**Design and Implementation of Human – Computer Interfaces**
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Lecture: 18
Case Study on Prototype Evaluation - I

Hello and welcome to the NPTEL MOOCs course on design and implementation of human computer interfaces lecture number 17 where we are going to discuss about case studies on prototype building and evaluation.
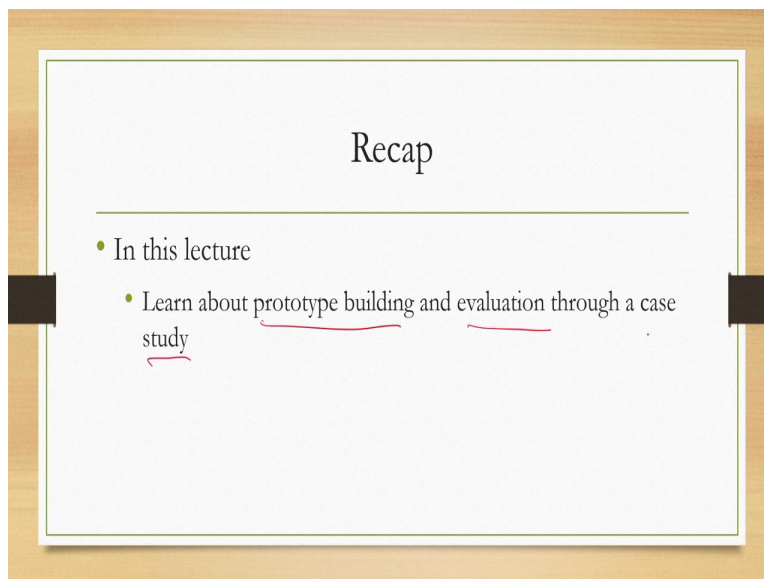
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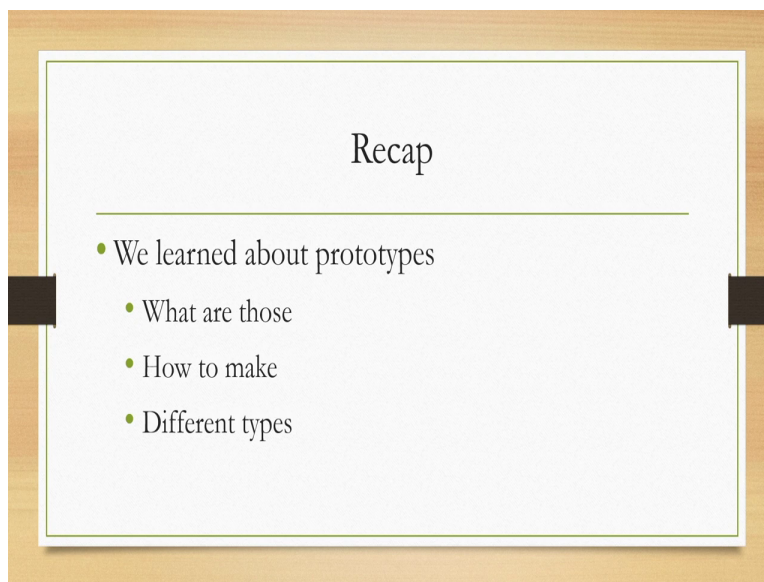
So, before we start let us quickly recap what we have learnt. So, far earlier we learned about prototypes namely what is a prototype and we learned about different prototypes also we learned about how to make prototypes and the different prototypes that we can make all these things we have learned in the earlier lectures that is one side that is what are prototypes and how to make them.

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We have also learned how to evaluate the prototypes in the design prototype evaluate cycle we need to build as well as evaluate the prototype. So, we have learnt 2 techniques for evaluation of prototypes rather quick evaluation of prototypes one is cognitive walkthrough and the other one is heuristic evaluation. I hope you can remember these techniques and in this lecture we are going to see how the prototypes can be built and how it can be evaluated using these techniques.

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So, we will specifically learn about building of prototypes and evaluation of those prototypes using a case study. So, that is our objective for this lecture.

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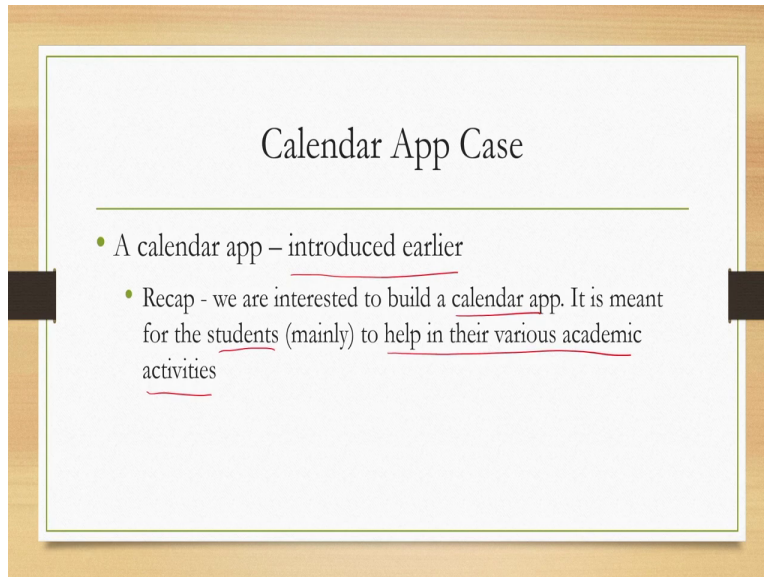
Before we go into the content let us quickly understand the case. So, we have already mentioned it before this is about the calendar app which we have introduced earlier. if you may recollect we are interested to build a calendar app it is meant for the students primarily for the students to help in their various academic activities. Now that is the requirement stated in a very broad manner and we have seen earlier how to gather the functional requirements for this calendar app and how to represent them in a hierarchical manner.

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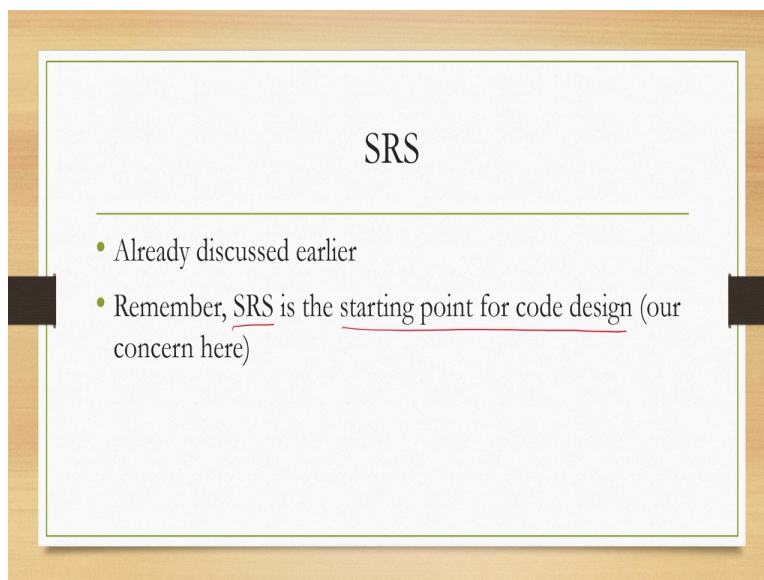
Let us quickly recollect the functional requirement hierarchy for this calendar app. We need that because what we have mentioned earlier is SRS or the software requirement specification

document is the starting point for design of the code as well as the interface. So, here our concern is to get the interface designed and evaluated rather than the code and for that also we will use the SRS document as the starting point to come up with an interface design that will support the functional requirements that are specified in the SRS document. So, let us quickly recap the SRS document for the calendar app that we have earlier gone through.

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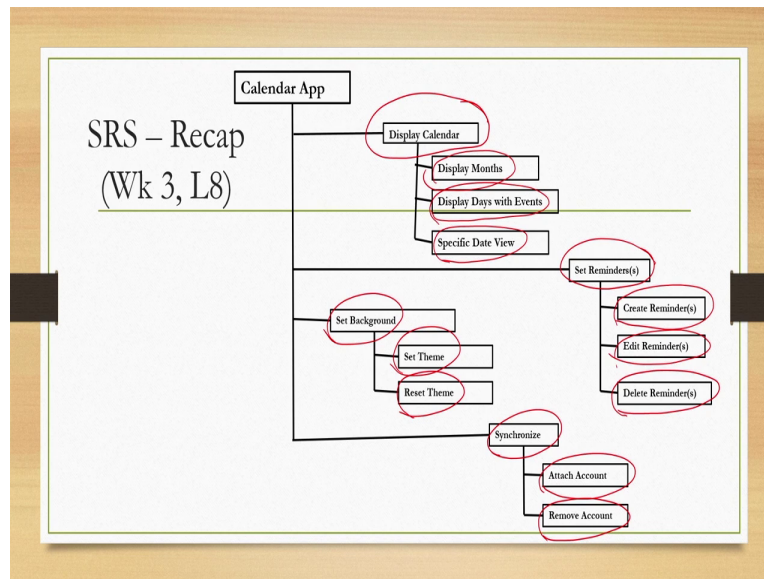
Particularly in lecture number 8 in the third week we have gone through this SRS document. Now the SRS document contains several functional requirements arranged in the form of a hierarchy the top level functions are there for example display calendar is one top level functions under which there are 3 sub functions display months display days with events and specific date view these are 3 sub functions under display calendar function at the top level.

Another top level function is set reminders here again there are 3 sub functions create reminders edit reminders and delete reminders. Then we have a third top level function set background under which there are 2 sub functions set theme and reset theme. We have a 4th top level function synchronize under which we have attach account and remove account these 2 subfunction.

So, this is the functional hierarchy which we converted to the SRS document and which will be the starting point of our interface design that means we are going to design an interface that will support these functions.

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Prototype with Cognitive Walkthrough
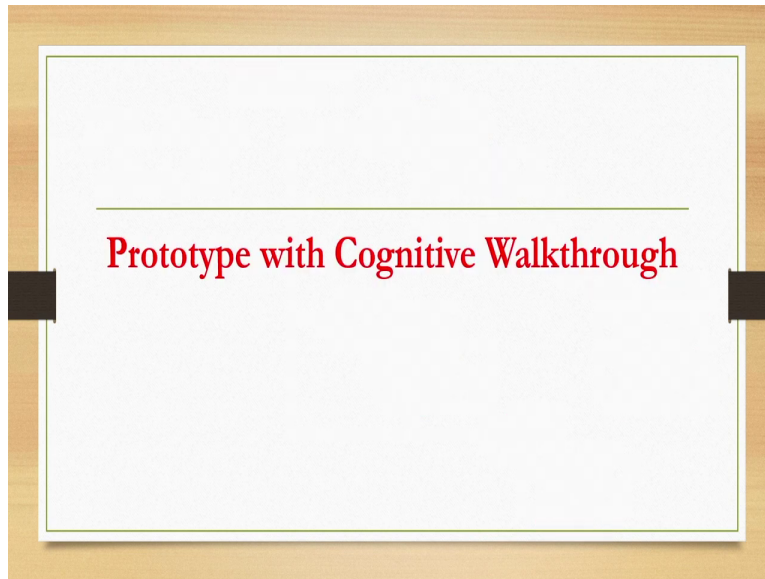
So, first we will talk about building the prototype and getting it evaluated with the cognitive walk through method. So, let us first see how we can build the prototype and how it looks. So, to perform cognitive walk through if you recollect we need at least a medium fidelity prototype or high fidelity prototype. In fact low fidelity can also work provided we design it in an appropriate manner however it should be a vertical prototype that is the important concern here.

