Assignment M4: CS6750

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Abstract—Towards the HCI assignment M, I have selected one of my academic partner websites. The main aim of the website is to get the students registered and offer them preparation material required to successfully complete IAS/PCS exams. Website has been in use for the past 10 years, now we are in process to get it renewed so that we can bring more features to our students. We will be redesigning the **"Study Material"** section of the website ***(as shown in appendix Figure-A ,B)*** to make it more user friendly and reduce the cognitive load of the user. In this phase we are evaluating different prototypes obtained from the prototyping phase.

1. PREDICTIVE EVALUATION

To do predictive evaluation, I will choose a Card Prototype ***(As shown in Appendix section: card1, card2, card3, card4)*** from the previous prototyping phase. My project involves redesigning a 'Study Material Section' of the existing website. So, the objective would be to test the user comfort level with a modified interface. Since our target users are mostly novices (in terms of technical expertise), hence it makes sense to approach the evaluation process as cognitive walkthrough.

The main task of the user would be to find the appropriate course notes and read in a redesigned interface. So, the focus of this evaluation will be on the navigation part of the interface.

Card prototypes represent a step-by-step process (by using multiple screenshots) to accomplish the task, so I will be analyzing if the sequence of cards represents the real user workflow, in other words if the cards offer a feedforward approach to the main task.

I will go through all the cards (developed during the prototype phase), and by putting myself in the user's shoes, I will check if the sequence of cards simulates the real-world task of accomplishing the goal.

Goals and Action	Subtasks	will the user try and achiev	will the user notice that	will the user associate the	if correct action performed
		the right outcome	correct option available to ther	correct action with outcome	will user see progress made
				they expect	towards intended goal
Goal 1: Locate Study Material	1. write URL into browser				
section	2. locate "study material"				
	button on right top(**card1**)				
Goal 2: Search the relevant	1. Locate the search box(**card2**)				
Notes through search query	2. Enter the relevant query(**card 3**)				
	3. Use Advance serach (if needed-**card4**)				
	4. browse over notes list				
Goal 3: Read the selected	1. Right click on the note				
Note or save it to external	2. choose the option as per				
storage	requirement				

Cognitive Walkthrough of The Card Prototype

2. QUALITATIVE EVALUATION

I will select a textual prototype from the prototyping phase to do the qualitative evaluation. Qualitative evaluation will be carried out by using a survey method. I

will recruit a few of my friends, staff from my school, and two of the family members to do the survey. Survey questionnaire does not require physical presence of the members so it will be sent out in form of Emails or Link for google form.

questions in the survey must represent the textual description of the prototype. at the same time it should also connect with user inventory (obtained from need finding exercise). By doing the survey, I should be in position to understand if the textual description of the prototype represents the working system and it fits with the mental model of the user. a sample of survey questionnaire can be found in the Table below:

1	How would you rate the difficulty level in finding the "study material" section in the new interface?
2	How would you rate the process of finding a search box in the new interface?
3	Would you recommend autocompletion of search query (as explained in the new interface)?
4	Do you think that search box offers enough feedback for query search to the user?

5	How would you rate the process of finding advanced search options while performing the search operation?
6	Do you think that list of items in drop down form (as per search query) is a good way to locate relevant items quickly?
7	How would you rate the option of right click in list of items? (to save, read, export to external storage)
8	How would you rate the process of finding voice search in search criteria?
9	Would you recommend any other changes to the current prototype?

In the previous phase, a textual prototype was developed as per the data obtained from the user inventory and brainstorming. So the prototype description represents the requirements of the user. Survey data offers more clarity and validity of the product as per user's requirements.

3. EMPIRICAL EVALUATION

I will select the wireframe for empirical evaluation. I will use the previous version of the interface (in paper prototype form, without any changes) ***(As shown in Figure-C)*** and current version (in paper prototype form, with modified search box) ***(As shown in Figure -D)*** to do the comparison. The main task for the user is to locate the relevant course notes to study. The main task can be further divided into subtasks for two different versions of the prototype.

