User Interface Design Prototyping

Primary Persona

Name: Julia Thompson
Age: 44
Sex: Female
Occupation: *History Lecturer, Cardiff University*
Key Quote: “Does everyone understand this?”
Julia has had to adapt to the pandemic, and the different teaching style that is now required, so had to switch to online teaching but still wishes to teach at the highest quality possible. She recognises that she needs to teach remotely but still wants to maintain a high level of interactivity with students; she would like to be able to teach as well as, if not better than, in pre-pandemic lectures. Julia is not overly confident with technology but she recognises its importance, especially at the moment, and does not want this to interfere with the quality of her lectures.

Goals: Julia would like to maintain a very similar teaching style to pre-pandemic teaching. She would like to be able to share her screen with students so that she can continue to present the lectures with relative ease. She would also like to be able to easily record meetings and have these easily accessible for rewatching or downloading. Julia would also like to easily be able to reschedule or create new meetings. She would also like there to be text chat functionality as she recognises that some of her students may not want to talk but may still wish to contribute.

Use Cases

Julia is a lecturer who is not overly confident with technology. She wants to be able to schedule the meetings so that they automatically appear on her and her students’ timetables. These timetabled meetings should then have clickable links for everyone to join using, but the lecturer/host (i.e. whoever scheduled the meeting) should have the control - be able to mute people, turn cameras on/off, enable/disable the chat features. She would also like to make sure that she can present the lectures in as similar a way as possible to pre-pandemic lectures, so would appreciate screen sharing options.

Use Case 1: Join Meetings

The first primary task in the system is to be able to join or watch meetings.

Purpose: The lecturer should be able to join video meetings at specified times, on the timetable, and watch previous lectures at any point in time.

Start-condition: The Lecturer is on the application timetable screen

Basic Flow:

1. Select the meeting they would like to join
2. A dialogue box will pop-up with differing options depending on if the meeting has happened or is yet to happen.
3. The options in the dialogue box are to: close the dialogue box, join the meeting, or reschedule it.
4. Select to Join Meeting button
5. Options to have camera on/off and microphone on/off appear.
6. Select options
7. Click “Join” button to enter into meeting
8. Entered into meeting
9. Buttons for screen-sharing, to open the chat messages, to record the meeting, end the meeting, or leave the meeting are displayed as well as the video streams of meeting attendees with cameras on.

Alternative Flows:

AC1: Lecturer opens the app at the time of a scheduled meeting

1. Dialogue box pops up to inform them that a meeting is about to start
2. Options to “join meeting” or exit the dialogue box are given along with information about the meeting, i.e. module, timing, meeting type, topic.
3. Basic Flow continues from step 4.

AC2: Lecturer clicks on a past meeting

1. Complete basic flow step 1
2. A dialogue box will be displayed saying that the meeting has already happened and have options to watch the meeting recording or exit the dialogue box
3. Select “Watch Meeting” button
4. Meeting video opens and begins to play

Use Case 2: Schedule Video Meetings

The second use case is the ability to schedule or reschedule meetings is a primary task for Julia as she likes to be organised and to know exactly when she has each session.

Purpose: The lecturer should be able to schedule video meetings at specific times and for specified lengths of time, once scheduled these should appear on a timetable for them and students.

Start-condition: The Lecturer is on the application home screen or timetable screen.

Basic Flow:

1. Clicks “Schedule a New Meeting” button
2. System opens a new window with dropdown options for the module, a text box for the topic, and dropdown options for the meeting type, meeting day, and meeting time
3. Lecturer Selects the meeting options
4. Confirm selection choice
5. New meeting appears on the timetable in the appropriate session

Alternative Flows:

AC1: Lecturer wants to change when a meeting is scheduled for

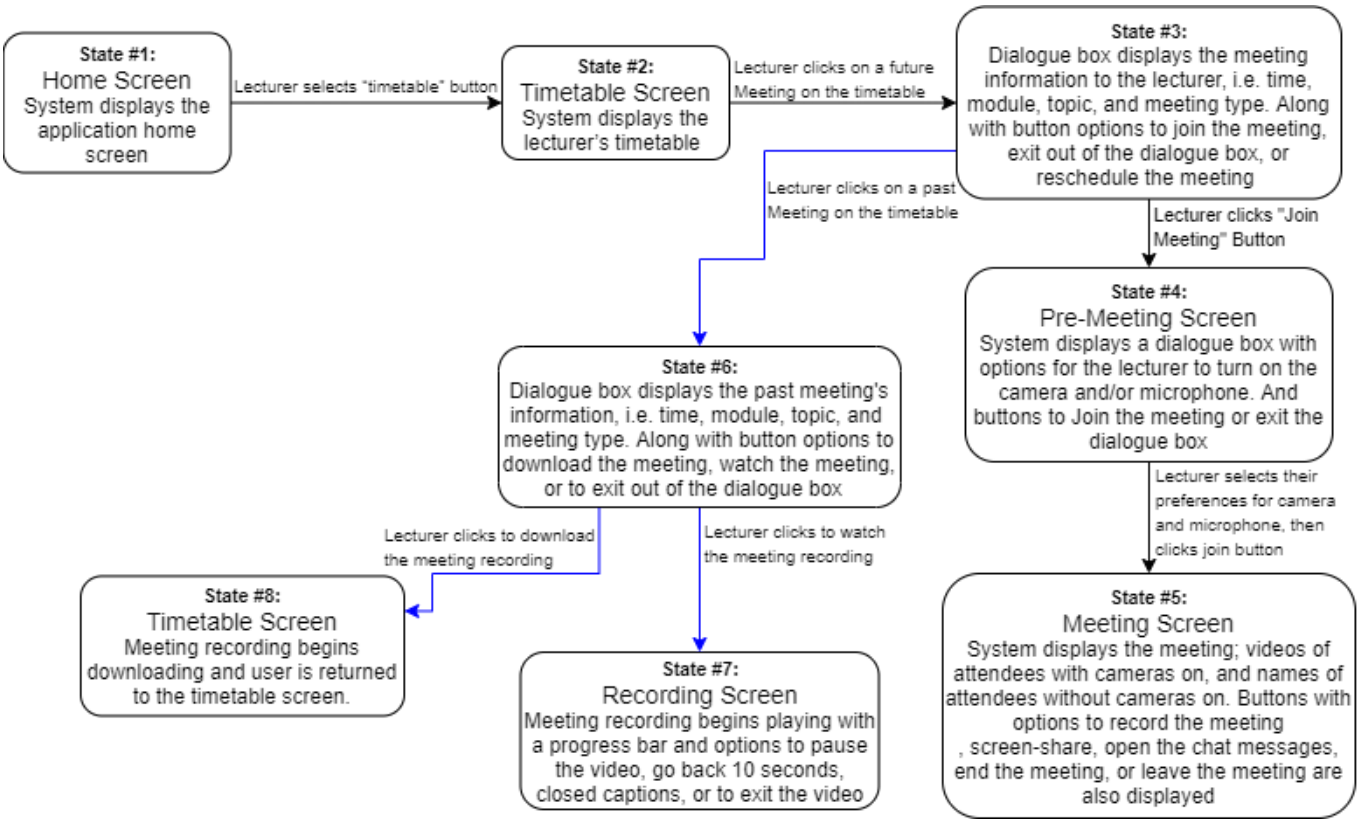
1. Click on a future meeting that they want to reschedule
2. Options for the meeting pop-up with information about the meeting (module and time etc.) and a button to reschedule it appear (as well as a button to join the meeting)
3. Click “Reschedule” button
4. Systems display options to change the date and time
5. Confirm selection choice
6. Adjusted meeting information appears in appropriate spot on timetable

State Transition Networks (STNs)