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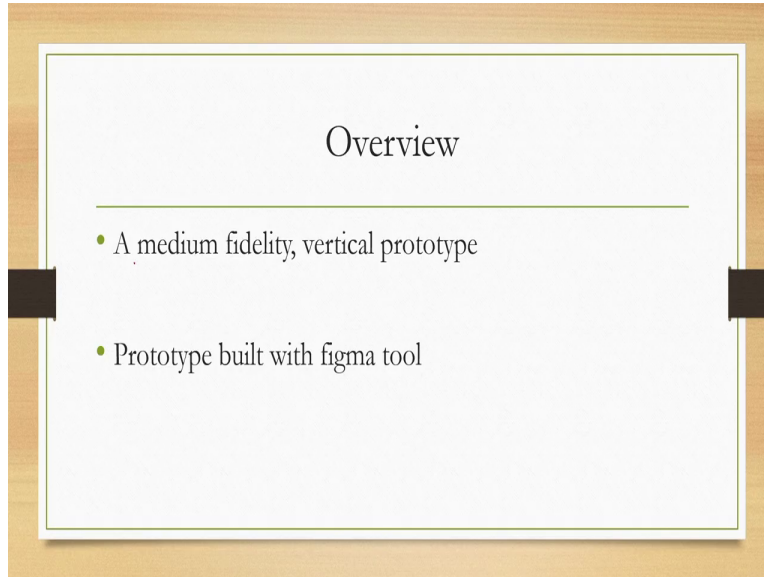
So, we need to create a vertical prototype and this prototype that we are going to discuss has been created with a tool called figma this is an online tool that you can also use to create prototypes.

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Now the prototype has several of the functions not all functions are being discussed here. Namely months in a year days in a month specific date set reminder edit reminder delete reminder set theme where you can select the theme and after theme is applied those views those things we have prototyped. Remember that here in this case study we are not designing a

prototype that supports all the functions that are present in the functional hierarchy a few functions are left out particularly synchronization.

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So, let us first quickly go through the interface how it looks like once the SRS is prototyped first we will see how the months in a year looks like when it appears on the interface. So, there are this 3 year-wise views are given say for 2 entry 21 we get to see January February March in this way similarly for 2020 to 2023. So, essentially it will be in the form of a matrix. For each year the months are shown in this manner.

So, it is a 3 by 4 matrix where there are 3 columns and 4 rows and the months along with the days in the month are arranged in this matrix form as shown in the view. Now this view is what we have prototyped to demonstrate the view of the months in a year.

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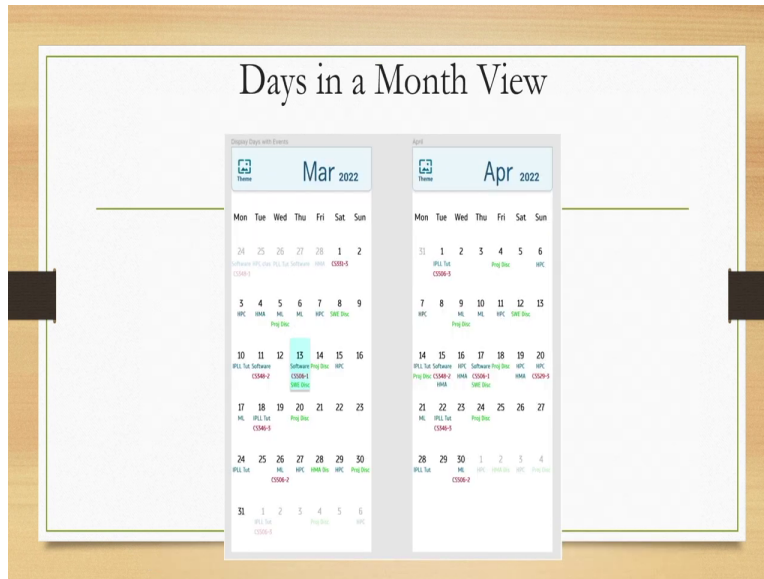
Next if we want to see the days in a month. So, in the earlier view those dates or days were shown in a very small manner which may not be properly visible. So, we want to enlarge it and see it in that case we can get a view like this. Remember that here we are not concerned about how we get this view only thing is this is the view for days in a month it can appear through tap it can appear through touch it can appear through strike or finger stroke.

Any interaction is fine or mouse click but we are more concerned about the view rather than the actual interaction. So, for example if we want to see a month say March 2022 or say April 2022 this is the kind of view that we will get where the days of the week are shown here Monday Tuesday Wednesday Thursday Friday Saturday Sunday and then we get to see the dates or the days in the month.

So, for example march 2022 starts from a Saturday and up to 31st of the month and additionally with each day we can display certain events along with it in the way shown here. So, that is the view that we want to create for our system.

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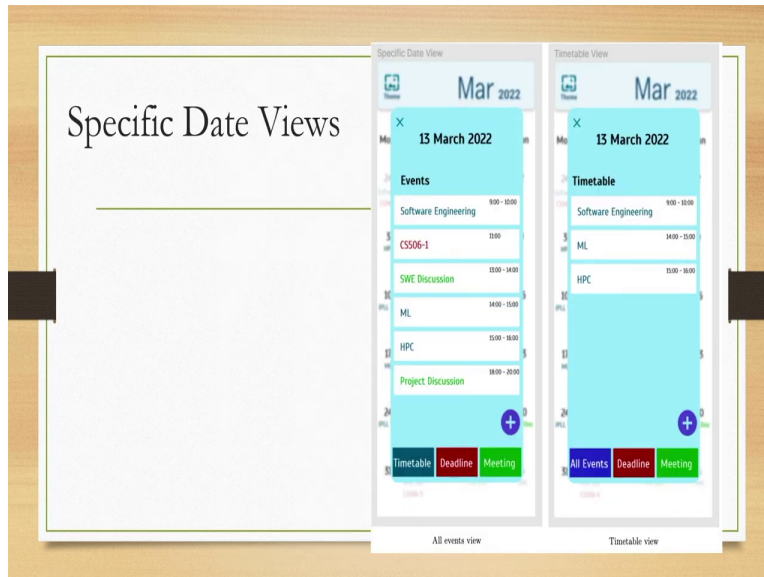
Now there is this specific date view. So, that is about the earlier view was about seeing all the days in a month. Now a specific day I want to see in details. So, then what kind of interface will appear what is our design that can be seen here in the form of this prototype for specific date views. So, for example 13th March 2022 it shows the events that are listed on this date software engineering CS506 some discussion some other topics along with time of the event project discussion along with time of the event.

So, this is all events view. Now in the bottom side as you can see we have different options time tables deadlines meetings. Now if we select time table then we will get a timetable view where only the classes will be shown that are there on that particular date software engineering ml high performance computing along with the class timings. So, here these other discussions like shown here in the under the all events view will not be shown.

So, this is what the specific date views look like and this is what we intend to design for the system.

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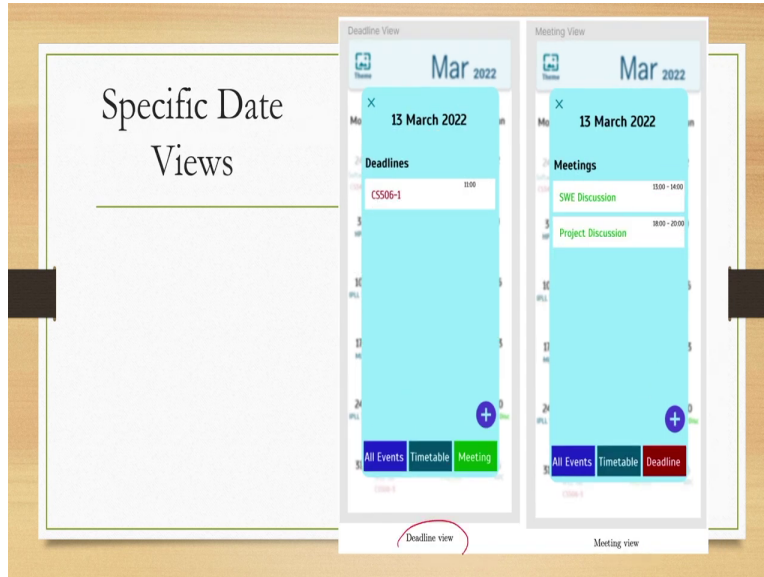
We can also have deadline view like a specific event deadline is there with the time or we can have meeting view. So, all the meetings will be listed under this view for a specific date. So, for a specific date either we can see all the events or we can see specific events like time table deadlines meetings and so on.

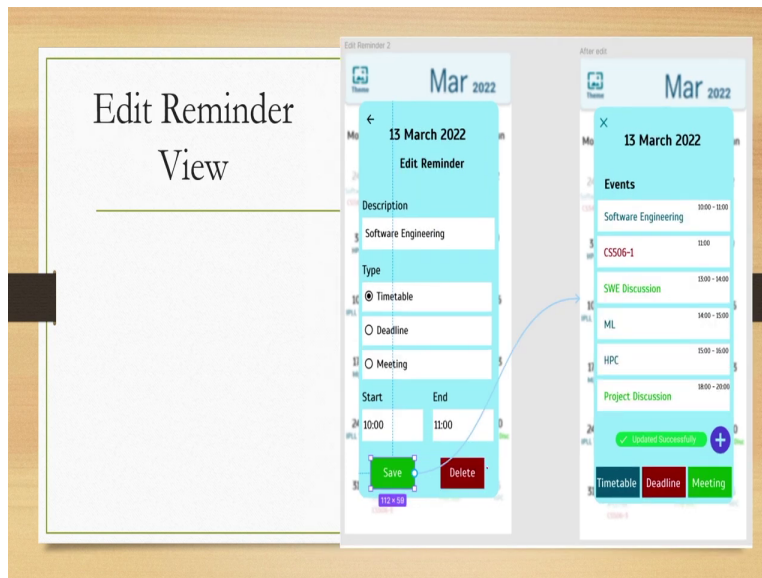**(Refer Slide Time: 11:30)**
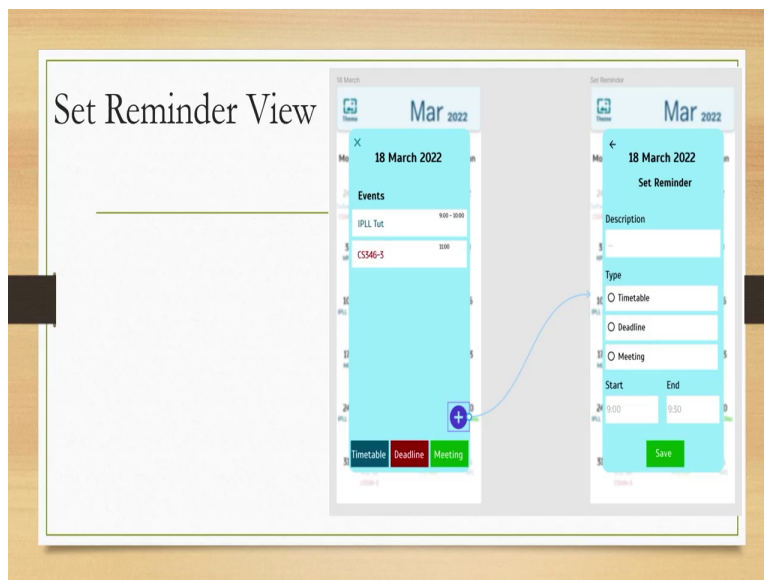
Next is the view for setting of reminders. So, for a specific date say 18th March there are some events and for some event we may set a reminder. So, this can be the place or this is the place in our design using which we can set the reminder. So, if we select this option plus then this screen will appear set reminder screen where you need to put some description and select the type with

the timetable deadline or meeting and the reminder and the event duration and then it will be saved.