Sub-Tasks associated with current prototype version	**Sub-Tasks associated with Redesigned prototype version**
Write URL of website into browser.	Write URL of website into browser
Locate the 'study material' section on Homepage.	Locate the 'Study Material' section on Homepage.
Locate the notes from the list on the study material page.	Execute the query in the search box. (depending on user, advanced search criteria or voice command can also be used)
Select the notes of interest.	Select 'notes' of interest from dropdown list
Save the notes to local storage.	Right click the selected item

Open to read.	Read it or save it to external storage.

The above-mentioned subtasks can be broadly categorized into (Effectiveness, Efficiency, and Satisfaction of the user).

3.1 Effectiveness

Effectiveness is about the task completion rate. We should assign a value of "1" to completed subtasks and a value of "0" for uncompleted subtasks within a defined time frame. It will be measured in terms of quantitative data.

3.2 Efficiency

Efficiency will be calculated in relative terms (specific to one user with respect to another user). For example, if one user takes 1 seconds to complete a task while another user takes 2-3 seconds to complete the same task. It will be measured in quantitative data.

3.3 Overall satisfaction (after accomplishing the task)

It is about the user's satisfaction level after accomplishing the given task. It can be measured in terms of ordinal quantitative data.

We will measure effectiveness and other parameters associated with each subtask and it will be measured in specified criteria (for example, quantitative form of data etc.).

Testing scenario can be described in the following matrix (***as shown in Table-F below). Two versions of the prototype will work as independent variables and the three parameters (effectiveness, efficiency, and satisfaction) will be dependent variables, the value of dependent variable directly correlates to subtasks performed by the user.***

	Main Task: Locate the relevant course notes to study		
	Effectiveness User1, user2..	Efficiency user1, user2..	Satisfaction user1, user2…
Prototype without search box			
Prototype with search box			

Table-F: Matrix to perform user's efficiency test

The Null hypothesis in my testing would be that the user has an equal amount of effectiveness, efficiency, and satisfaction level across all subtasks. If any of these parameters vary in two versions of prototype (while testing), then Alternative hypothesis is proved (if result favors the new prototype) or discorded (if result favors the current prototype). In the case of a negative outcome, we have to again analyze the system in order to get new data.

As an experimental method, I will use the ***within Subject method***, given less number of participants for testing, it is difficult to randomly divide the group into two subjects. Secondly, it would be good to test both prototypes with all available participants. ***To calculate the effectiveness and relative efficiency I will apply the chi-squared test and the Smirnov test on Table -F.***

3.4 Possible Confounding Variable

User's prior expertise in using this website (or any other academic website) may influence the testing results as it will increase his/her capacity to adopt new changes quickly. Since we have diverse participants for testing so demographic patterns (maturity and experience) may also influence the overall results.

4. EXECUTION

In order to proceed with the next step in my design cycle, ***I will choose predictive evaluation and qualitative evaluation as my two approaches.*** For qualitative evaluation I am using a survey method, which is a good approach to get the sufficient numbers of user feedback in a natural setting without influence of any external factors. To verify this process I can do predictive evaluation putting myself in the user's position and being neutral towards the design approach.

Empirical evaluation would be a difficult choice because of unavailability of the required number of participants at any given place.

5. REFERENCES

1. MacKenzie, I.S. (2013). Chapter 5: Designing HCI Experiments. *Human-Computer Interaction: An Empirical Research Perspective*. (pp. 157-188). Waltham, MA: Elsevier.
2. Nielsen, J., & Molich, R. (1990, March). Heuristic evaluation of user interfaces. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 249-256). ACM.
3. Usability testing wireframes with your users, Retrieved from: https://balsamiq.com/learn/articles/usability-testing-wireframes/
4. User Testing prototypes and wireframes (2019), Retrieved from: https://www.justinmind.com/blog/user-testing-prototypes-wireframes/#:~:text=

Test%20early%2C%20test%20often,-Fans%20of%20the&text=Regularly%20user%20testing%20prototypes%20is,every%20iteration%20on%20your%20product.