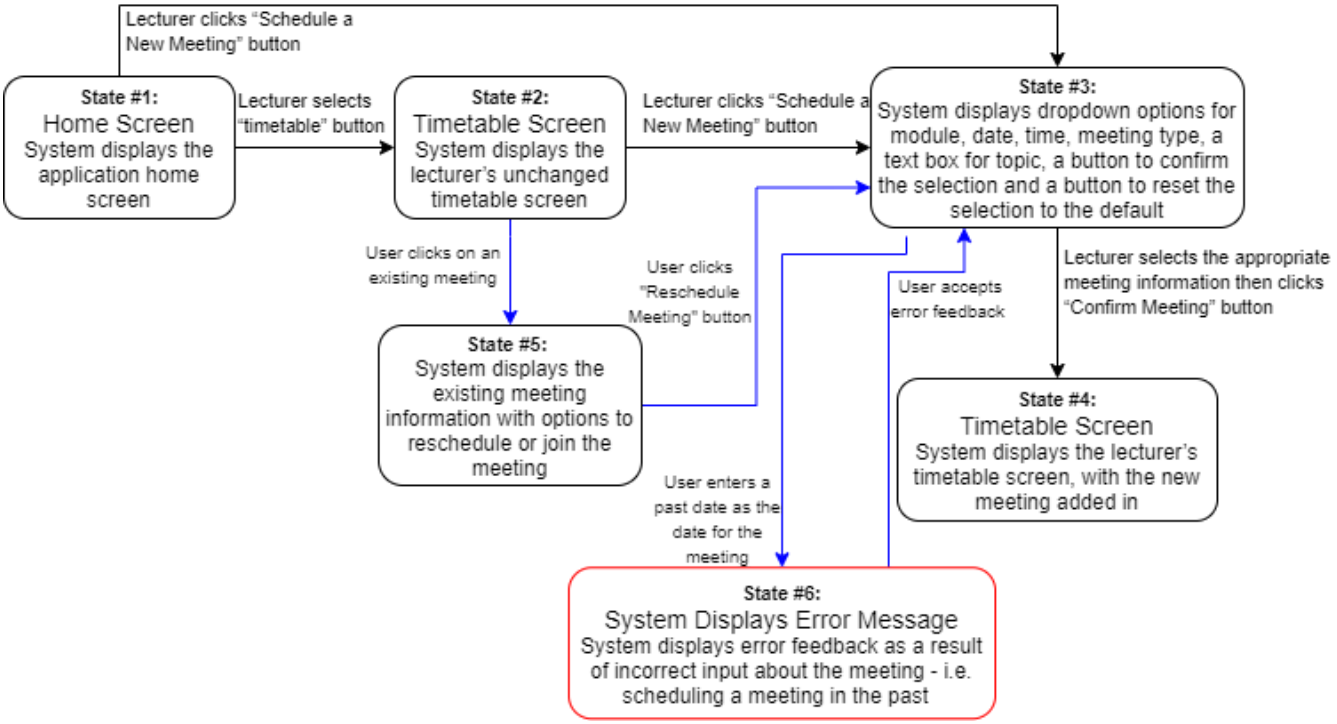
From the two use cases, I have produced two State Transition Network diagrams to display an abstract representation of how the lecturer can progress through the basic and alternative flows of the system.

Black connectors demonstrate the basic flow while blue arrows highlight the alternative flow - with potential errors are highlighted in red boxes. Each state represents a different screen in the flow.

State Transition Diagram 1:



State Transition Diagram 2:



Prototyping

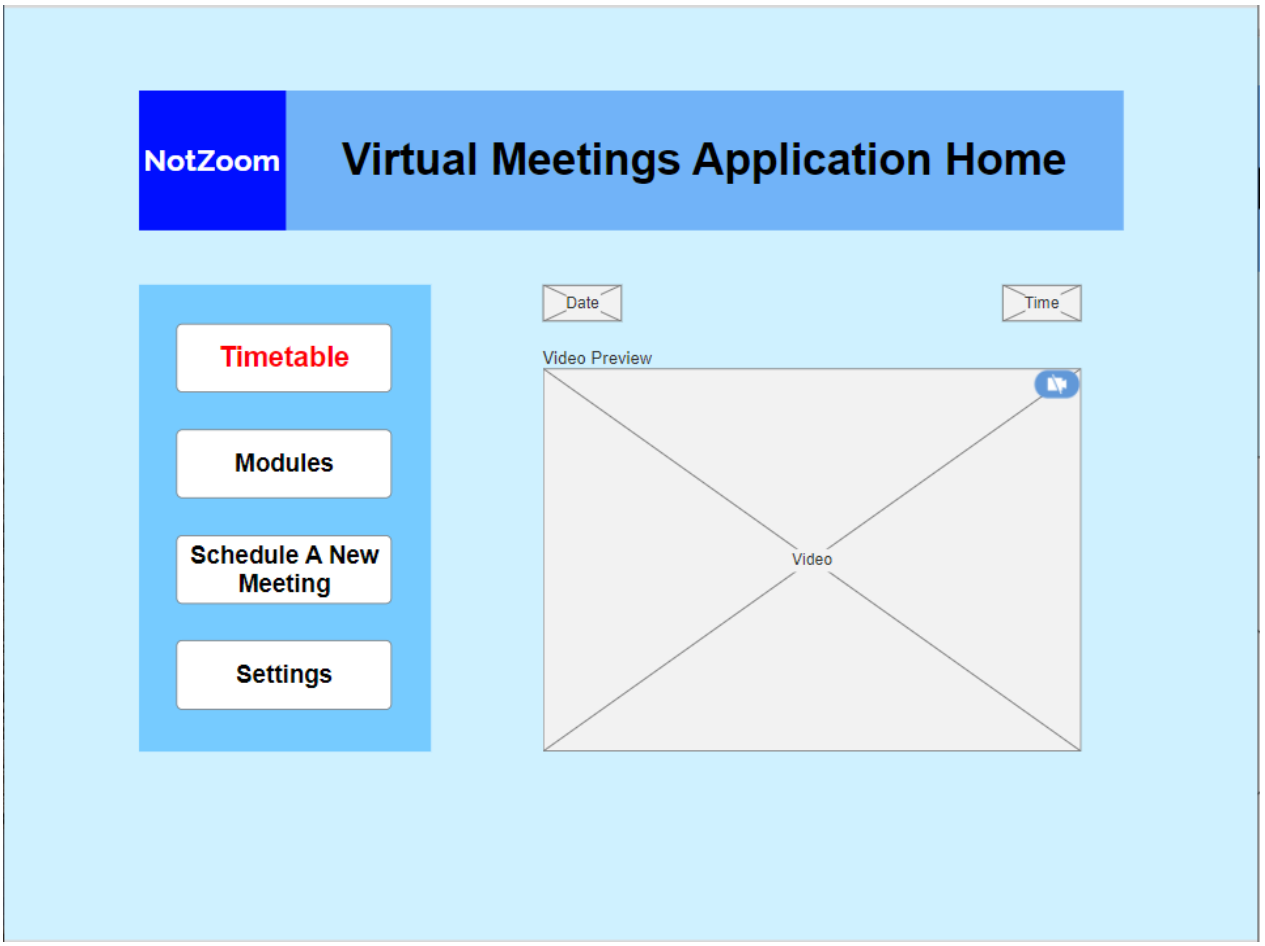
To demonstrate the above use cases and state transition networks, I created a prototype. Screenshots to demonstrate each state are shown below. Some features displayed in the interface are not directly related to the use cases or STN's but are additional features - for instance, being able to view the modules that the lecturer teaches from the home screen. Other features, for instance, the meeting chat have also been shown to highlight some of the additional functionality of the prototype.

I have tried to maintain a consistent design throughout my prototype, using the same colour scheme, similar placements of certain objects on different screens, and having the logo on as many relevant screens as possible.

I also tried to utilise as many of Nielson's 10 usability heuristics as possible. For instance, on all screens there are clear methods for changing the screen - either a cancel button, leave or end meeting button, or a home/timetable button. This satisfies Nielson's third heuristic for user control and freedom.

Use Case 1: Joining a Meeting

Home Screen aka State 1:



For the design for this screen, I decided to split it into 3 clear sections: the Heading, the Navigation panel, and the Video Screen. I did this to make a visual hierarchy clear to the user. This makes it clear to the user where they are, where they can go, and what they can do on this page.