So, there is this save option provided here. So, you can use the save option and then this reminder will appear with the event for that specific date as shown here. So, after save option is selected then the reminder appeared. We can also get a similar interface to edit the reminder the interface looks similar and there we can edit this reminder start and end times and save it.

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We can also delete a reminder with this delete option the interface more or less looks similar.
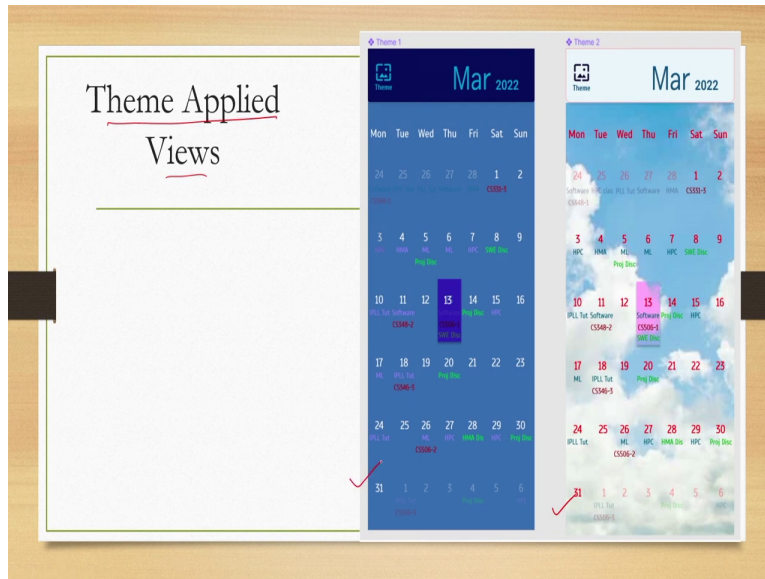
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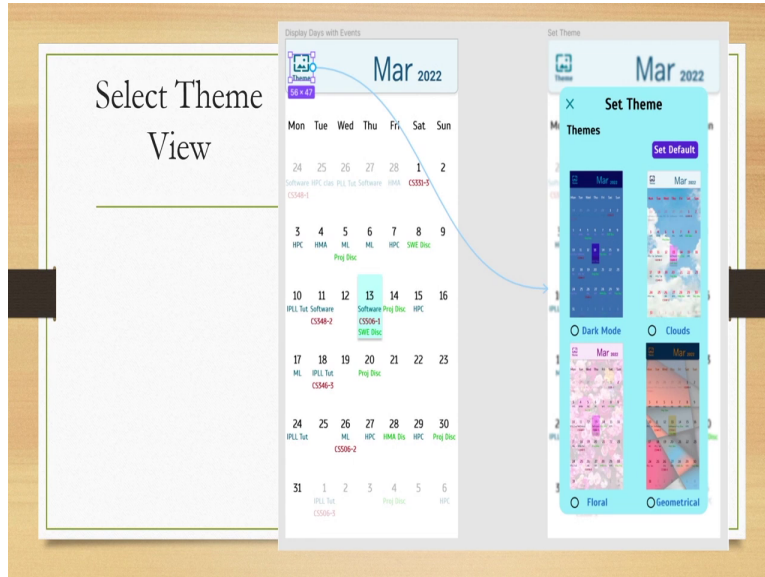
The next function that we prototyped is select theme. So, this is the view that we get to see when the select theme functionality is executed with the system. So, we have to remember here that by the use of the term view what we are referring to is that this is how the interface will look like if the system is implemented and this is what the user gets to see. So, there is this theme option present. Now once this is selected then different themes appear here.

So, this is the theme window here with this boundary. So, this is the window that appears having different themes like dark mode clouds geometrical floral and from here we can select a theme then once the theme is selected then we get theme applied view. So, if we have selected a specific cloud theme then it looks something like this or if you have selected dark mode then it looks something like this and so on.
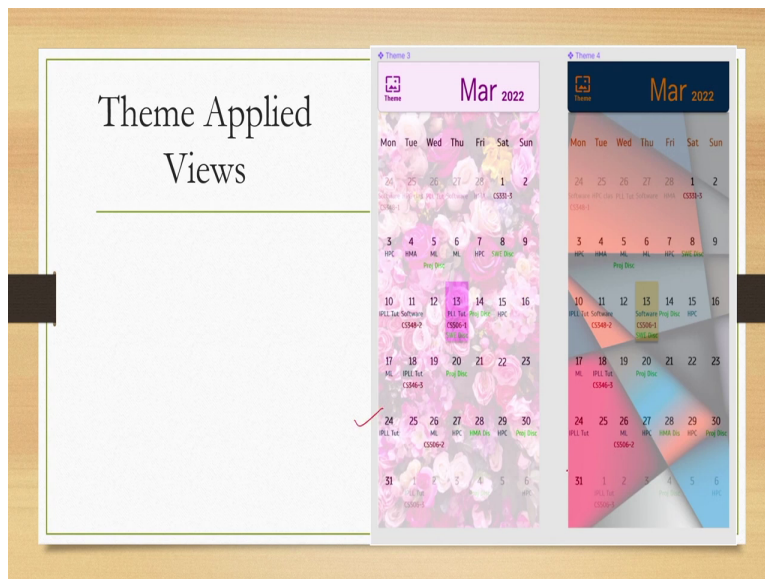
So, with the selection of the theme the theme gets applied on the interface and the user gets the corresponding view.

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Similarly the other 2 themes that we can apply plural as well as geometric themes and then these will be applied on the background of the interface.

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So, that is all about how the prototype looks and how we can implement the functional hierarchy that we have identified during the requirement identification phase to create the prototype. Just to recollect what we have just seen is how the interface appears to the users what the users get to see while using the system. And our objective here is to create the prototypes for those interfaces rather than actually writing a program to implement the system.
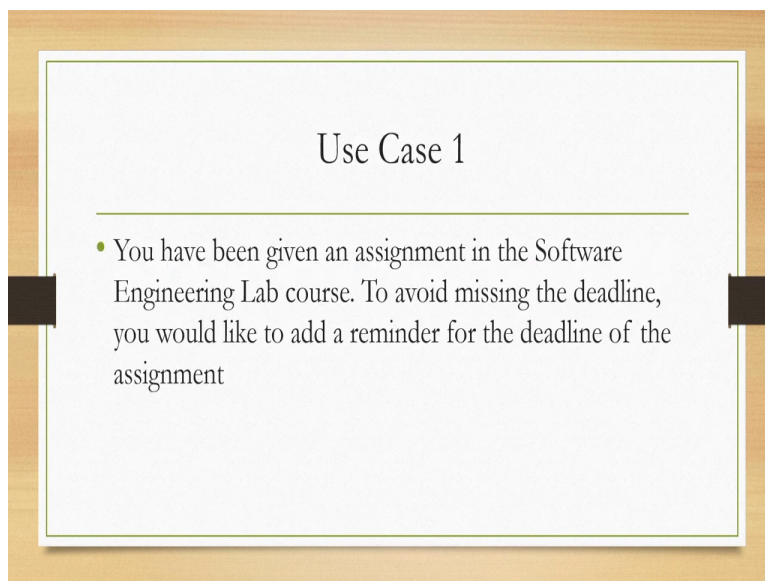
And those prototypes we can evaluate to see whether there are any usability issues with the design that we have come up with for implementing the interfaces. So, now our next task is once the prototype is ready we need to evaluate it.

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Use Cases for Cognitive Walkthrough
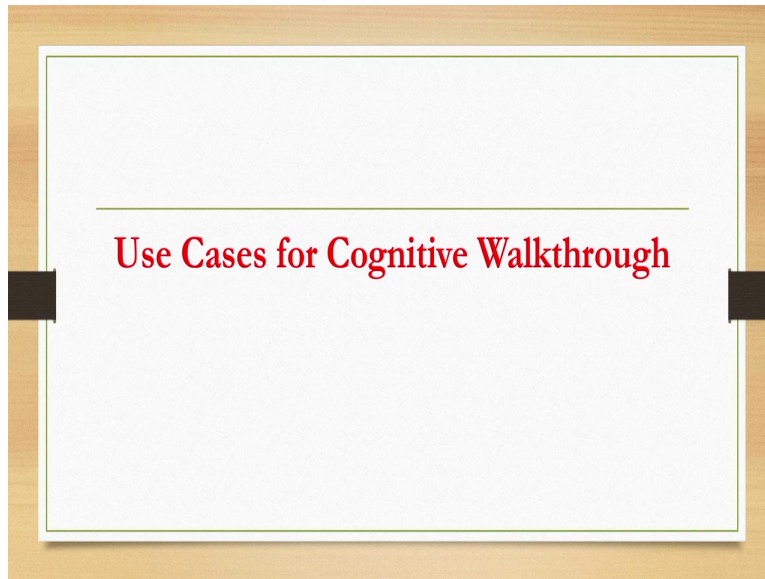
So, let us see for this particular that we have just seen how we can apply evaluation techniques. So, here we will first start with cognitive walkthrough and see how cognitive walkthrough can be applied to know if there are usability issues with the specific design that we have prototyped and just discussed.
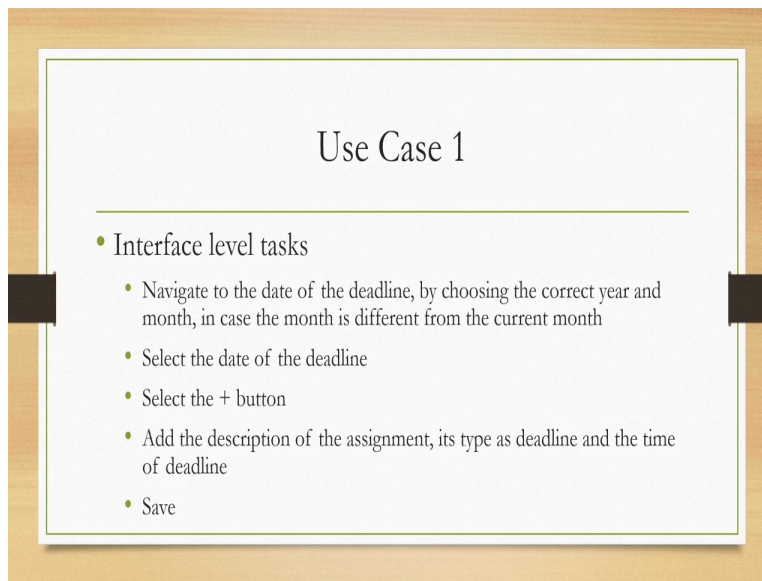
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Use Case 1

- You have been given an assignment in the Software Engineering Lab course. To avoid missing the deadline, you would like to add a reminder for the deadline of the assignment

Now if you may recollect for cognitive walkthrough you need to come up with a use case and you have to give this use case to the evaluators. So, they will try to use the interface with respect to the use case and then try to figure out problems if any and then create a report and finally those will be compiled together. So, let us see one use case related to the usage of the calendar by a student.