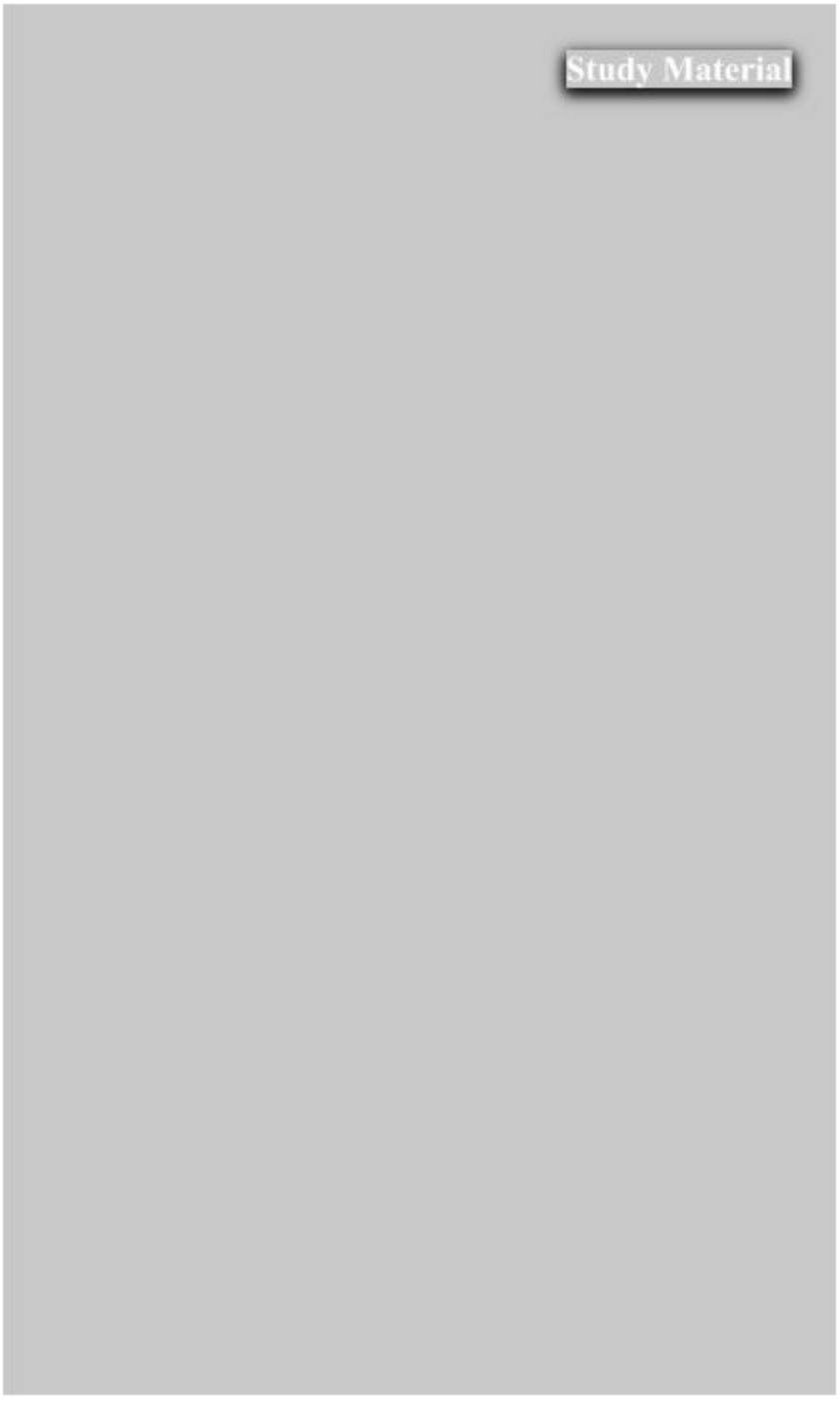
6. APPENDIX

Figure - A

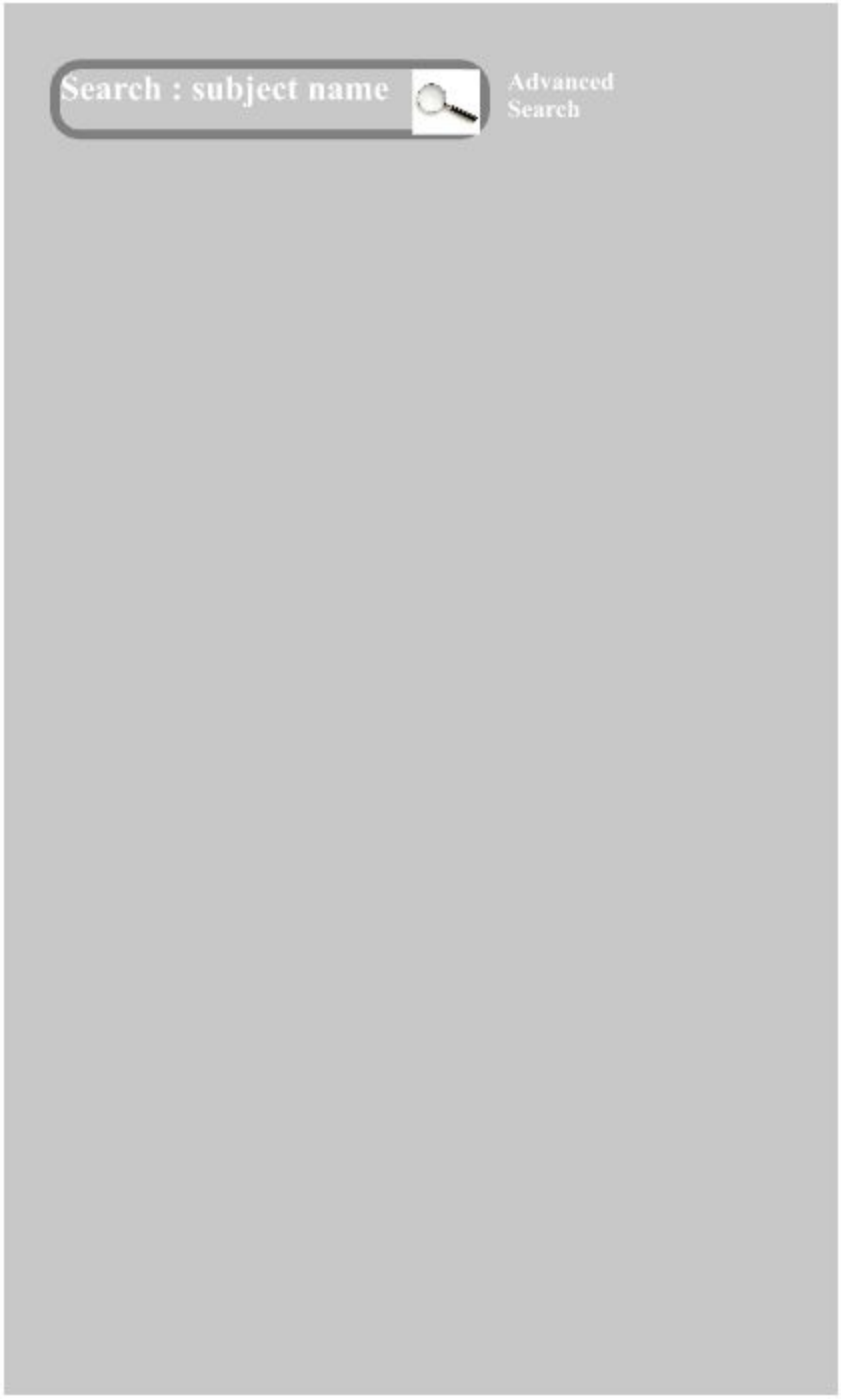
Download

#	Title	Download
1	Current Affair 12 March 2021 in Hindi	Download
2	Current Affair 12 March 2021 in English	Download
3	Current Affair 11 March 2021 in Hindi	Download
4	Current Affair 11 March 2021 in English	Download
5	Current Affair 10 March 2021 in Hindi	Download
6	Current Affair 10 March 2021 in English	Download
7	Current Affair 09 March 2021 in Hindi	Download
8	Current Affair 09 March 2021 in English	Download