In terms of interface elements, I have used 2 boxes, of slightly different shades with the heading being darker - this was to add to the hierarchical design, a logo, 4 buttons, and 3 placeholders. The 4 buttons are the navigation for this state. I tried to make the navigation as simple as possible; from the home screen the timetable button is made to stand out a little bit more as that is the most important button for the users' as it will display when they have meetings and what they are. Another useful button in the navigation is the "Schedule A New Meeting" button. This is on the homescreen as well as on the timetable screen so that if the lecturer has planned to schedule a meeting on a specific day and time and they know that it will be possible to schedule it, they can easily skip to scheduling without having to go through the timetable.

The largest placeholder is for a preview of the video that would be displayed when you enter into the meeting, I have done this so that it is easier to prepare the backgrounds for meetings as you can see exactly what everyone else will. But to keep the user in control,

they have the ability to turn the camera off by clicking on the camera icon in the corner of the video. I also included date and time placeholders so that when the app is opened, users will easily be able to work out how much time they have until meetings would start. The other two placeholders are for the date and time.

This page deals with user error by preventing it. The only things the user can do is click on buttons, these either navigate to another page or turn the camera on/off.

Feedback is provided by the user clicking on one of the buttons and the screen changing to the relevant one, alternatively by the user clicking the camera icon and the video preview either displaying a black square (if the user turned the camera off) or displaying the user.

Timetable aka State 2:

Throughout the design, I have kept a blue colour scheme for backgrounds and headings. This was to try and keep the design aesthetic and as cohesive as possible. I have also tried to use softer tones where possible for this same reason. This interface uses a NavBar, a box, a logo, a date label and a time label, and a table for the actual timetable. On the timetable I have filled in some example meetings that Julia may have. Additionally, I included a 10 minute “Buffer” between meetings as with online teaching there is a tendency for perfectly back-to-back meetings without a break. This buffer allows for meetings to run slightly over, or for users to have a quick cooldown, or make a cup of tea, etc. before the next meeting.

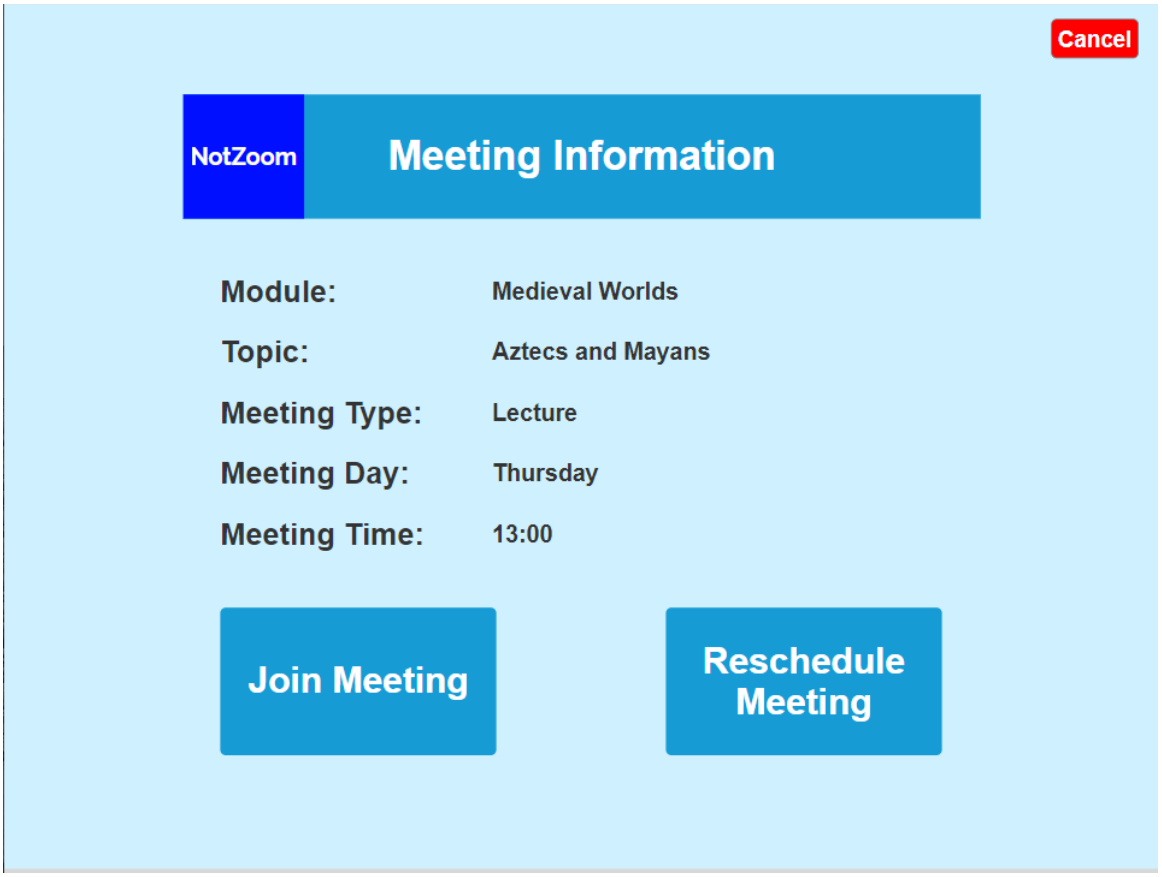
For the actual timetable, I considered using a “Grid of Equals” but decided that, although being in a table might make the screen look a little bit busier, it would be easier to display

exactly when meetings are in this format. It also means that on each meeting the only information displayed is the module to keep it as simple as possible. If the user wants more information about a meeting they can click on that session on the timetable and, if the meeting is yet to happen, will display options to either Join or Reschedule the meeting. If the meeting has happened, the options are instead to watch or download the meeting.

For each session on the timetable, when scrolled over, it is highlighted in a bright pink to show the user exactly which session they might be about to select, satisfying Nielson's first usability heuristic. Navigation wise, this screen has 3 options: go back to the home page, go forward to the meeting scheduling page, or open a pop-up to see the video preview. These all enable feedback, again, either by changing the screen or by opening a pop-up.

This state has no further methods for preventing user error as the user is not inputting anything other than clicks or hovers, this satisfies Nielson's sixth usability heuristic as all possibility for errors is prevented.

Meeting Information (future or present) aka State 3:



I have kept this state very simple, displaying only the necessary information and having only the necessary and relevant information, again satisfying Nielson's ninth usability heuristic. This state also satisfies Nielson's seventh usability heuristic as the user is not required to remember which meeting they clicked on as that information is provided here as well as on the timetable, along with additional information. This screen also satisfies Nielson's third and sixth usability heuristics. The third by having the cancel button marked clearly in red and in

