no longer display name and email in the navigation bar.

Commented [MJ[14]: Should also be a error message displayed informing the user that they need to be logged in.

		TC07	Check the if being redirected to the login page that the 'next' GET parameter works in redirecting the user to the page they first tried to access	1. Enter /en/lectures/ in the URL bar 2. Enter Username 3. Enter Password 4. Click Login	Username = mwj7 Password = <my_password>	Should be redirected to Lecture List page (/en/lectures/) and logged in with name and email displayed in the left of the navigation bar.
TS02	Check welsh language localisation	TC08	Check site displays in Welsh	1. Go to any or all of the possible site URLs 2. Click on Cymraeg in the bottom left corner of the screen	See Possible Site URLs above	Redirects to the same URL with /cy/ prepended on the URL All static display text should be in Welsh
		TC09	Check I18n URLs work	1. Go to any or all of the possible site URLs with /en/ appended to URL 2. Go to any or all of the possible site URLs appended with /cy/	See possible Site URLs above	• All static text is displayed in English for /en/ URLs • All static text is displayed in Welsh for /cy/ URLs
TS03	Check create lecture	TC10	Check create new lecture with valid data	1. Login as described in TC01 2. Click on 'New Lecture' in the navigation bar 3. Enter title 4. Enter Number of slides 5. Enter Notes 6. Click Choose and select the test lecture 7. Click Create	title = My Lecture number of slides = 15 notes = <text> See test lecture location above.	• Redirect to Lecture List Page (/en/lectures/). • New lecture 'My Lecture' will be added to list. With Creation Date set to today's date. • There will be a green success message in the top right corner with the text "Lecture Created: My Lecture" • When Navigating clicking on lecture title to navigate to 'Lecture Detail' page the info in the fields in the left panel will be the same as that entered in the create form. • When then clicking on 'View Lecture PDF' in the navigation bar the PDF will be displayed in the browser.
		TC11	Check create new lecture with valid data and optional data missed out	1. Login as described in TC01 2. Click on 'New Lecture' in the navigation bar 3. Enter title 4. Enter Number of slides 5. Click Create	title = My Lecture number of slides = 15	• Redirect to Lecture List Page (/en/lectures/). • New lecture 'My Lecture' will be added to list. With Creation Date set to today's date. • There will be a green success message in the top right corner with the text "Lecture Created: My Lecture" • When Navigating clicking on lecture title to navigate to 'Lecture Detail' page the info in the fields in the left panel will be the same as that entered in the create form. • The 'View Lecture PDF' navigation link will NOT be there because there is no uploaded file to link to
		TC12	Check create lecture with invalid data	1. Login (described in TC01) 2. Click on 'New Lecture' in the navigation bar 3. Enter title 4. Enter Number of slides 5. Click Create	title = My Lecture number of slides = eeee	Displays a prompt with text "Please enter a number" on the number of slides field
		TC13	Check create lecture with	1. Login (described in TC01) 2. Click on 'New Lecture' in the navigation bar	N/A	Displays a prompt next to the first missing field with text "Please fill in this field"