Suppose you have been given an assignment in the software engineering lab course to avoid missing the deadline you would like to add a reminder for the deadline of the assignment. So, essentially it is about setting a reminder for a particular assignment.
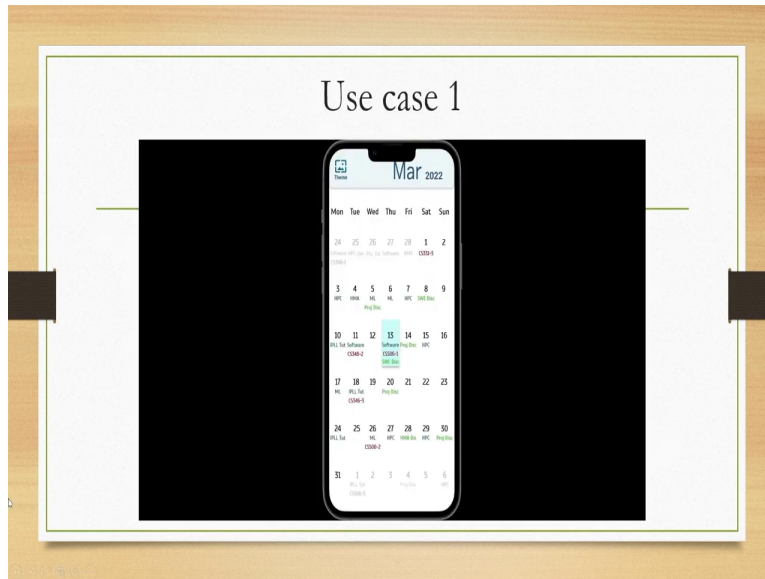
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Let us first try to identify what are the interface level tasks that means what are the tasks that the users are going to perform on the interfaces to achieve the objective that is setting of reminder first thing is user has to navigate to the date of the deadline by choosing the correct year and month in case the month is different from the current month. Then the user has to select the date of the deadline select the plus button to set reminders.
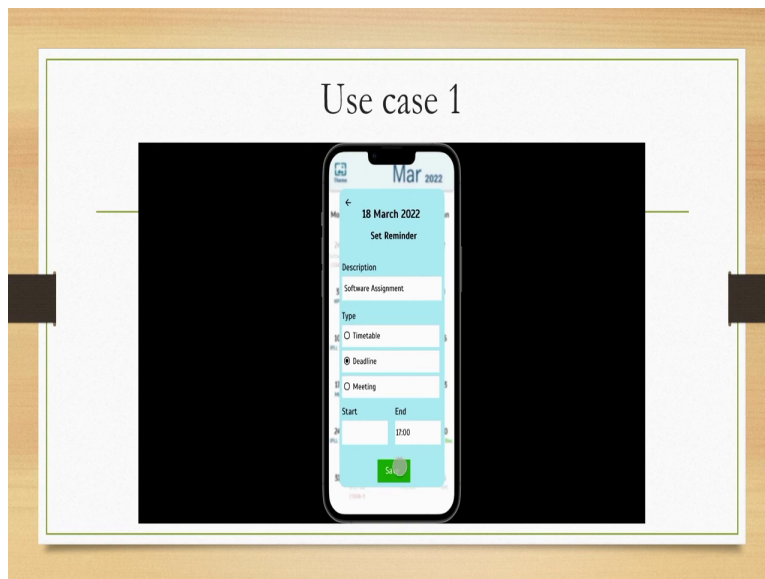
Add the description of the assignment its type as deadline and the time of deadline and finally save the reminder. So, these are the interface level tasks that the user needs to perform.
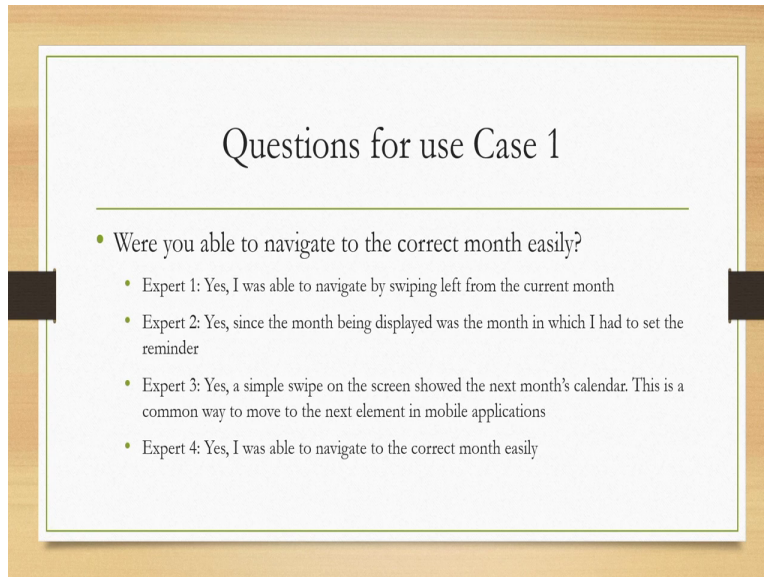
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Use case 1

So, this is this screen shows the scenario and here let us quickly see how these tasks can be performed.

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Use case 1

This is an animation for the activities to be done to achieve this objective of setting a reminder for a particular assignment okay. So, these are the things on the interface that we need to perform in sequence which we have just mentioned and seen in the video.

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Questions for use Case 1

- Were you able to navigate to the correct month easily?
  - Expert 1: Yes, I was able to navigate by swiping left from the current month
  - Expert 2: Yes, since the month being displayed was the month in which I had to set the reminder
  - Expert 3: Yes, a simple swipe on the screen showed the next month's calendar. This is a common way to move to the next element in mobile applications
 - Expert 4: Yes, I was able to navigate to the correct month easily

Now this use case is given to the evaluators. So, remember that for cognitive walkthrough we need a team consisting of between 3 to 5 evaluators who should not be part of the design team but there should be experts domain experts and they have to go through the use case perform the interface tasks on the prototype given and then come up with a report to help them prepare the report some questions can be supplied.

So, let us see few such questions for example suppose we have set this question where you able to navigate to the correct month easily. Now let us see different views expressed by the experts.. Expert one here the term. Expert essentially refers to a domain. Expert who is not part of the design team but who knows how to use a calendar. So,. Expert one says in response to the question yes I was able to navigate by swiping left from the current month with the prototype that is given.

Expert 2 also said yes since the month being displayed was the month in which I had to set the reminder.. Expert 3 again yes a simple swipe on the screen showed the next month's calendar this is a common way to move to the next element in mobile applications. So, some commentary also added.. Expert 4 said yes I was able to navigate to the correct month easily. There are of course some variations like. Expert 2's response is somewhat different than the other 3.

And everybody has their own way of looking at the things and prepare response for the question asked.

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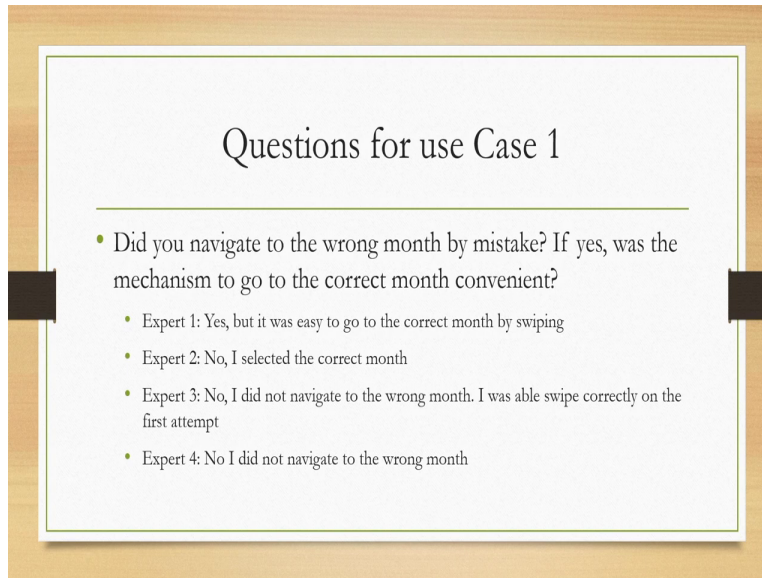
Then the next question is did you navigate to the wrong month by mistake if yes was the mechanism to go to the correct month convenient.. Expert one said, yes but it was easy to go to the correct month by swiping.. Expert 2 said no I selected the correct month. So, there was no error made. Expert 3 said no I did not navigate to the wrong month I was able to swipe correctly on the first attempt.
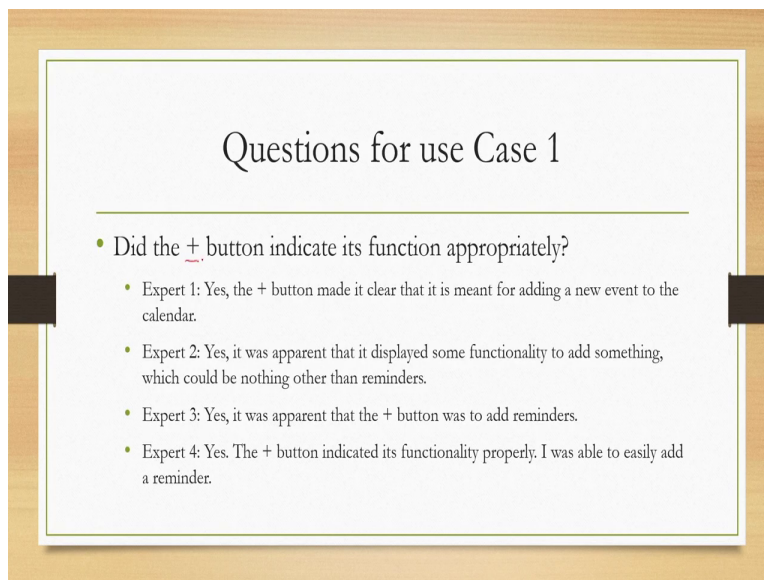
So, there again there was no error. Expert 4 mentioned no I did not navigate to the wrong one. So, from these responses we can make out that. Expert one probably made some mistake and then was able to come out of this erroneous situation easily whereas the other 3 experts did not make the mistake. Another question is was it apparent that you could add a reminder by clicking on the date or selecting the date.

Expert one said though it was not that apparent I did click the date to add a reminder on that date the events listed below the dates helped however I am not sure about how to add events in an effective manner which would span across more than a day that is a very relevant point added.. Expert 2 said yes not at first but I figured it out.. Expert 3 said that it was not completely

apparent but because there was not any other option for it in the default view it was extremely likely and accordingly he has figured it out.