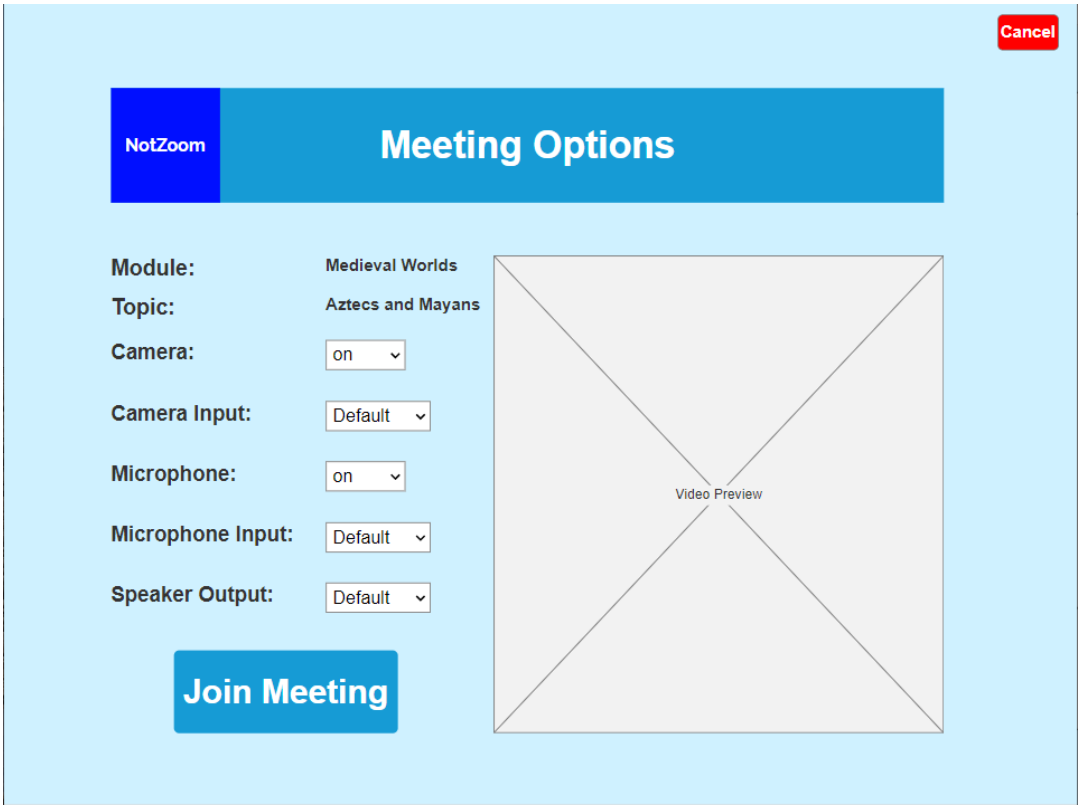
no uncertain terms, and the sixth by, again, not having anything the user could do to throw an error as the only things they could do would be to click a button.

I left-aligned the meeting information to make everything as clear as possible to the user, this also displays the grouping in an understandable way: the items on the right is the important information while the information on the left is just the labels. I also included the logo and a large heading to make the page more interesting and also to satisfy Nielson's first heuristic as it informs the user exactly what this page is for.

From here, the user can either navigate back to the timetable screen by clicking the cancel button, or to the meeting by clicking to join the meeting, or to the rescheduling page by clicking that button.

This screen also does not have a method to deal with errors as it is just buttons and text so prevents any and all errors.

Pre-Meeting Screen aka State 4:



For this screen I kept the logo and the heading, and the module and topic (so that the user does not have to recall what meeting they are joining. Again, a video preview is given to the user before they enter the meeting. The video is on the right of the screen as it should be displayed as a result of the users selections for the camera - ie on/off, default or other. This state has 5 dropdowns to allow the user some freedom - satisfying Nielson's third heuristic - for instance, choosing what inputs and outputs they would like to use, and whether they wish to broadcast themselves visually or acoustically.

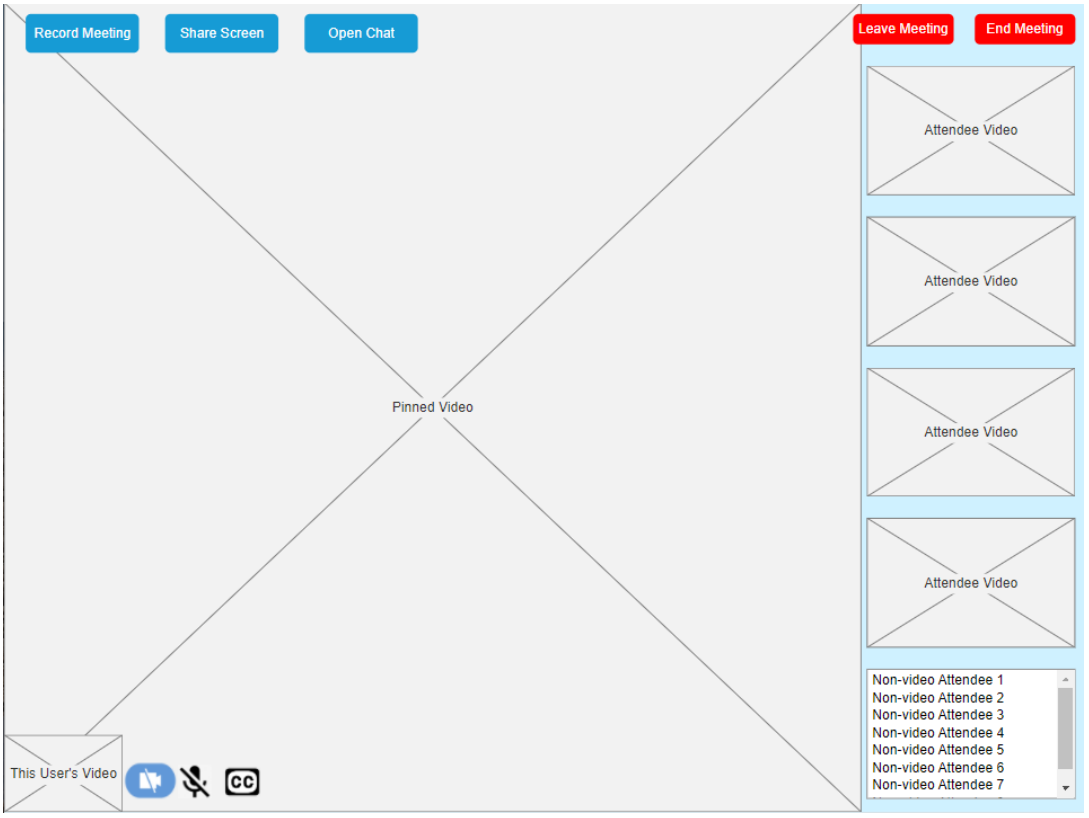
I chose to have all the user interactions on the left of the page as that is the general way people would scan a page, so they would see and interact with these first. Again, I grouped

the labels on one side and the interactions on the other to make it more visually appealing and understandable.

As the interactions are just drop downs or buttons, and the dropdowns have a very limited number of options for the user, this screen also makes it impossible for the user to create an error.

When the user has selected their options, they click the join button and the screen shifts to the meeting.

Meeting Screen aka State 5:



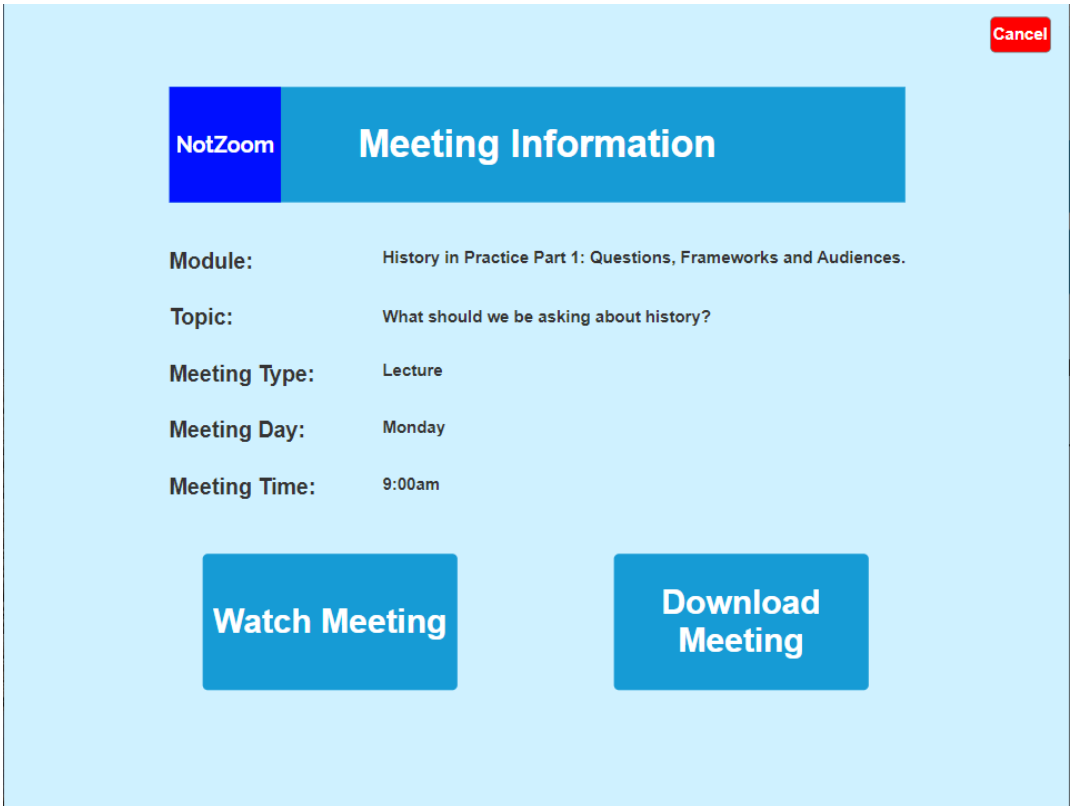
This interface still utilises some of the blue colour scheme but is notably different from other screens as it is the end of the process. The majority of this screen is videos (as placeholders here). Additionally, there is a list option for the attendees who do not have their videos on, this is so Julia is able to easily take attendance, if needed. The icons that I have used are clear as to what they are for: camera off, microphone off, and for live closed captions. These are all established icons so clear to most users what they are for and what they do. Additional buttons in this interface are to record the meeting, share the screen, or to open the chat. Then there are options to either end or leave the meeting - ending the meeting kicks all users out, while leaving just removes this user from the meeting. These buttons satisfy Nielson's third heuristic as it is clear how to exit the state.