			missing required data	3. Miss out either or both of the title and number of slides fields 4. Click Create		
		TC14	Check only PDF file uploads are accepted.	1. Login (described in TC01) 2. Click on 'New Lecture' in the navigation bar 3. Enter title 4. Enter Number of slides 5. Enter Notes 6. Click Choose and select any file that is not a PDF Click Create	title = My Lecture number of slides = 15 notes = <text>	Should redisplay the create form with the added text 'Unsupported file extension: PDF Only.'. Should also display a red alert below the form saying the form data is invalid
TS04	Check lecture listing & deletion	TC15	Check Lecture delete	1. Create Lecture (Described in TC10) 2. Click on Delete for the lecture just created 3. Click on Confirm	N/A	Should Add a lecture to the list. When clicking on Delete should navigate to 'Confirm Delete' page. Clicking on Confirm should navigate back to lecture list with the lecture gone from the list. There will be a green success message in the top right corner with the text "Lecture Deleted: My Lecture"
		TC16	Check lecture confirm delete	1. Create Lecture (Described in TC10) 2. Click on Delete for the created lecture 3. Navigate to the previous page with the back button	N/A	Should add a lecture to the list. When clicking on Delete should navigate to 'Confirm Delete' page. Clicking on back button will navigate back to lecture list where the lecture should still be in the list.
		TC17	Check message display if no lectures present	1. Login (described in TC01) 2. If any lectures are in list delete them following the process described in TC13	N/A	There should be a grey alert box displayed with the text "No Lectures".
		TC18	Check lecture list pagination	1. Ensure there is enough lectures to require pagination by creating a minimum of 9 new lectures following the process described in TC10 2. Click on any or all of the pagination links below the lecture list	N/A	No more than 8 lectures should be on any pagination page.
		TC19	Check lecture ordering	1. Create multiple lectures (Described in TC10) 2. Delete some of them (Described in TC13)	N/A	Lectures should be ordered with the most recently created being at the top
TS05	Check view lecture data	TC20	Check able to view lecture data	1. Create a lecture (Described in TC10) 2. Click on title of the lecture you just created in the lecture list	N/A	Should be on 'Lecture Detail' page On the left side of the screen there should be a section with a dark background that contains the values for the lecture's title, slide count and notes; these values should match the ones you entered upon lecture creation.
TS06	Check edit lecture data	TC21	Check displays correct data in Edit Lecture page	1. Login, create and view a lectures data as described in TC18 2. Click on the 'Edit' link above the lecture title field	N/A	Should be on 'Edit Lecture' page with a form similar to the one displayed on the 'Create Lecture' page however all three fields should be filled in with the values previously viewed on the 'Lecture Detail' page.
		TC22	Check lecture details are updated correctly when providing correct data	1. Go to the 'Edit Lecture' page (Described in TC19) 2. Enter new_title into title field 3. Enter new_notes into notes field 4. Click Update	new_title = Awesome New Title new_notes = Awesome New Notes	Should be on 'Lecture Detail' page with new title and notes displayed in the fields in the panel on the left side of page.
		TC23	Check lecture details cannot be submitted if providing invalid data	1. Go to the 'Edit Lecture' page (Described in TC19) 2. Provide incorrect data or invalid file to the lecture details form (like TC12 & TC14)	N/A	Should see same result for missing data, invalid data or wrong file type as described above in TC?? & TC?? (Missing data prompt user to fill in field, Invalid data reloads form with red alert and wrong file type reloads form and display unsupported file type notification.)
TS07	Check Lecture Search	TC24	Check Search Lecture by full title	1. Login & Create a lecture (Described in TC10) 2. Create two more lectures with titles provided 3. Type 'Second Lecture' into the search field 4. Click 'Search'	title(2) = 'Second Lecture' title(3) = 'Third Lecture'	Only the lecture titled 'Second Lecture' should be displayed in the list.
		TC25	Check Search Lecture by partial title	1. Login & Create a lecture (Described in TC10) 2. Create two more lectures with titles provided 3. Type 'Lecture' into the search field 4. Click 'Search'	title(2) = 'Second Lecture' title(3) = 'Third Lecture'	All three lectures should be displayed in the list (My Lecture, Second Lecture, Third Lecture)