Expert 4 said it was not apparent that I could add a reminder by clicking on the date I just happened to click on a date and was directed to that view that contained an option to add the reminder. So, from these 4 views it appears that the intuitiveness of adding a reminder is not very high with the current design.

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Next question did the plus button indicate its function appropriately. Expert one said yes the plus button made it clear that it is meant for adding a new event to the calendar. Expert 2 says yes it was apparent that it displayed some functionality to add something which could be nothing other than reminders. Expert 3 said yes it was apparent that the plus button was to add reminders and. Expert 4 said again yes the plus button indicated its functionality properly I was able to easily add a reminder. So, all agreed on this point.

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Questions for use Case 1

- Were the input fields in the set reminder window clearly visible and was their naming appropriate?
  - Expert 1: The input fields were clearly visible. However, for adding the deadline, both start and end was shown which confused me. I would have liked to have just an end time of the deadline.
  - Expert 2: Yes, the input fields were appropriately labeled and were visible.
  - Expert 3: Yes, the input fields were colored differently to the background. The labels
  - made it easy to understand the purpose of each input field.
  - Expert 4: Yes. The input fields in the set reminder were visible and their names clearly reflected what they were meant for.

Where the; input fields in the set reminder window clearly visible and was there naming appropriate. Expert one said the input fields were clearly visible however for adding the deadline both start and end was shown which confused me I would have liked to have just an end time of the deadline. Expert 2 said yes the input fields were appropriately labeled and were visible. Expert 3 said yes the input fields were coloured differently to the background the labels made it easy to understand the purpose of each input field.

And expert 4 said yes the input fields in the set reminder were visible and their names clearly reflected what they were meant for. So, essentially one expert disagreed with the naming convention but other 3 agreed.

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Questions for use Case 1

- Were you able to see the assignment after addition in the deadline view?
  - Expert 1: Yes, I was able to see the assignment added in the deadline view and it was also highlighted in the calendar. The "saved successfully" message also confirmed the addition of the assignment.
  - Expert 2: Yes, the deadline appeared in the deadline view with the banner displaying that it was added successfully.
  - Expert 3: I could see the event added correctly in the specific day view.
  - Expert 4: Yes. The assignment was visible in the deadline view after addition, I also liked that the assignments were sorted by time.

Were you able to see the assignment after adding in the deadline view that was the next question. Expert one said yes I was able to see the assignment added in the deadline view and it was also highlighted in the calendar the saved successfully message also confirmed the addition of the assignment. So, this is a very important observation made by the expert that there was actually a feedback. Expert 2 again said yes the deadline appeared in the deadline view with the banner displaying that it was added successfully.

So, the same feedback is mentioned by. Expert 2 as well expert 3 also said I could see the event added correctly in the specific day view although he did not mention about the feedback. Expert 4 said yes the assignment was visible in the deadline view after addition I also liked that the assignments were sorted by time. So, some other feature was highlighted by the expert.

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Use Case 2

- Due to some unavoidable circumstances, your class for the Software Engineering course today has been shifted to 10:00 am to 11:00 am. You would like to edit the reminder for the class with updated timings

So, that was about one use case 4 experts were appointed to evaluate the interface and they were given this particular use case and asked 5 questions on which they provided their response. Now let us see another use case due to some unavoidable circumstances your class for the software engineering course today has been shifted to 10 am from 10 am to 11 am you would like to edit the reminder for the class with updated timings. So, now the task is to edit the reminder.

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Use Case 2

- Interface level tasks
  - Select today's date
  - Select the Software Engineering class event
  - Edit the start and end time fields to 10:00 am and 11:00 am respectively
  - Save

What are the interface level tasks select today's date select the software engineering class event edit the start and end time fields to 10 am and 11 am respectively and finally save it.
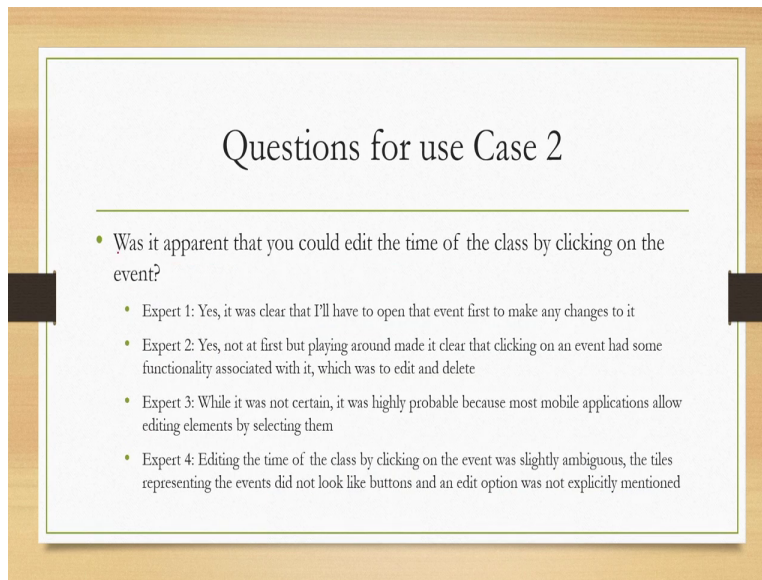
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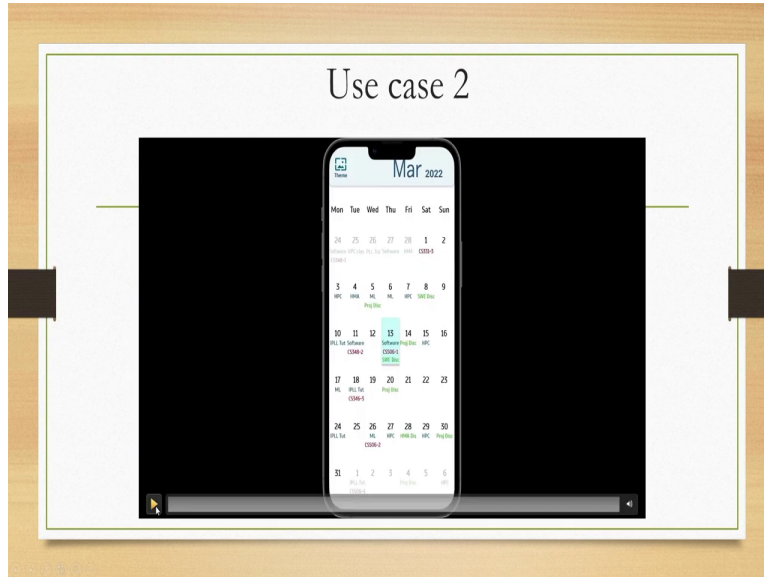
So, this is how this interface level tasks can be performed. Again you can see the video and get an understanding of how the interface level tasks can be performed.

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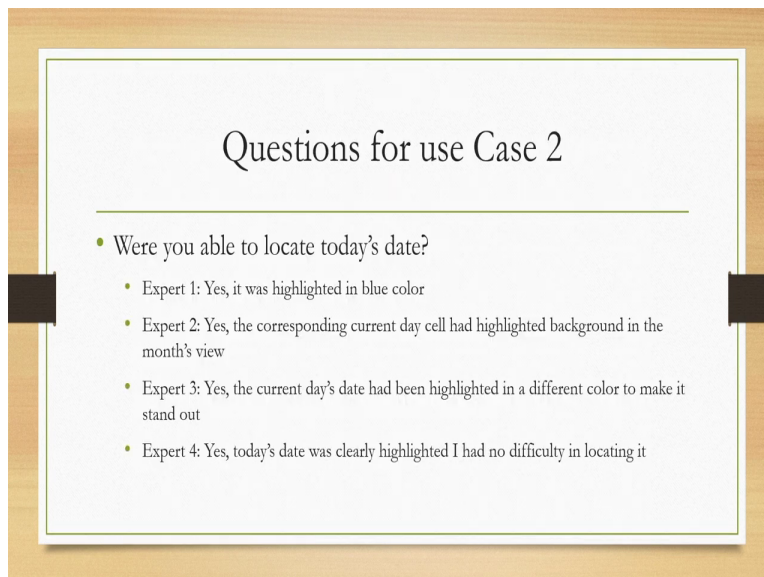
Again few questions were asked to the evaluators to the experts and their responses were collected. First question were you able to locate today's date. Expert 1 said yes it was highlighted in blue colour. Expert 2 said yes the corresponding current day cell had highlighted background in the months view. Expert 3 said yes the current days date had been highlighted in a different colour to make it stand out and. Expert 4 said yes today's date was clearly highlighted I had no difficulty in locating it. So, all could see the date.

Next question was, was it apparent that you could edit the time of the class by clicking on the event. Expert 1 said yes it was clear that I will have the have to open the event first to make any changes to it. Expert 2 said yes not at first but playing around made it clear that clicking on an event had some functionality associated with it which was to edit and delete. Expert 3 mentioned while it was not certain it was highly probable because most mobile applications allow editing elements by selecting them.

So, expert 3 actually bringing in the learning from similar apps which expert had used earlier. Expert 4 said editing the time of the class by clicking on the event was slightly ambiguous the tiles representing the events did not look like buttons and an edit option was not explicitly mentioned. So, it was not very intuitive to the expert.

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Questions for use Case 2

- Was it apparent that the fields were editable?
    - Expert 1: It wasn't apparent from the fields itself. But the window popped up showing edit reminder made it clear that I can edit the fields
    - Expert 2: Yes, clicking the fields made them turn into edit mode, then it could be edited
    - Expert 3: The "Edit Reminder" heading at the top made me confident that the fields here were editable. This was confirmed when I clicked on the input field
    - Expert 4: Yes it was apparent that the fields were editable , as the fields either closely resembled text boxes or radio buttons

Next question is was it apparent that the fields were editable. Expert one said it was not apparent from the fields itself but the window popped up showing edit reminder made it clear that I can edit the fields. Expert 2 said yes clicking the fields made them turn into edit mode then it could be edited. Expert 3 said the edit reminder heading at the top made me confident that the fields here were editable this was confirmed when I clicked on the input fields.

Expert 4 yes it was apparent that the fields were editable as the fields either closely resemble text boxes or radio buttons. So, there is clearly a division in opinion some say it is apparent some thought it is not apparent and those who said it is apparent they probably used their knowledge of similar apps to infer that the particular functionality can be done with this particular interactio.

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Questions for use Case 2

- Did you make an error while editing and saving? If yes, was the mechanism to correct it convenient?
  - Expert 1: No, I was able to correctly edit the time fields and save it.
  - Expert 2: No, I correctly edited the fields and saved successfully.
  - Expert 3: Yes, while editing the event; I deleted the event by mistake. So, I had to make a new event with the same details. It would be better if you could give a warning, or ask for confirmation before deletion.
  - Expert 4: No. I did not make an error while editing and saving.

Next question was did you make an error while editing and saving if yes was the mechanism to correct it convenient. Expert one said no I was able to correctly edit the time fields and save it. So, no error met. Expert 2 also said no error met I correctly edited the fields and saved successfully. Expert 3 said that yes while editing the event I deleted the event by mistake. So, I had to make a new event with the same details it would be better if you could give a warning or ask for confirmation before deletion.