The pinned video is displayed left-aligned and taking up the majority of the screen with the other videos on the left and much smaller. This sizing was to display the hierarchy of the meeting.

The buttons and icons are all used to provide feedback. The record button will change colour and give all meeting members a message to warn that it is being recorded. The screen-share button will show this user's screen to the other users and turn off their camera. The chat button will open the chat box in a popup window. Then the icons turn the camera/microphone/captions on or off and switch to icons with or without the line through depending on which way it was clicked to.

There is no possibility of user error from this state as, again, all the interactions are button based.

Meeting Information (past) aka State 6:



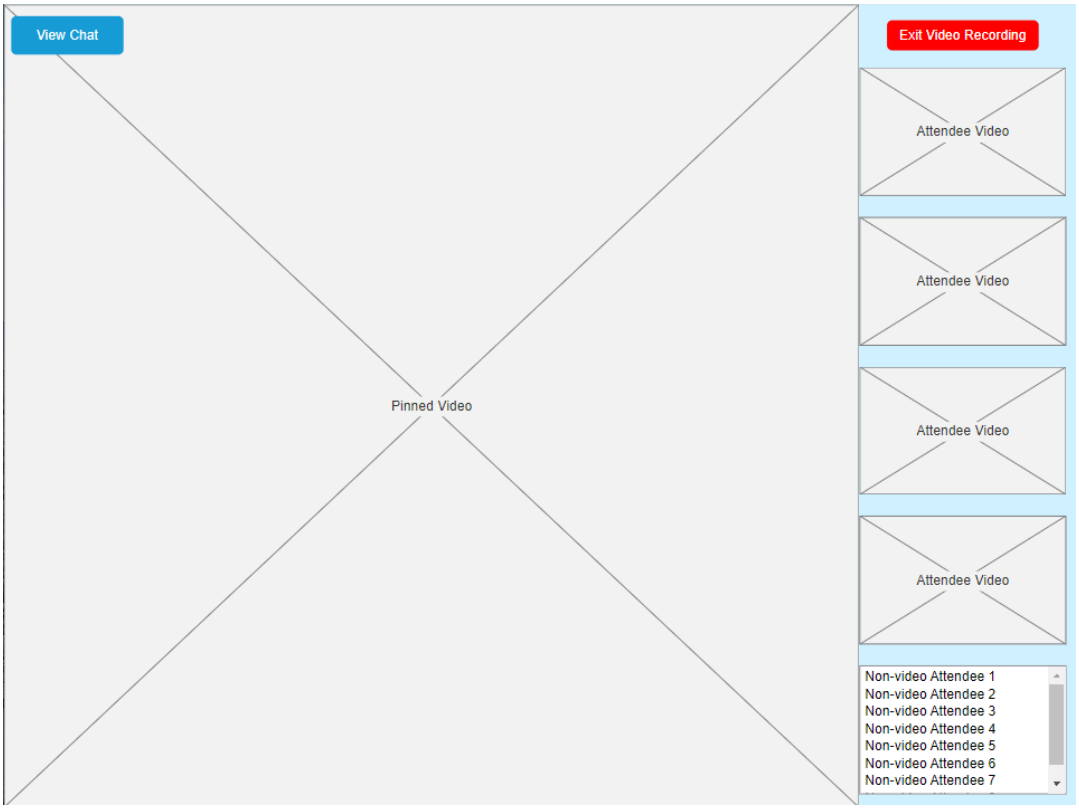
As with State 3, I have kept this state very simple, displaying only the necessary information and having only the necessary and relevant information, again satisfying Nielson's ninth usability heuristic. This state also satisfies Nielson's seventh usability heuristic as the user is not required to remember which meeting they clicked on as that information is provided here as well as on the timetable, along with additional information. This screen also satisfies Nielson's third and sixth usability heuristics. The third by having the cancel button marked clearly in red and in no uncertain terms, and the sixth by, again, not having anything the user could do to throw an error as the only things they could do would be to click a button.

I left-aligned the meeting information to make everything as clear as possible to the user, this also displays the grouping in an understandable way: the items on the right is the important information while the information on the left is just the labels. I also included the logo and a large heading to make the page more interesting and also to satisfy Nielson's first heuristic as it informs the user exactly what this page is for.

From here, the user can either navigate back to the timetable screen by clicking the cancel button, or to the meeting video clicking to watch the meeting, or can download the video, this will navigate them back to the timetable screen while it downloads the meeting, a notification will then pop-up once the meeting has been downloaded.

This screen also does not have a method to deal with errors as it is just buttons and text so prevents any and all errors.

Watch Meeting aka state 7:



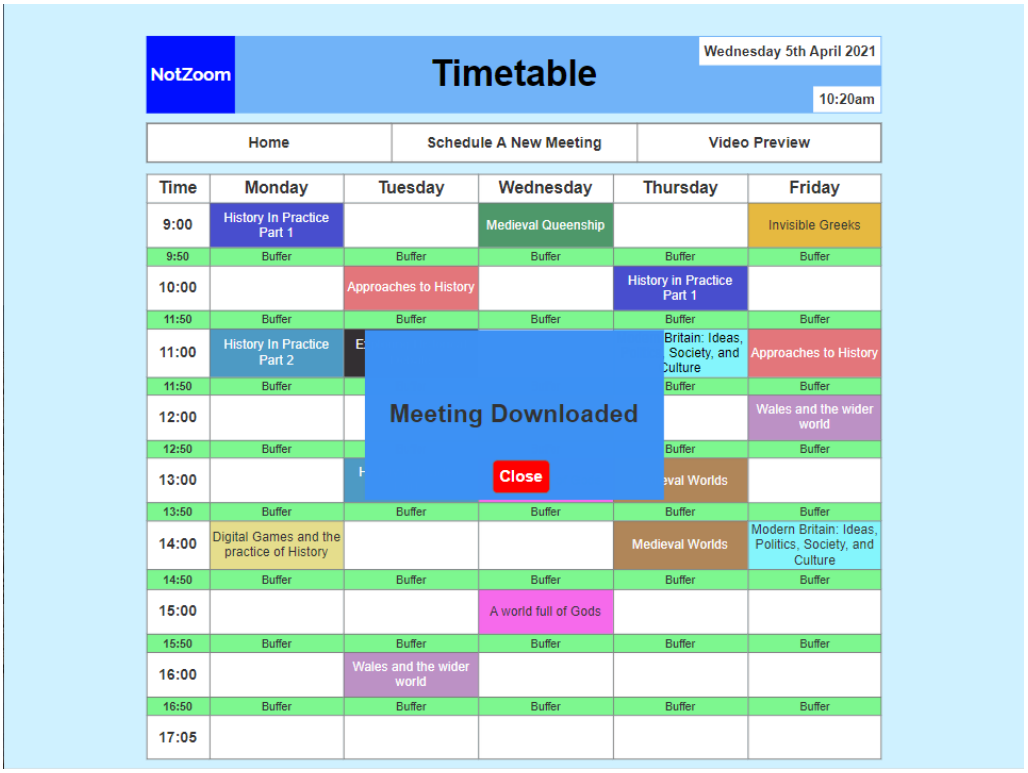
This interface is similar to that of state 5, however it has less functionality as it is effectively just a video player. The majority of this screen is videos (as placeholders here). Additionally, there is a list option for the attendees who do not have their videos on, this is so Julia is able to take attendance after the meeting has occurred, if needed. The buttons in this interface are limited to opening the chat from the meeting and to exit out of the meeting recording This button satisfies Nielson's third heuristic as it is clear how to exit the state.