		TC26	Check Lecture Search by full Date	1. Login & Create a lecture (Described in TC10) 2. Type the date of creation into the search field 3. Click "Search"	N/A	Only the lectures created on the entered date should be shown
		TC27	Check Empty Search displays all lectures	1. Ensure there are some lectures in the lecture list 2. Ensure the search field is empty 3. Click 'Search'	N/A	All lectures that have been created by the user should be displayed.
TS08	Check PDF download functionality	TC28	Check staff user can view and download the uploaded PDF file	1. Create a lecture with a PDF file (Described in TC14) 2. Click on the lecture's title in the lecture list to go to the 'Lecture Detail' page 3. Click on 'View Lecture PDF' in the navigation bar on 'Lecture Detail' page 4. Click on the Download button on this page	N/A	- After clicking on 'View Lecture PDF' the PDF should be displayed in the browser. - Clicking Download will download the pdf into the downloads folder on computer
TS09	Check extract from PDF functionality	TC29	Check slide count can be extracted from uploaded PDF file	1. Create a lecture with a PDF file (Described in TC14) 2. Click on the lecture's title on the 'Lecture List' page to go to the 'Lecture Detail' page 3. Click on 'Extract from PDF'	N/A	Slide count displayed for the lecture should now be the same as the number of PDF pages/slides.
TS10	Start a feedback session	TC30	Check session can be created	1. Login, create lecture and navigate to 'Lecture Detail' page (Described in TC20) 2. Click 'Create Feedback Session'	N/A	Session should be displayed as table row under feedback session heading in 'Lecture Detail' page. The first start time of the session should be 'N/A' The last end time of the session should be 'N/A'
		TC31	Check session can be started	1. Create session (Described in TC30) 2. Click on session row in table 3. Click on 'Start Session'	N/A	First start time of session should change to when 'Start Session' was clicked Last end time of session should change to 'Session Running'
		TC32	Check Session can be stopped	1. Create Session & Start Session (Described in TC30 & TC 31) 2. Click on session row in table 3. Click on 'End Session'	N/A	Last end time of session should change to when 'End Session' was clicked.
		TC33	Check session can be restarted	1. Create, start and stop session (TC30, TC31, TC32) 2. Ensure session row is highlighted by clicking on session row 3. Click 'Start Session'	N/A	Last end time of session should change to 'Session Running' When hovering over the first start time value of the session there should be popup displaying both times the session was started one will be the time when 'Start Session' was just clicked.
TS11	Generate Session Code	TC34	Check session is created with valid code	1. Create session (Described in TC30)	N/A	Session should be displayed as table row and entry for 'Code' column should be a 6-character uppercase Alphanumeric value.
		TC35	Check code can be changed	2. Create session (Described in TC30) 3. Click on the row containing that session in the table 4. Click Generate New Code	N/A	Session should display a different code than before.
TS12	View questions asked to current session	TC36	Check un reviewed questions can be viewed on the lecture detail page	1. Start a Feedback Session for the lecture (Described in TC31) 2. Connect to the session just started (Described in TC??) 3. Post a question to the session (Described in TC??) 4. Go to the 'Lecture Detail' page for the lecture the session was created for. 5. Click on the row for the session	N/A	The session's question list on the lecture detail page should update to display the new question, with the time it was posted.
TS14	Stop Session Running	TC37	Check running session can be stopped	1. Navigate to a lecture with a running session or start a new session (Described in TC??)	N/A	Session should be displayed as table row under feedback session heading in 'Lecture Detail' page. The start time of the session should be the time of session start and the