So, some feedback mechanism is required which was not present in the prototype or rather in the design. Expert 4 said, no I did not make an error while editing and saving. So, only one expert made an error and according to the expert the feedback regarding the error should be there which was missing.
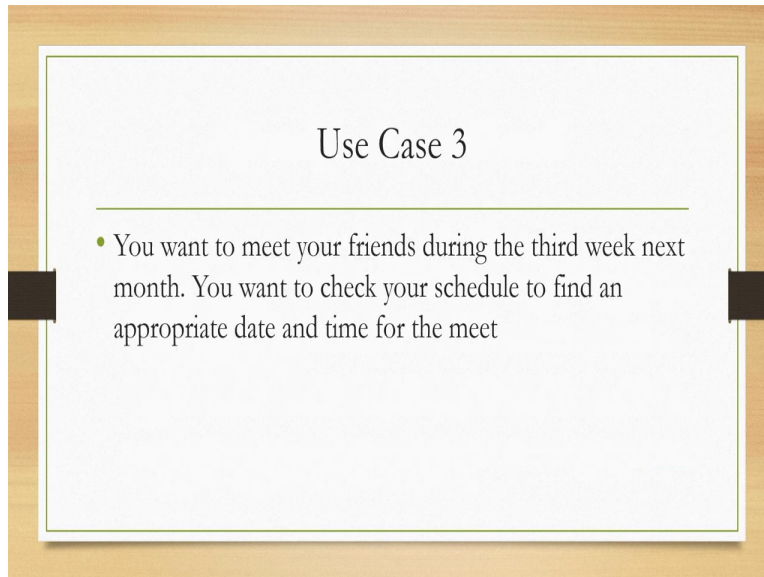
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Questions for use Case 2

- Were you able to see the class event with updated timings?
  - Expert 1: Yes, I was able to see the "Updated successfully" message, along with the update in the timings of the event
  - Expert 2: Yes, it was visible in the events view for a particular date, and banner was displayed showing a successful update.
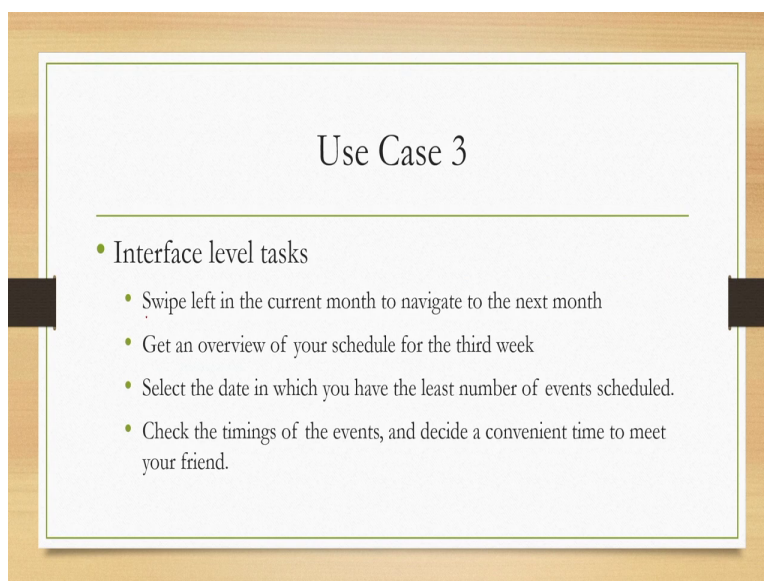 - Expert 3: Yes, after saving the edited reminder, the class timings had been updated in other views too.
  - Expert 4: Yes I was able to see the class event with updated timings, the green pop up indicating that the update is successful made the process transparent.

The next question was where are you able to see the class event with updated timings. Expert one said yes I was able to see the updated successfully message along with the update in the timings of the event. Expert 2 also said yes in fact all experts said yes expert 3. Expert 4 it was visible in the events view for a particular date according to. Expert 2 and banner was displayed showing a successful update. Expert 3 said yes after saving the edited reminder the class timings had been updated in the other views too.

Similarly expert 4 said yes I was able to see the class event with updated timings the green pop-up indicating that the update is successful made the process transparent. So, most of the experts appreciated the feedback given regarding the operation.

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Use Case 3

- You want to meet your friends during the third week next month. You want to check your schedule to find an appropriate date and time for the meet

Let us consider another use case you want to meet your friends during the third week in the next month you want to check your schedule to find out find an appropriate date and time for the meet.

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Use Case 3

- Interface level tasks
  - Swipe left in the current month to navigate to the next month
  - Get an overview of your schedule for the third week
  - Select the date in which you have the least number of events scheduled.
  - Check the timings of the events, and decide a convenient time to meet your friend.

So, what are the interface level tasks swipe left in the current month to navigate to the next month get an overview of your schedule for the third week in the month view itself select the date in which you have the list number of events scheduled even better if you have a date where no events is scheduled check the timings of the events and decide a convenient time to meet your

friend. So, these are the interface level tasks that you need to perform to create an appointment with a friend.

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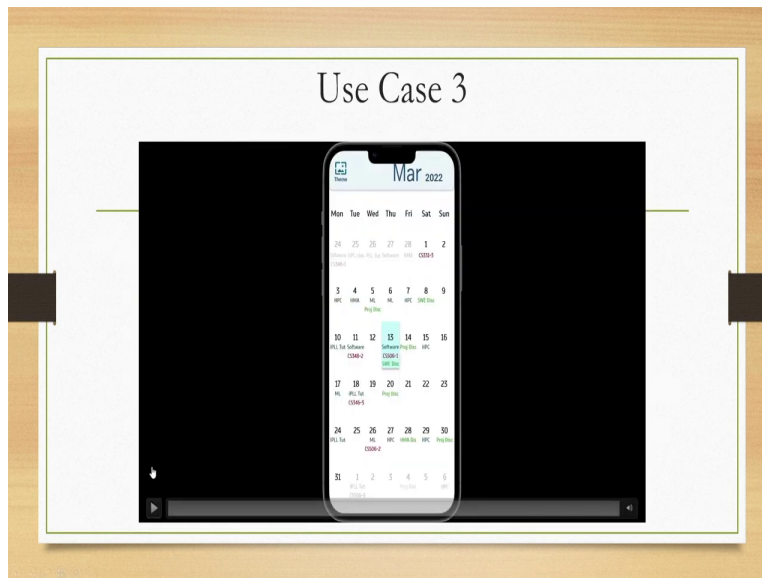
Let us quickly see through a video how these interface level tasks can be achieved can be performed with the prototype. As you can see swipe left then minimum event day then appointment fixing. So, that is how you can schedule an appointment.

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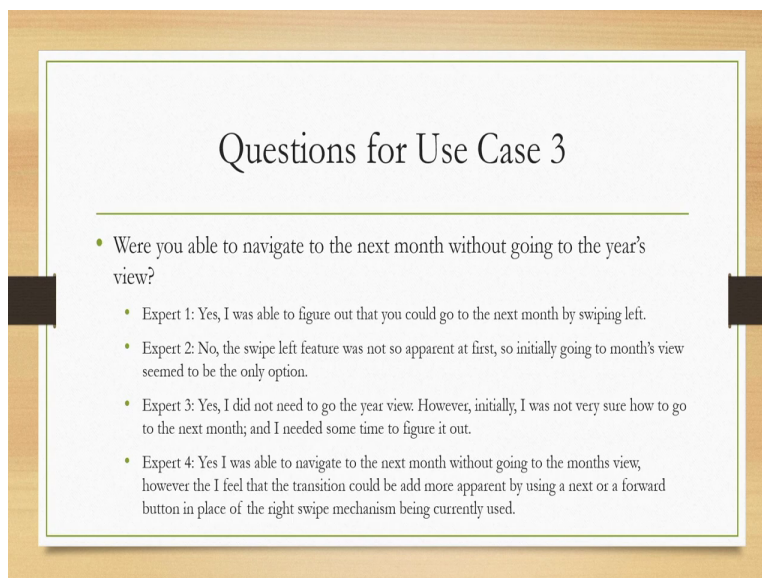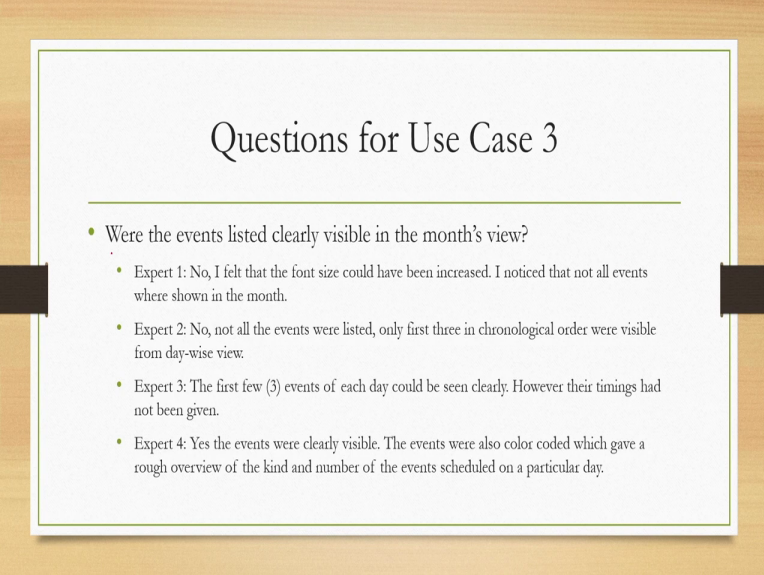
Similar to the earlier use cases here also the experts asked few questions and their responses were collected first question was where you able to navigate to the next month without going to

the year's view. Expert one said yes I was able to figure out that you could go to the next month by swiping left. Expert 2 also was asked the same question and his response was no the swipe left feature was not so, apparent at first.

So, initially going to months view seemed to be the only option. Expert 3 said yes I did not need to go to the year view however initially I was not very sure how to go to the next month and I needed some time to figure it out. Expert 4 said yes I was able to navigate to the next month without going to the months view however I feel that the transition could be made more apparent by using a next or a forward button in place of the swipe mechanism being currently used.

So, in response to this particular question asked the experts had different opinions along with some suggestions.

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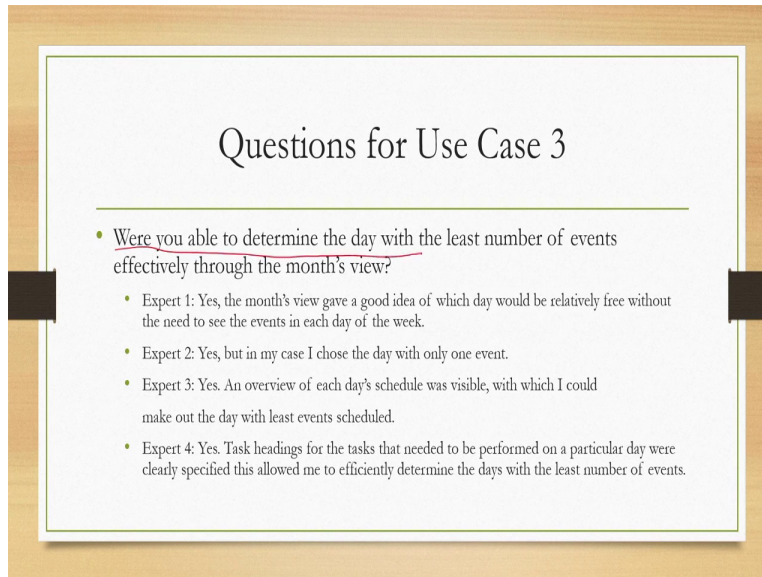
Next question asked was where the events listed clearly visible in the months view. Expert 1 said no I felt that the font size could have been increased I noticed that not all events were shown in the month. Expert 2 said no not all the events were listed only first 3 in the chronological order were visible from day wise view. Expert 3 said the first few 3 events of each day could be seen clearly however their timings had not been given.