The pinned video is displayed left-aligned and taking up the majority of the screen with the other videos on the left and much smaller. This sizing was to display the hierarchy of the meeting.

The buttons are the two ways that this state can provide feedback. The chat button will open the chat box in a popup window while the exit button will return the user to the timetable screen.

There is no possibility of user error from this state as, again, all the interactions are button based.

Download Meeting aka State 8:



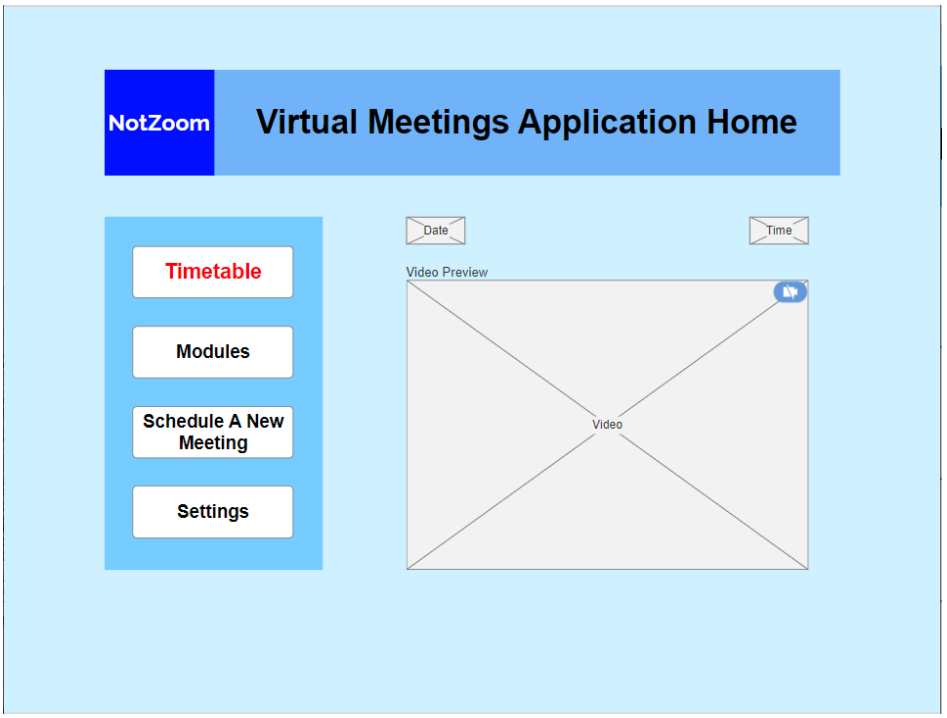
This state is simply just the timetable with a pop-up message overlaid on it, this pop-up tells the user that the meeting has been downloaded. When they click the close button they can access the timetable as normal again.

The pop-up is blue to fit with the colour scheme of the application however it is a different shade to the other blues used previously to show it is for a different purpose. The pop-up is deliberately placed directly in the way of the timetable so that the user must acknowledge that the meeting has been downloaded before continuing. The close button is large and red - this is to satisfy Nielson's third heuristic as it makes it very clear exactly how to exit out of the state.

Feedback is provided by clicking the close button, this closes the pop-up. This screen has no room for user error as it is simply clicking the close button.

Use Case 2:

Home aka State 1:



The first two states for this use case are the same, and thus the descriptions are also. For the design for this screen, I decided to split it into 3 clear sections: the Heading, the Navigation panel, and the Video Screen. I did this to make a visual hierarchy clear to the user. This makes it clear to the user where they are, where they can go, and what they can do on this page. In terms of interface elements, I used 2 boxes, of slightly different shades with the heading being darker - this was to add to the hierarchical design, a logo, 4 buttons, and 3 placeholders. The 4 buttons are the navigation for this state. I tried to make the navigation as simple as possible; from the home screen the timetable button is made to stand out a little bit more as that is the most important button for the users' as it will display when they have meetings and what they are. Another useful button in the navigation is the "Schedule A New Meeting" button. This is on the homescreen as well as on the timetable screen so that if the lecturer has planned to schedule a meeting on a specific day and time and they know that it will be possible to schedule it, they can easily skip to scheduling without having to go through the timetable.

The largest placeholder is for a preview of the video that would be displayed when you enter into the meeting, I have done this so that it is easier to prepare the backgrounds for meetings as you can see exactly what everyone else will. But to keep the user in control, they have the ability to turn the camera off by clicking on the camera icon in the corner of the video. I also included date and time placeholders so that when the app is opened, users will easily be able to work out how much time they have until meetings would start. The other two placeholders are for the date and time.

This page deals with user error by preventing it. The only things the user can do is click on buttons, these either navigate to another page or turn the camera on/off.

Feedback is provided by the user clicking on one of the buttons and the screen changing to the relevant one, alternatively by the user clicking the camera icon and the video preview either displaying a black square (if the user turned the camera off) or displaying the user.

Timetable aka State 2:

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	History In Practice Part 1		Medieval Queenship		Invisible Greeks
9:50	Buffer	Buffer	Buffer	Buffer	Buffer
10:00		Approaches to History		History in Practice Part 1	
11:50	Buffer	Buffer	Buffer	Buffer	Buffer
11:00	History In Practice Part 2	Exploring Historical Debate		Modern Britain: Ideas, Politics, Society, and Culture	Approaches to History
11:50	Buffer	Buffer	Buffer	Buffer	Buffer
12:00			Invisible Greeks		Wales and the wider world
12:50	Buffer	Buffer	Buffer	Buffer	Buffer
13:00		History in Practice Part 2	A world full of Gods	Medieval Worlds	
13:50	Buffer	Buffer	Buffer	Buffer	Buffer
14:00	Digital Games and the practice of History			Medieval Worlds	Modern Britain: Ideas, Politics, Society, and Culture
14:50	Buffer	Buffer	Buffer	Buffer	Buffer
15:00					
15:50	Buffer	Buffer	Buffer	Buffer	Buffer
16:00		Wales and the wider world			
16:50	Buffer	Buffer	Buffer	Buffer	Buffer
17:05					

This interface uses a NavBar, a box, a logo, a date label and a time label, and a table for the actual timetable. On the timetable I have filled in some example meetings that Julia may have. Additionally, I included a 10 minute “Buffer” between meetings as with online teaching there is a tendency for perfectly back-to-back meetings without a break. This buffer allows for meetings to run slightly over, or for users to have a quick cooldown, or make a cup of tea, etc. before the next meeting.