				2. Click on the row for that session in the Feedback Sessions table 3. Click on ‘Stop Session’		end time should be the time that ‘Stop Session’ was clicked.
TS15	Mark a question as reviewed	TC38	Mark an asked question as reviewed	1. Create a session and start it (Described in TC31) 2. On another tab, connect to the session and ask a question to the session (Described in TC56) 3. Go back to original tab to view the session in the ‘Lecture Detail’ page 4. Ensure the session row is highlighted blue by clicking on it 5. Click ‘Mark Reviewed’ next to the asked question in the Session’s Questions list	N/A	Question should be removed from list under Session’s Questions heading on the ‘Lecture Detail’ page.
TS16	Toggle question for a session	TC39	Disable questions for a session	1. Create a session and start it (Described in TC31) 2. Click on disable questions on the session action button panel 3. On another tab, connect to the session	N/A	When you click disable questions you should see the grey text “[Disabled]” next to the Session Question’s heading When connected to the session you should see an alert telling you questions are disabled
		TC40	Re-Enable questions for a session	1. Create a session and start it (Described in TC31) 2. Click on disable questions on the session action button panel 3. On another tab, connect to the session 4. Go back to previous tab on ‘Lecture Detail’ page and click enable questions	N/A	When you click enable questions you should see the grey text “[Disabled]” next to the Session disapear
TC17	Merge session with previous session	TC41	Check can merge when there is a previous session	1. Create two sessions 2. Click on one of them	N/A	There will be a blue button to merge the first one with the one below or a blue button to merge the last one with the one above.
		TC42	Check cannot merge when there is not a previous session	1. Ensure you only have one session created for a lecture 2. Click on the session row for that session	N/A	There should be no option to merge it in the action panel once it is clicked on because there is only one session there
TS18	Merge session with next session	TC43	Check can merge when there is a next session to merge with	1. Create two sessions 2. Click on one of them	N/A	There will be a blue button to merge the first one with the one below or a blue button to merge the last one with the one above.
		TC44	Check cannot merge when there is not a next session to merge with	1. Ensure you only have one session created for a lecture 2. Click on the session row for that session	N/A	There should be no option to merge it in the action panel once it is clicked on because there is only one session there
TS19	View session feedback in graphs	TC45	Check can view all feedback for a session	1. Create session and start it (Described in TC31) 2. Connect to the running session (Described in TC50) 3. Submit feedback to the session. 4. Go to the ‘Feedback Detail’ page for the active session 5. Click on the session in the list	N/A	The feedback options entered should be displayed in pie charts on the ‘Feedback Detail’ page The change in options and amount of feedback should be the same as was entered.
		TC46	Check changes in feedback automatically updates on the ‘Feedback Detail’ page	1. Ensure a session is running and has feedback already (Described in TC54) 2. Connect to the session and submit some more feedback to the session on another tab in the browser 3. Go back to the original browser tab to view the ‘Feedback Detail’ page again (without reloading the page)	N/A	The added feedback should be noticed as a change in numbers of the pie charts or bar graphs being displayed on the ‘Feedback Detail’ page
		TC47	Check can switch between viewing data as pie or bar charts	1. Submit feedback for a session and view all feedback for a session (Described in TC45) 2. Change the value of the drop down select from ‘Pie Charts’ -> ‘Bar Charts’ (or Visa-Versa)	N/A	Upon switching the drop-down the displayed data should change to be displayed as the other type of chart; the amount and type of data itself should not change. The new charts will replace the positions of the old charts.
		TC48	Check can view session feedback for a specific lecture slide	1. Ensure there is a session running (Described in TC31) 2. Ensure the lecture that the session is for has a slide count more than 1 3. Connect to the session on a different browser tab (/connect) by entering the	N/A	• The submitted feedback data will show collectively in pie charts on the ‘Feedback Detail’ page when ‘All Feedback’ is the value