And expert 4 said yes the events were clearly visible the events were also colour coded which gave a rough overview of the kind and number of the events scheduled on a particular day. Again here majority disagreed that they were clearly visible only one agreed. So, that is a very interesting finding.

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Third question asked was where are you able to determine the day with the least number of events effectively through the month's view. Expert once said yes the month's view gave a good idea of which day would be relatively free without the need to see the events in each day of the week. Expert 2 also said yes but in my case I choose the day with only one event. Expert 3 again yes an overview of each day schedule was visible with which I could make out the day with list events scheduled.

And expert 4 also conquered that yes task headings for the tasks that needed to be performed on a particular day were clearly specified this allowed me to efficiently determine the days with the least number of events. So, all agreed in this particular response.

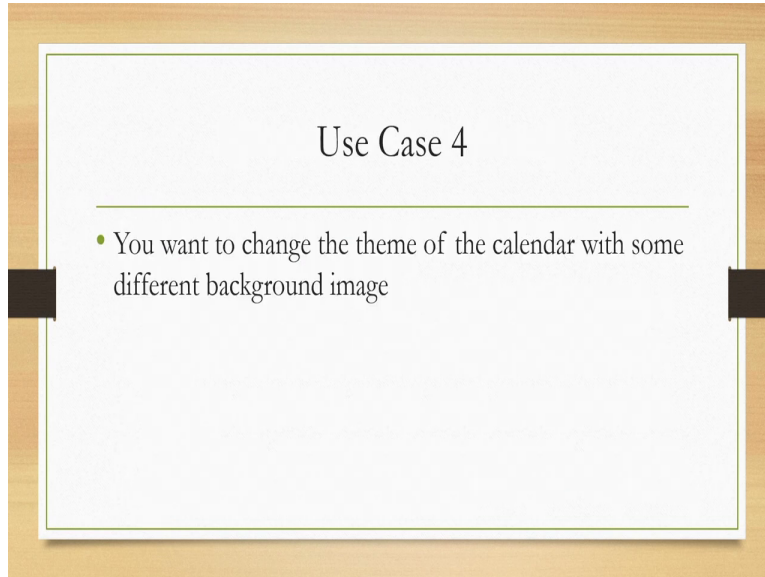**(Refer Slide Time: 35:25)**

Questions for Use Case 3

- Were you able to decide a convenient time to meet your friend which doesn't clash with the other events in the day?
  - Expert 1: Yes, after viewing the events in the day with least number of events, I was able to decide a convenient time. The events being displayed in the sorted order of time helped.
  - Expert 2: Yes, I chose 12:00 hrs to 16:00 hrs slot on 18th April as it had the least number of events.
  - Expert 3: Yes, I could see the timings of all events on that day, and decide an appropriate time accordingly.
  - Expert 4: Yes , I could easily decide a convenient time to meet with my friend on a given day. The events scheduled on a given day were clearly specified and were sorted by time, this allowed me to efficiently decide a convenient time to meet with my friend

Next question were you able to decide a convenient time to meet your friend which does not clash with the other events in the day. Note that all the questions are related to the interface level tasks and each question has one to one correspondence to the tasks that need to be performed at the interface level to achieve the objective. So, in response to this question expert 1 said yes after viewing the events in the day with least number of events I was able to decide convenient time the events being displayed in the sorted order of time helped.

So, some feature that helped the expert was also mentioned by the expert. Expert 2 said yes I choose 12 hours to 16 hour slot on 18th April as it had the least number of events. Expert 3 said yes I could see the timings of all events on that day and decide an appropriate time accordingly. Expert 4 also said yes I could easily decide a convenient time to meet with my friend on a given day the events scheduled on a given day were clearly specified and were sorted by time.

So, the same feature is highlighted by this expert as well which is helpful this allowed me to efficiently decide a convenient time to meet with my friend. So, here again everybody conquered with the view that they were able to decide a convenient time without any problem.

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Use Case 4

• You want to change the theme of the calendar with some different background image

Let us see one more use case you want to change the theme of the calendar with some different background image. So, if this is the use case then what are the interface level tasks. Click on the figure icon click or select by some means on the figure icon which is labeled as theme select the theme that you wish to apply. So, these are the interface level tasks.

(Video Starts: 37:34)

 Let us quickly see the video on how it can be achieved so here the theme option is selected then the themes appeared and then a particular theme is used and the theme is applied.

(Video Ends: 37:47)

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Questions for Use Case 4

- Were you able to set theme correctly?
  - Expert 1:Yes, the icons were labeled appropriately, rest of the procedure was simple
  - Expert 2:Yes, I could easily set the theme
  - Expert 3:Yes, I applied the theme without any problems
  - Expert 4:Yes, I could easily apply the theme

So, the questions that were asked were you able to set theme correctly. Expert 1 said yes the icons were labeled appropriately rest of the procedure was simple. Expert 2 said yes I could easily set that theme. Expert 3 also concurred yes I applied the theme without any problems. So, is expert 4 who said yes I could easily apply the theme. So, nobody faced any issue. Apart from these specific questions some general questions were also asked to the experts.

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General Questions about the Prototype

- Was there any component in the interface which you could not understand?
  - Expert 1: No, I was able to understand all the components of the interface as they have clear functions
  - Expert 2: Most of the things were fairly easy to grasp other than the year view where the months in a year were displayed. The swiping action though was not apparent at first but is fairly easy to grasp.
  - Expert 3: The swipe method to change to adjacent months and years was not understandable at first. Also, changing to year view from month view by clicking on the year was not clearly visible. Editing a reminder was also not very clear at first. However, when I used the app for some time, I was able to understand each component
  - Expert 4: I was able to understand all the components in the interface. For the large part, the interface was intuitive and easy to use and the functions that were performed by individual components were clear
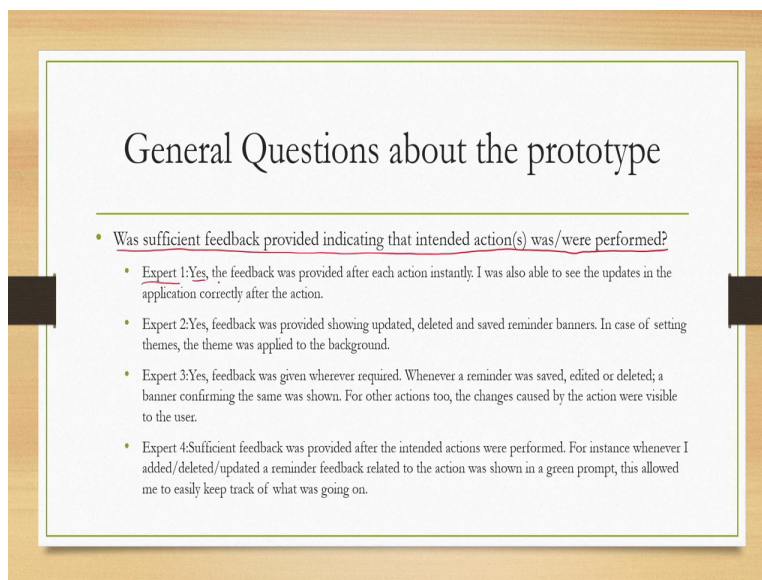
For example was there any component in the interface which you could not understand unrelated to any use case this is a general question. Expert one said no I was able to understand all the components of the interface as they have clear functions. Expert 2 said most of the things were

fairly easy to grasp other than the year view where the months in a year were displayed. The swiping action though was not apparent at first but it is fairly easy to grasp.

Expert 3 said the swipe method to change to adjacent months and years was not understandable at first also changing to your view from month view by clicking on the year was not clearly visible. Editing reminder was also not very clear at first however when I used the app for some time I was able to understand each component. So, initially those were problematic as per expert 3 but once a user gets familiar there are no issues.

Expert 4 said I was able to understand all the components in the interface for the large part the interface was intuitive and easy to use and the functions that were performed by individual components were clear that is the view of expert 4.

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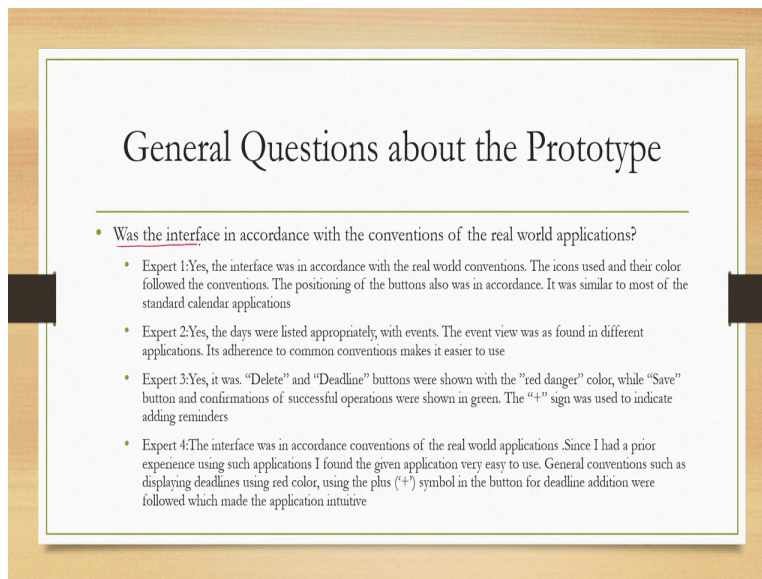
General Questions about the prototype

- Was sufficient feedback provided indicating that intended action(s) was/were performed?
  - Expert 1:Yes, the feedback was provided after each action instantly. I was also able to see the updates in the application correctly after the action.
  - Expert 2:Yes, feedback was provided showing updated, deleted and saved reminder banners. In case of setting themes, the theme was applied to the background.
  - Expert 3:Yes, feedback was given wherever required. Whenever a reminder was saved, edited or deleted; a banner confirming the same was shown. For other actions too, the changes caused by the action were visible to the user.
  - Expert 4:Sufficient feedback was provided after the intended actions were performed. For instance whenever I added/deleted/updated a reminder feedback related to the action was shown in a green prompt, this allowed me to easily keep track of what was going on.

Another general question asked was sufficient feedback provided indicating that intended actions was or were performed successfully or unsuccessfully. Expert one said yes the feedback was provided after each action instantly I was also able to see the updates in the application correctly after the action. Expert 2 said yes feedback was provided showing updated deleted and saved reminder banners in case of setting theme the theme was applied to the background.