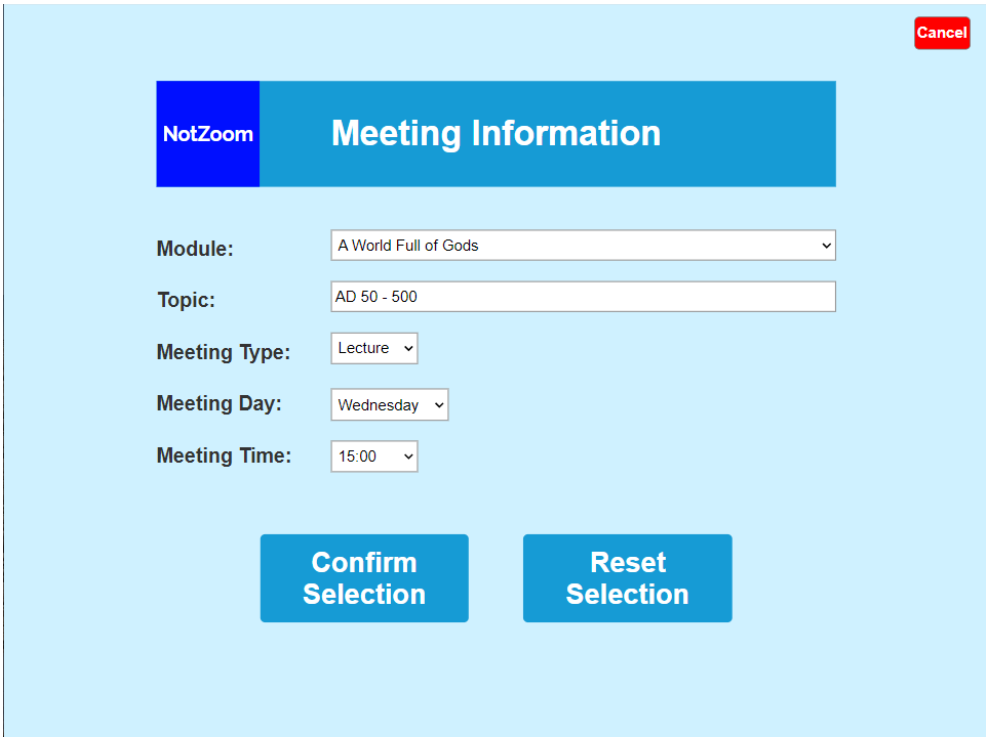
For the actual timetable, I considered using a “Grid of Equals” but decided that, although being in a table might make the screen look a little bit busier, it would be easier to display exactly when meetings are in this format. It also means that on each meeting the only information displayed is the module to keep it as simple as possible. If the user wants more information about a meeting they can click on that session on the timetable and, if the meeting is yet to happen, will display options to either Join or Reschedule the meeting. If the meeting has happened, the options are instead to watch or download the meeting.

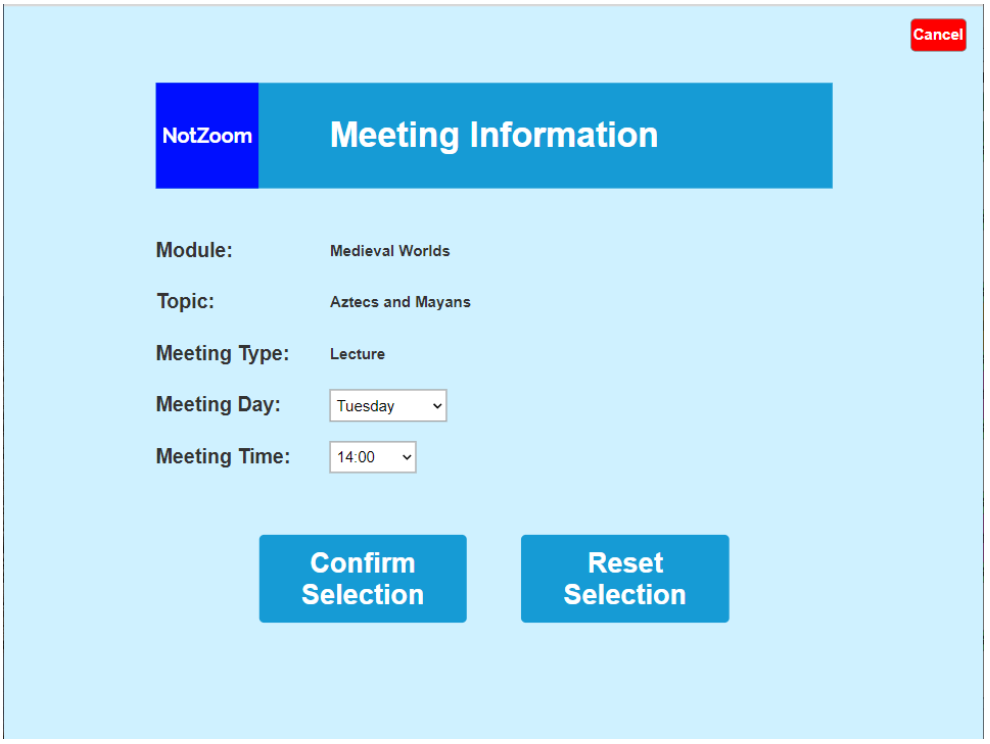
For each session on the timetable, when scrolled over, it is highlighted in a bright pink to show the user exactly which session they might be about to select, satisfying Nielson’s first usability heuristic. Navigation wise, this screen has 3 options: go back to the home page, go forward to the meeting scheduling page, or open a pop-up to see the video preview. These all enable feedback, again, either by changing the screen or by opening a pop-up.

This state has no further methods for preventing user error as the user is not inputting anything other than clicks or hovers, this satisfies Nielson's sixth usability heuristic as all possibility for errors is prevented.

Schedule a new meeting or Reschedule Meeting aka State 3:

This state has two variations, the first is for after clicking on the "schedule a new meeting" while the second is for rescheduling a meeting. In the first version of the state, the lecturer is able to edit all of the meeting details, while in the second version, they are only able to edit the day and time of the meeting. The two screens are otherwise identical.





Both versions of the state have a header with the logo, an obvious, red cancel button, dropdowns for day and time, and 2 buttons to confirm or reset the selection. The former has 2 additional additional dropdowns, for module and meeting type, and also a text box for the meeting format. The latter, instead of the text box and 2 dropdowns, has 3 labels with the unchangeable meeting information. Both screens fit with the same consistent design that was shown in the first use case.

I used this layout as it is very similar to the join meeting layout, which helps with having a concise design throughout the application and it means that the information in the same spaces can easily be grouped together. This consistency satisfies Nielson's fourth usability heuristic.

Feedback is provided in many ways. One being through the dropdowns changing and the text changing based on the user's entry. Another being from clicking the reset button and clearing each of the changeable items to the default state (lecture, monday, 9:00, etc.). The confirm selection button returns the user to the timetable screen but with the new/updated changes now on the timetable. The cancel button returns the user to the timetable screen, without making any changes.

One error the user can create in this state is attempting to schedule a meeting in the past, if the user does this the system skips to state 6 and gives a pop-up error message that they have to accept before they are allowed to continue.

Updated Timetable aka State 4:

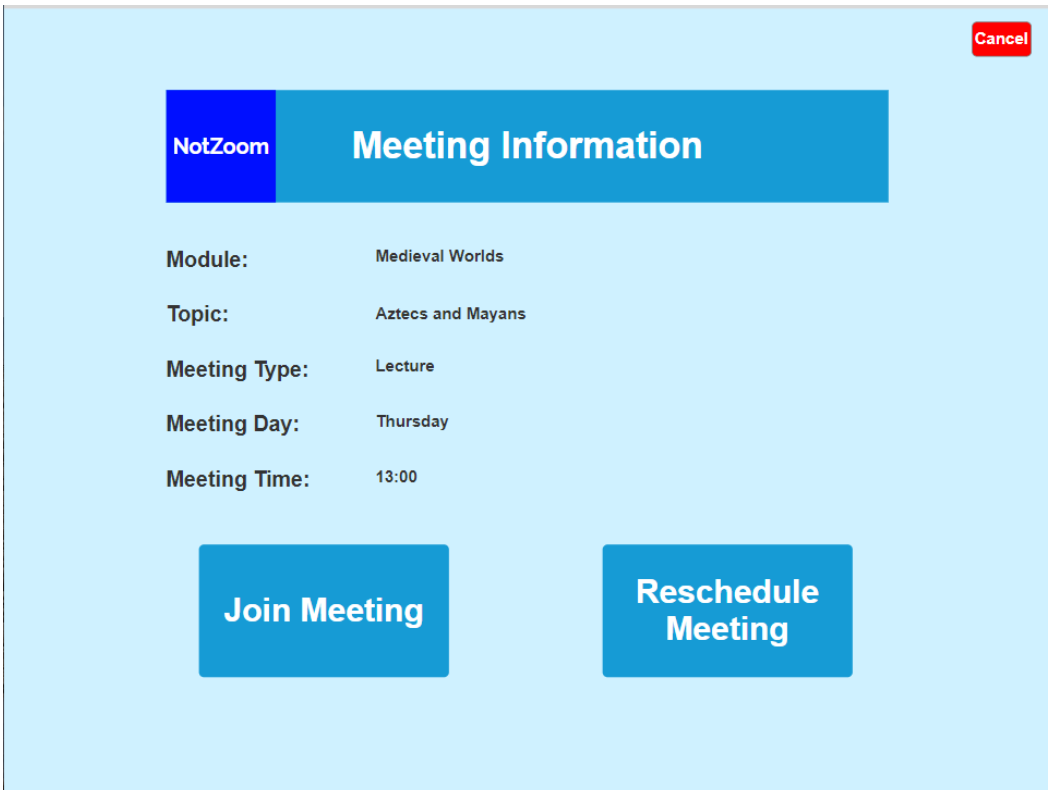
Two versions of updated timetables are shown below, these are to show adding a new meeting (A world full of gods, on Wednesday at 15:00) and rescheduling a meeting (medieval worlds on Thursday at 13:00 to Tuesday at 14:00).