				session code (Described in TC50) 4. Select arbitrary feedback options and choose the 'Slide 1' option for the 'Feedback for which slide' field. 5. Click 'Submit' to submit the feedback 6. Select any feedback options but choose the 'Slide 2' option for the 'Feedback for which slide' field. 7. Click 'Submit' to submit the feedback 8. On previous browser tab go to 'Feedback Detail' page for the associated lecture 9. Change the drop-down options from 'All Feedback' to 'Slide 1 Feedback Only' 10. Change the drop-down options from 'Slide 1 Feedback Only' to 'Slide 2 Feedback Only'		of the drop-down select. • When changing the drop-down to 'Slide 1 Feedback Only' only the submitted feedback entry that was associated with slide 1 should be displayed. • When changing the drop-down to 'Slide 2 Feedback Only' only the submitted feedback entry that was associated with slide 2 should be displayed in the pie chart data.
		TC49	Check can switch between viewing feedback data for different sessions	1. Create a session and set it running (Described in TC31) 2. Create another session and set it running 3. Submit feedback to that session (Described in TC54) 4. Submit feedback to the second session 5. Go to the 'Feedback Detail' page for the lecture the sessions belong to 6. Click on the first session to view its feedback 7. Click on the second session to change to view its feedback	N/A	When clicking on first session its feedback data should be displayed in the charts When clicking on the second the session its feedback data should be displayed in the charts
TS20	Check connect to session	TC50	Check users can connect to active session	1. Start a session (Described in TC31) 2. Go to /connect 3. Enter the sessions code in the Session Code field 4. Click 'Connect'	N/A	Should be redirected to 'Lecture Feedback' page. With the session code displayed in the top left of the page.
		TC51	Check users cannot connect to inactive session	1. Start a session (Described in TC31) 2. Stop the session by clicking the 'End Running Session' button 3. Go to /connect 4. Enter the sessions code in the Session Code field 5. Click 'Connect'	N/A	Page should reload with red alert under form with the text 'Lecture is not active'
		TC52	Check users are disconnected when session is ended	1. Start a session (Described in TC31) 2. Go to /connect 3. Enter the sessions code in the Session Code field 4. Click 'Connect' 5. Go back on different tab to 'Lecture Detail' page and end the session by clicking 'End Running Session' 6. Go back to other tab and reload the 'Feedback' page	N/A	Should be redirected to the 'Connect' page with a red alert with the text 'Lecture is not active'
		TC53	Check session disconnect	1. Create a session and connect to session (Described in T50?) 2. Click 'Disconnect' in the navigation bar	N/A	Should be back on connect page (/connect) Attempted navigation to /feedback should result in 'Connect' page redirect with red alert with text 'Please connect to active session with valid feedback code'
TS21	Provide feedback	TC54	Check feedback can be submitted to a session	1. Create a session and start it (Described in TC31) 2. Connect to the session on a different browser tab (Described in TC50) 3. Choose options for each of the drop-downs under the 'Give Feedback' heading. 4. Click 'Submit' 5. Navigate to the 'Feedback Detail' page on the previous tab	N/A	When submitting feedback a green notification should be displayed underneath he Submit button saying the feedback has been submitted. Feedback entered should match that displayed in the graphs on the 'Feedback Detail' page
TS22	Change provided feedback	TC55	Check previously submitted feedback can be overwritten by user who submitted it	1. Submit feedback to a session (Described in TC54) but associate the feedback with Slide 1 by selecting 'Slide 1' in the last drop-down.	Feedback for which slide option = Slide 1	When submitting the feedback for slide 1 the first time a green alert with the text 'Slide 1 Feedback Submitted' should be displayed. When submitting different feedback for slide 1 a green alert with the text

				2. Then change some of the options but still associate the feedback with 'Slide 1'		'Slide 1 Feedback Re-submitted' should be displayed. Only the values of the last feedback submission for slide 1 should be displayed in the 'Feedback Detail' charts (Assuming no other feedback was previously provided for the session).
TS23	Ask a question to a session	TC56	Check can post a session	1. Start a session (Described in TC31) 2. Go to /connect 3. Enter the sessions code in the Session Code field 4. Click 'Connect' 5. Enter a question in the 'Ask Question? 'text area 6. Click 'Post'	question = Why is the sky blue?	Question should be displayed in a list group below the input text area with the time ago posted displayed. If navigating back to the 'Lecture Detail' page that contains the session the question should also appear there under 'Session's Questions' area of the page (assuming the corresponding session row is highlighted) with the same time posted ago.
TS24	Delete a previously asked question	TC57	Check can delete a posted session	1. Ask a question to a session (Described in TC56) 2. Ensure you are on the 'Feedback' page where you can view your asked question in the list under the Ask Question? text area 3. Click 'Delete' button next to the asked question	N/A	Question should be removed from list. Question should also be removed from listing in the corresponding 'Lecture Detail' page.