Expert 3 also said yes feedback was given wherever required whenever a reminder was saved edited or deleted a banner confirming the same was shown for other actions too the changes caused by the actions were visible to the user. Expert 4 also conquered that sufficient feedback was provided after the intended action was performed. For instance whenever I added deleted or updated a reminder feedback related to the action was shown in a green prompt this allowed me to easily keep track of what was going on. So, everybody agreed with the feedback.

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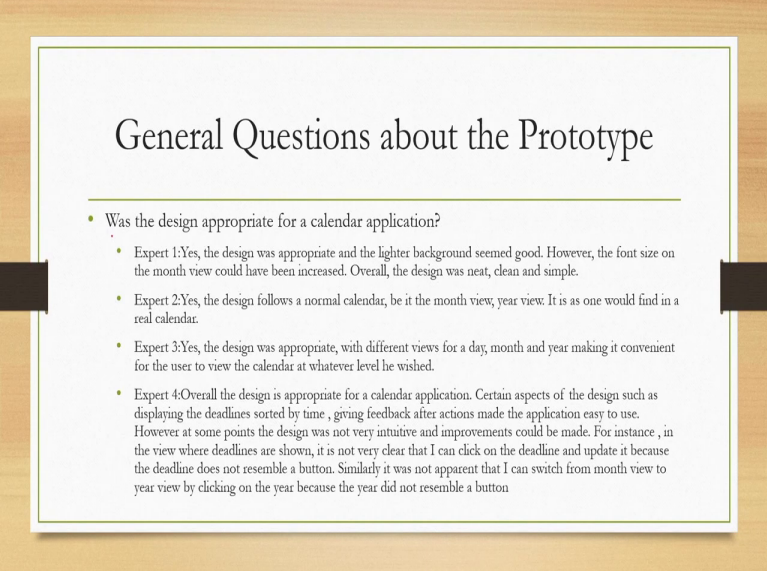
Another general question was the interface in accordance with the conventions of the real world applications as per their understanding. Expert one said yes the interface was in accordance with the real world conventions the icons used and their colour followed the conventions. The positioning of the buttons also was in accordance it was similar to most of the standard calendar applications according to expert 1.

Expert 2 also said yes the days were listed appropriately with events the event view was as found in different applications its adherence to common conventions makes it easier to use. Expert 3 said yes it was in accordance with the conventions delete and deadline buttons were shown with the red danger colour file save button and confirmation of successful operations were shown in green the plus sign was used to indicate adding reminders which according to the expert are in accordance with the conventions.

Expert 4 said the interface was in accordance with conventions like the other experts conventions of the real world applications. Since I had a prior experience using such applications I found the given application very easy to use general conventions such as displaying deadlines using red colour using the plus symbol in the button for deadline addition were followed which made the application intuitive. So, everybody found that the conventions colour schemes icons that are used are in accordance with the real world conventions.

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Was the design appropriate for a calendar application that is a very broad and generic question asked to the evaluators for their opinions response. Let us see how they responded. Expert one said yes the design was appropriate and lighter background seemed good however the font size on the month view could have been increased overall the design was neat clean and simple. Expert 2 said yes the design follows a normal calendar be it in the month view year view it is as one would find in a real calendar.

Expert 3 also said yes the design was appropriate with different views for a day month and year making it convenient for the user to view the calendar at whatever level he wished. Expert 4 said overall the design is appropriate for a calendar application certain aspects of the design such as displaying the deadlines sorted by time giving feedback after actions made the application easy to use however at some points the design was not very intuitive and improvements could be made.

For instance in the view where deadlines are shown it is not very clear that I can click on the deadline and update it because the deadline does not resemble a button. Similarly it was not apparent that I can switch from month view to year view by clicking on the year because the year did not resemble a button. So, some concerns were flagged by the expert. So, that is the response rather these are the responses collected from the evaluators based on some use cases as well as some open general questions.

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Now from these we need to compile them together and identify the issues through some analysis of the responses. So, the analysis reveals that each evaluator was able to perform the tasks smoothly and achieve the required objective they were all satisfied with the overall experience. The controls for essential actions such as addition deletion updation of events were provided through buttons which reflected their intended purpose as revealed by the experts.

Whenever the user performed some action the app went through visible changes the feedback was provided by the app to the user whenever the user added edited or deleted reminder. Although errors were made by the evaluators at some point they were able to recover from the error. One evaluator faced an error when he mistakenly deleted the reminder and had to go through the process of adding the reminder again. It would be better if we could show a

confirmation prompt before saving or deleting a reminder. So, here some refinement in design is required to address the constant raised by the evaluator.

The interface is similar to most of the other calendar applications at some points the steps to achieve the desired functionality were not apparent but the evaluators experience with other similar applications guided them. So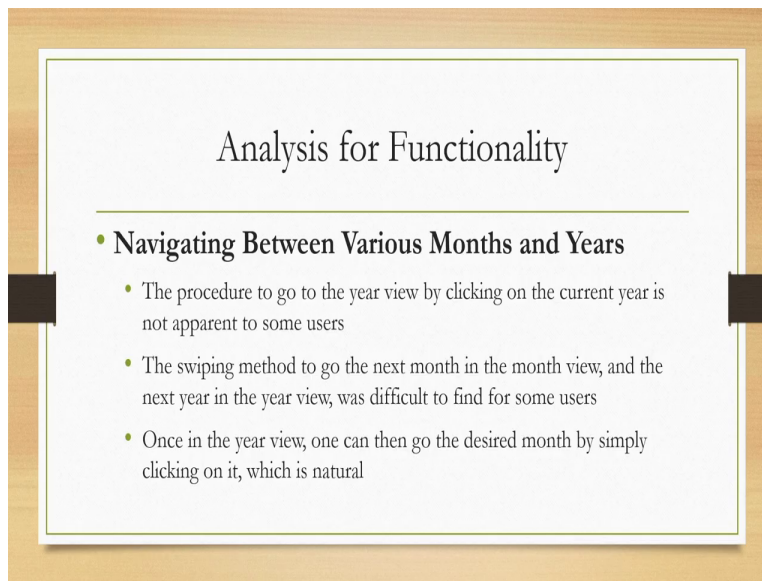, there is a potential point of concern where things are not very intuitive and it expects the user to have some prior knowledge of using similar systems. For novice or intermittent users probably such modifications are required for expert users the design is all right.

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So, at the level of functionality if we analyze the responses provided by the evaluators we can find out several things. Navigating between various months and years in this case what we found out through the evaluation is that the procedure to go for to the year view by clicking on the current year is not apparent to some users. So, this is a point of concern. The swiping method to go to the next month in the month view and the next year in the year view was difficult to find for some users.

Once in the year view one can then go to the desired month by simply clicking on it which is natural. So, there is no issue with that.

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Analysis for Functionality

- Viewing the events of a specific day
  - The procedure to view the events of a specific day is quite intuitive and clear
  - By simply clicking on the day in the month view, we can view all events of that day
  - These events are sorted in order of their start time. Further, clearly labeled buttons give the user the option of seeing a particular type of event (timetable / deadline / meeting)
  - Each type of event is assigned its own color. So the user can easily make out the type by looking at the event

Viewing the events of a specific day the procedure to view the events of a specific day is quite intuitive and clear as revealed by the responses by simply clicking on the day in the month view we can view all events of the day which is apparent to the users. These events are sorted in order of their start time further clearly labeled buttons give the user the option of seeing a particular type of event timetable deadline or meeting each type of event is assigned its own colour.

So, the user can easily make out the type by looking at the event. These are some positive sides of the design.

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Analysis for Functionality

- Add/Edit/Delete Events
  - The '+' button for adding events gives the user a clear indication of its purpose
  - The procedure for editing/deleting events, though, is not very obvious
  - Users did not feel confident that clicking on the event would enable them to perform those operations
  - Once in the add/edit reminder view, users can easily save the events with appropriate details
  - It would be better to ask for confirmation before saving changes, to handle errors

Regarding add edit delete events the plus button for adding events gives the user a clear indication of its purpose as revealed by the responses. The procedure for editing deleting events though is not very obvious this is one point of concern, users did not feel confident that clicking on the event would enable them to perform those operations. So, that is another point of concern that the users are not very confident.

Once in that edit reminder view users can easily save the events with appropriate details it would be better to ask for confirmation before saving changes to handle errors. So, this is another point of concern.

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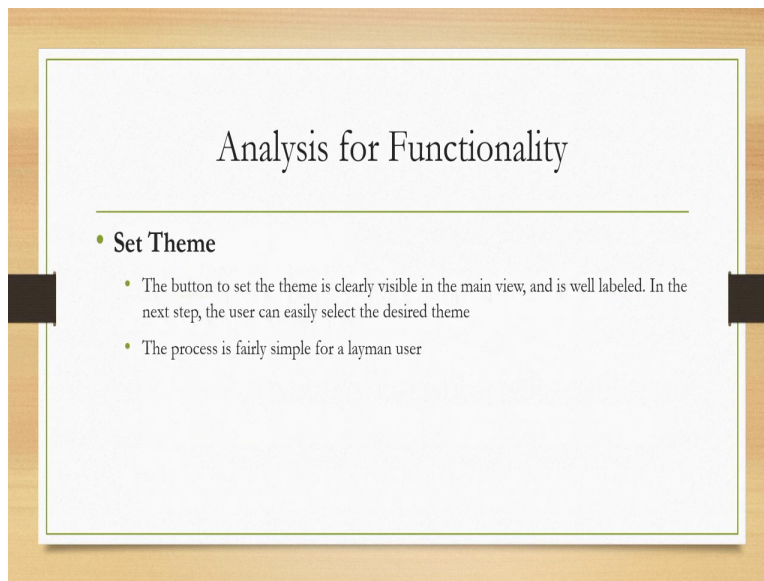
Regarding set theme functionality what the responses reveal is that the button to set the theme is clearly visible in the main view and is well labeled in the next step the user can easily select the desired theme the process is fairly simple for a layman user that is what the responses by the evaluators reveal regarding this particular functionality. So, as you can see we started with building the prototype we use the Figma tool to build the different views.

These views are built keeping in mind that the users are going to see the system in this way and they are going to use the system with interaction in this way. Once the design is represented with the prototype we set out to evaluate it through cognitive walkthrough for that we have created 4

use cases ask the evaluators to perform those cases perform the interface level tasks to achieve those objectives mentioned in the use cases.

And while they perform those interface level tasks the problems they faced we tried to extract those problems in with the help of a set of questions that were posed to the evaluators. So, their responses gave us some idea of the issues that are faced by them which are likely to have implications for usability of the interface. So, those issues we have identified during the analysis phase also we identified some issues by posing some broad generic questions unrelated to the use cases.

And those also revealed some positive and negative sides with respect to usability of the proposed design. At the end when we compile the responses together and analyzed it we identified the positive sides of the design and we also identified some issues that needs to be addressed. So, in the design prototype evaluate cycle. So, once we identify issues after the evaluation phase we refine the design by going to the design stage again and then prototype it again get it evaluated as discussed in the earlier lecture.

So, in this lecture we have seen one such iteration. In continuation of this in the next part of this lecture we will get to see how to prototype and evaluate heuristically a design. I hope you enjoyed the material understood the concepts that we tried to learn here looking forward to meeting in the next lecture, thank you and goodbye.