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	History In Practice Part 1		Medieval Queenship		Invisible Greeks
9:50	Buffer	Buffer	Buffer	Buffer	Buffer
10:00		Approaches to History		History in Practice Part 1	
11:50	Buffer	Buffer	Buffer	Buffer	Buffer
11:00	History In Practice Part 2	Exploring Historical Debate		Modern Britain: Ideas, Politics, Society, and Culture	Approaches to History
11:50	Buffer	Buffer	Buffer	Buffer	Buffer
12:00			Invisible Greeks		Wales and the wider world
12:50	Buffer	Buffer	Buffer	Buffer	Buffer
13:00		History in Practice Part 2	A world full of Gods	Medieval Worlds	
13:50	Buffer	Buffer	Buffer	Buffer	Buffer
14:00	Digital Games and the practice of History			Medieval Worlds	Modern Britain: Ideas, Politics, Society, and Culture
14:50	Buffer	Buffer	Buffer	Buffer	Buffer
15:00			A world full of Gods		
15:50	Buffer	Buffer	Buffer	Buffer	Buffer
16:00		Wales and the wider world			
16:50	Buffer	Buffer	Buffer	Buffer	Buffer
17:05					

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	History In Practice Part 1		Medieval Queenship		Invisible Greeks
9:50	Buffer	Buffer	Buffer	Buffer	Buffer
10:00		Approaches to History		History in Practice Part 1	
11:50	Buffer	Buffer	Buffer	Buffer	Buffer
11:00	History In Practice Part 2	Exploring Historical Debate		Modern Britain: Ideas, Politics, Society, and Culture	Approaches to History
11:50	Buffer	Buffer	Buffer	Buffer	Buffer
12:00			Invisible Greeks		Wales and the wider world
12:50	Buffer	Buffer	Buffer	Buffer	Buffer
13:00		History in Practice Part 2	A world full of Gods		
13:50	Buffer	Buffer	Buffer	Buffer	Buffer
14:00	Digital Games and the practice of History	Medieval Worlds		Medieval Worlds	Modern Britain: Ideas, Politics, Society, and Culture
14:50	Buffer	Buffer	Buffer	Buffer	Buffer
15:00			A world full of Gods		
15:50	Buffer	Buffer	Buffer	Buffer	Buffer
16:00		Wales and the wider world			
16:50	Buffer	Buffer	Buffer	Buffer	Buffer
17:05					

Apart from these updates, the timetable is the same as described earlier.

Meeting Information (future) aka State 5:



This state matches state 3 of the previous use case.

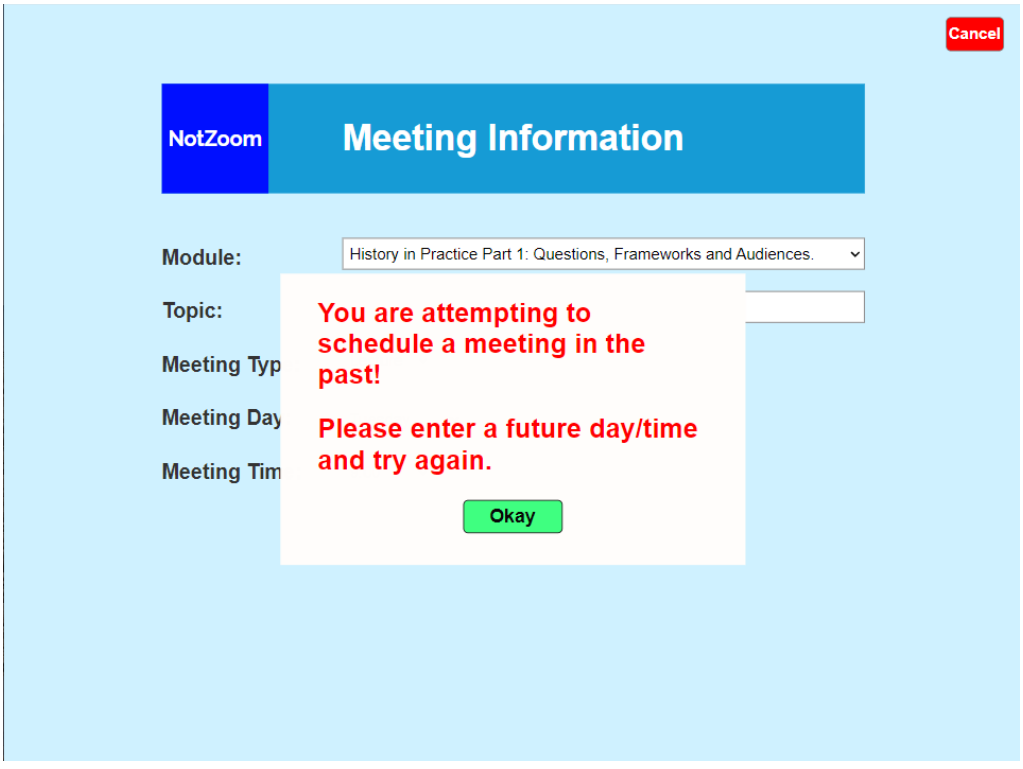
I have kept this state very simple, displaying only the necessary information and having only the necessary and relevant information, again satisfying Nielson's ninth usability heuristic. This state also satisfies Nielson's seventh usability heuristic as the user is not required to remember which meeting they clicked on as that information is provided here as well as on the timetable, along with additional information. This screen also satisfies Nielson's third and sixth usability heuristics. The third by having the cancel button marked clearly in red and in no uncertain terms, and the sixth by, again, not having anything the user could do to throw an error as the only things they could do would be to click a button.

I left-aligned the meeting information to make everything as clear as possible to the user, this also displays the grouping in an understandable way: the items on the right is the important information while the information on the left is just the labels. I also included the logo and a large heading to make the page more interesting and also to satisfy Nielson's first heuristic as it informs the user exactly what this page is for.

From here, the user can either navigate back to the timetable screen by clicking the cancel button, or to the meeting by clicking to join the meeting, or to the rescheduling page by clicking that button.

This screen also does not have a method to deal with errors as it is just buttons and text so prevents any and all errors.

Error Message aka State 6:



For this state I overlaid the pop-up error message on the scheduling state. The overlay means that the lecturer cannot continue with the meeting creation until they have accepted the error message.

This pop-up does not follow the same colour scheme as it is meant to be an error message, it states in no uncertain terms that the options the user entered were not allowed as the meeting should already have happened. The font for the message is red as it stands out and is generally associated with messages such as this, and the okay button is a soft green as it is seen as a colour for acceptance. The message is written in plain english which means it satisfies Nielson's fifth heuristic.

The only way to provide feedback from this state is through clicking the okay button which closes the pop-up and returns the confirm and reset selection buttons for the user.

As this is an error message with only one way out, there is no further ways for the user to generate an error in this state.