E. User Testing

Participants

Name	Location	Background	Date
Alicja Kutek (alk36)	Hugh Owen Library	English Speaker Computer User Creative Arts Student	29/04/2019
Bram Weston (brw17)	Hugh Owen Library	English Speaker Computer User Computer Science Student	29/04/2019
Ben Rowlands (ber17)	Hugh Owen Library	English English Speaker Computer User Business Management Student	29/04/2019
Joasia Syposz (Jos70)	Hugh Owen Library	English Speaker English Computer User Languages student	29/04/2019
Gwilym Griffith (gsg3)	Hugh Owen Library	English English Speaker Computer User	29/04/2019
Patrick Grey (pag15)	Rosser Lounge	English English Speaker Computer User Agriculture student	30/04/2019

Prompts for Notes and Issues

- Where would you start to look for this information?
- What keyword or title are you specifically looking for?
- Upon finding the page, is this what you expected?
- Is this where you expected this information to be?
- What do you think about the page layout? Why do you say that?
- How did you find this task?
- Was this an easy/difficult task? Why do you say this?
- Can you suggest any improvements?

Task List

Run through the task list once on a desktop and once on a mobile browser.

- As Staff (Starting point: /login/)
  1. Login as a member of staff and create a lecture on the system.
  2. Create a feedback session for a lecture and set it running.
  3. Change the website from English to Welsh or Visa-Versa
  4. Merge two feedback sessions, after creating another
  5. View the feedback for the first slide of a lecture as bar graphs
  6. Download a PDF of the lecture slides for a lecture
  7. Search for a specific lecture using the search box
- As a student (Starting point / OR /connect/)
  8. Provide feedback to a running lecture feedback session.
  9. Ask a question to a running lecture
  10. Download a PDF of the lecture slides for a lecture
  11. Disconnect from a session

Test Feedback

Example Person – Example Date

Task	Success Rate	Minor Usability Issues	Serious Usability Issues	Critical Usability Issues	Notes and Comments

Alicja Kutek – 29/04/2019 - Desktop

Task	Success Rate	Minor Usability Issues	Serious Usability Issues	Critical Usability Issues	Notes and Comments
1	Completed	Optional extra explanation needed Unaware if students can see notes so not sure what the content should be Unsure the purpose of the extra notes field	No	No	• Thinks new lecture should be better seen button not in navigation bar • Confused by how many slides I should put I'm not sure in the very beginning
2	Completed	Didn't know I had to click row to highlight session for use; maybe have a prompt	No	No	• Title should be made bigger in lecture detail page • If only one session is there should highlight it automatically?
3	Completed	No	No	No	None

4	Completed?	Not understanding what merge does Need a prompt of its success and a description of its use	Didn't know merge had finished unsure when I had completed the task.	No	None
5	Completed	Options to change to bar charts and feedback subset was not noticeable enough took a while to find/figure out.	No	No	Weird colour and text No. responses what is there for??
6	Completed	No	Couldn't see where the link to the pdf file might be. Assumed it might be near the rest of the lecture details but what was there was 'Extract from PDF' which looked like the most appropriate although still confusing, so I clicked it and the slide count changed for a reason I did not understand. Only after long period of confusion did I see View PDF in the navigation bar. *Need to move PDF and feedback link from nav bar to lecture detail control panel section*	No	If uploading slides why have extract from pdf manually why not just do it automatically upon slide upload.??
7	Completed	No	No	No	Didn't' need to use search box because only a few lectures (perhaps

					try next test with more lectures?)
8	Completed	No	No	No	Unsure if questions and feedback forms are separate thing or if submitted as one?
9	Completed	No	No	No	Might be nice to associate question to specific slides
10	Completed	No	No	No	Think for student the link to download PDF should stay as it is in Navigation bar
11	Completed	No	No	No	More notification when disconnected

Bram Weston – 29/04/2019 - Mobile

Task	Success Rate	Minor Usability Issues	Serious Usability Issues	Critical Usability Issues	Notes and Comments
1	Completed	No	Cymraeg button covering create button on create new lecture	No	None
2	Failed	No	Completely unsure of how to create the session in the first place – work flow not obvious	No	None
3	Completed	No	No	No	Position of button sometimes blocking content
4	Completed	No	No	No	None
5	Completed	Looking towards session action panel for link to feedback. Not obvious link to feedback	No	No	Possibly automatically load the first charts without the need to click on a session (or remove highlighting and add a prompt)
6	Completed	Move PDF link down near lecture detail it took a bit longer to find it in the navigation bar.	No	No	None
7	Completed	No	No	No	None
8	Completed	No	No	No	None
9	Completed	No	No	No	None
10	Completed	No	No	No	None

11	Completed	No	No	No	None

Ben Rowlands – 29/04/2019 – Desktop

Task	Success Rate	Minor Usability Issues	Serious Usability Issues	Critical Usability Issues	Notes and Comments
1	Completed	Maybe Make it explicit that only accepts pdfs I was thinking I might want to upload a file of a different type	No	No	None
2	Completed	Took a moment to realise that had to click on session row/tab to bring up options. But once first clicked on it was obvious after that.	Someone else's questions appeared when creating my new feedback session	No	None
3	Completed	No	No	No	None
4	Completed	No	No	No	None
5	Completed	No	No	No	Expecting some feedback or visual to display immediately upon entering feedback page not an issue but split-second delay
6	Completed	No	No	No	None
7	Completed	No	No	No	Couldn't search for a while because did not alert me to extra spaces I couldn't see. Either strip spaces off the end or alert me to the issue
8	Completed	No	No	No	None
9	Completed	No	No	No	None
10	Completed	No	No	No	None
11	Completed	No	No	No	None

Joasia Syposz – 29/04/2019 - Mobile

Task	Success Rate	Minor Usability Issues	Serious Usability Issues	Critical Usability Issues	Notes and Comments
1	Completed	Not clear file upload is option add prompt Cymreag button has blocked the create lecture button on mobile	No	No	I recommend using asterisk for easily displaying mandatory fields

2	Failed	Use of search bar for finding help or links – the search is only for searching through lectures therefore make it clear that is the case	No obvious change clicking create feedback session because changes to page were not visible upon click action	No	Idea some overlay icon to prompt user to scroll down would have made it easier
3	Completed	No	No	No	None
4	Completed	Easier if check boxes to select and merge sessions this is what I would I would be more used to using. It wasn't obvious with the text of the merge button perhaps a clearer button text sating exactly what two sessions would merge	No	No	None
5	Completed	Not clear where link is not obvious it's in navigation bar Session Table row keeps shifting back after horizontal scroll Instructions on feedback page not noticeable in current form perhaps more colour or better position	No	No	Remove bar and pie charts until session highlighted Maybe automatically highlight session on page load
6	Completed	No	No	No	Change text to "lecture PDF" because it both covers download and view
7	Completed	No	No	No	None
8	Completed	No	No	No	Deciding which slide at the end after entering all the feedback may make me have to rethink my feedback choices I recommend putting this first.

9	Completed	Delete button slightly off page in mobile browser	No	No	None
10	Completed	No	No	No	None
11	Completed	No	No	No	None

Gwilym Griffith – 29/04/2019 - Desktop

Task	Success Rate	Minor Usability Issues	Serious Usability Issues	Critical Usability Issues	Notes and Comments
1	Completed	Unclear on what notes field is; what are the notes to be used for students staff??ect Choose lecture field is not obvious in its function perhaps the word upload would make it more clear	No	No	None
2		Session row looks like field to enter data into perhaps change appearance (colour)			Going from a list of lectures to the lecture detail page with multiple sessions is initially confusing, unsure of why there are multiple sessions able to be created – some explanation might help but after first success it was clear
3	Completed	Cymraeg button not obvious place usually right top side	No	No	None
4	Completed	No	No	No	None
5	Completed	No	No	No	None
6	Failed	No	The lecture I created did not have a pdf so I could not find any link to download its pdf. If a lecture does not have a pdf make it clear that it does not have one and give me	No	None

			an option to upload one.		
7	Completed	No	No	No	Maybe show can search date also in search box placeholder *Note for whole site: idea to move all control to a uniform top section control panel that is constant throughout the site and would make it easier to use instead of different button locations on each page*
8	Completed	No	No	No	None
9	Completed	No	No	No	None
10	Completed	No	No	No	None
11	Completed	No	No	No	None

Patrick Grey – 30/04/2019 – Mobile

Task	Success Rate	Minor Usability Issues	Serious Usability Issues	Critical Usability Issues	Notes and Comments
1	Completed	Purpose and if optional or not was not clear for upload file field	On mobile Cymraeg button blocks create button	No	Tried scrolling to bottom first – new lecture quite faint on mobile
2	Failed	No	No clear change when hitting create session not sure where the session was. How to set running?	When on one section couldn't see the other section changes so there was no clear prompt of what to do	Be clearer with more prompting maybe?
3	Completed	No	No	No	None
4	Completed	No	No	No	None
5	Completed	No	No	No	None
6	Completed	No	No	No	None
7	Completed	No	No	No	None
8	Completed	Took a second to realise submitted because had to scroll down for success alert Could not realise had option to ask question because end of feedback feels like it could be end of the page	No	No	
9	Completed	No	No	No	None

10	Completed	No	No	No	None
11	Completed	No	No	No	None

User Testing Summary Notes

1. Summary – login & create lecture
    - Not clear if fields are optional or not
    - Not clear of notes and file upload purpose – who are notes for what file is to be uploaded?
    - Cymraeg button covering create button on mobile
    - New Lecture faint button on mobile device
2. Summary – create and start session
    - Lecture title should be part of a main heading for lecture detail page
    - Unsure of how to control session not obvious the row should be clicked
    - On mobile cannot see change when hitting create feedback session
    - Unclear on why lectures have sessions (maybe more help or description)
    - Tried to use search bar for help during this task (indicates purpose of search bar is not clear)
3. Summary – Change between English & Welsh
    - Location of button sometimes hidden on mobile
4. Summary – Merge two sessions
    - Not clear on what merge does
    - Not clear when merge had finished
    - Not obvious text on merge button describing which two session were to be merged
    - Check boxes to select multiple sessions to merge would be more user friendly
5. Summary – View feedback
    - Drop down options not noticeable enough
    - Wrong colour next to NO. Responses that doesn't make sense and should be removed
    - Looking towards session action panel for feedback link feels unnatural to look for it in navigation bar because it should be associated to a session
    - Expecting some visual display upon entering feedback page, grey background on mobile does not hint well to what should be done
6. Summary – Download PDF Lecture file
    - Move PDF download near the rest of the lecture details
    - Make it clear the difference between extract PDF and download PDF
    - Change text from 'View Lecture PDF' to 'Lecture PDF' because it covers both downloading and viewing
    - If the lecture does not have a PDF make it clear that it does not
7. Summary – Search for lecture
    - Make explicit search box functionality – "Search for lecture by name or date…"
    - Strip of extra spaces at end search didn't work because had extra whitespace but user did not know
8. Summary – Provide Feedback to a running lecture feedback session
    - Success alert at bottom is not immediate to see on mobile because you must scroll down
    - Selecting slide to associate with should be first field

9. Summary – Ask Question
    - Question delete button slightly of page in mobile browser
10. Summary – Download PDF
    - No Issues
11. Summary – Disconnect from Session
    - Add notification of successful disconnect from session