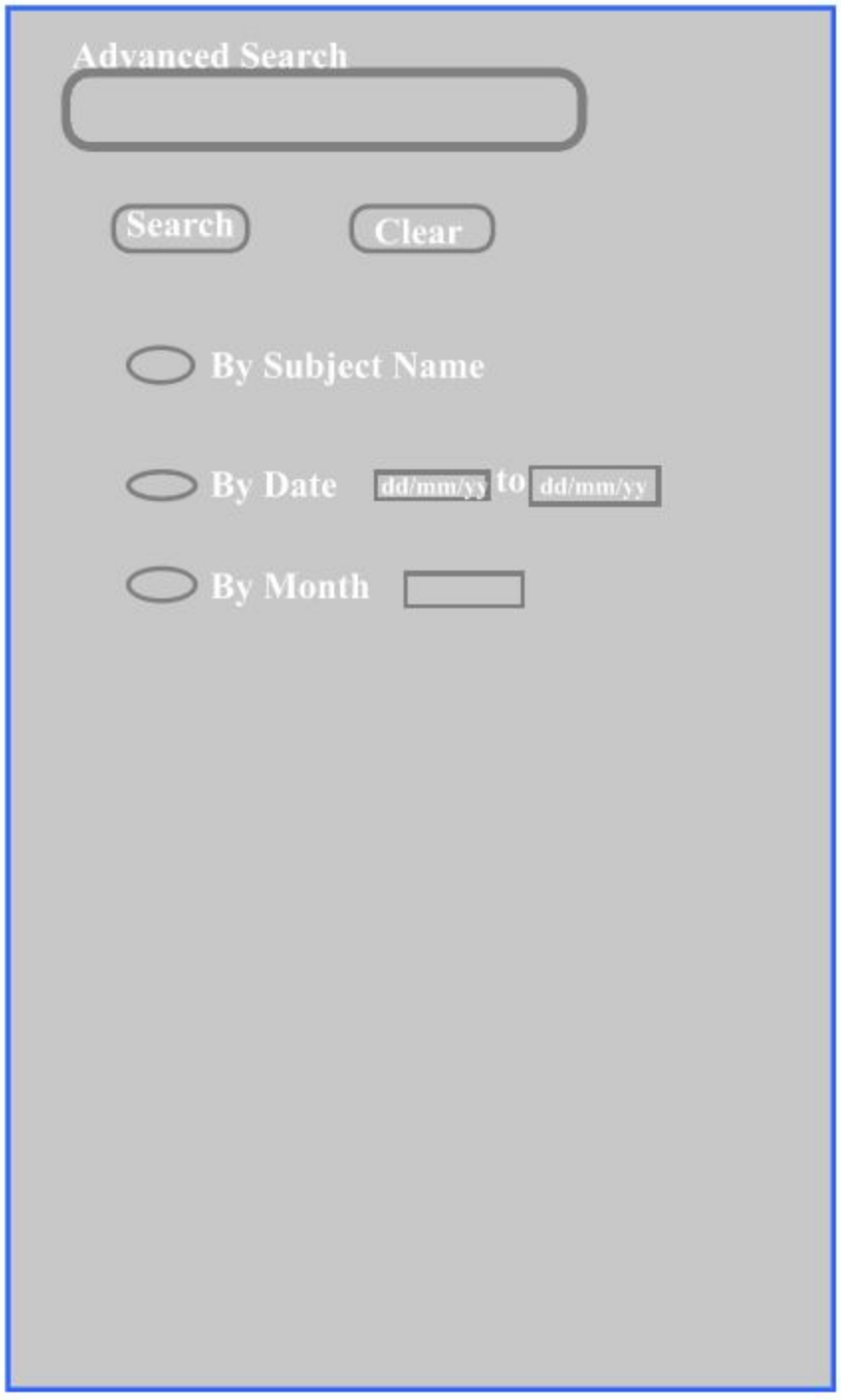
Figure - B



Card-1



Card-2


Advanced Search
Search
Clear
By Subject Name
By Date
dd/mm/yy
to
dd/mm/yy
By Month

Card - 3


Search :
Java
Advanced Search
JavaScript
JavaScript Vanilla
JavaScript Plugin
JavaScript jQuery
JavaScript CSS3

Card -4

Download

#	Title	Download
1	Current Affair 12 March 2021 in Hindi	Download
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5	Current Affair 10 March 2021 in Hindi	Download
6	Current Affair 10 March 2021 in English	Download
7	Current Affair 09 March 2021 in Hindi	Download
8	Current Affair 09 March 2021 in English	Download

Figure -C

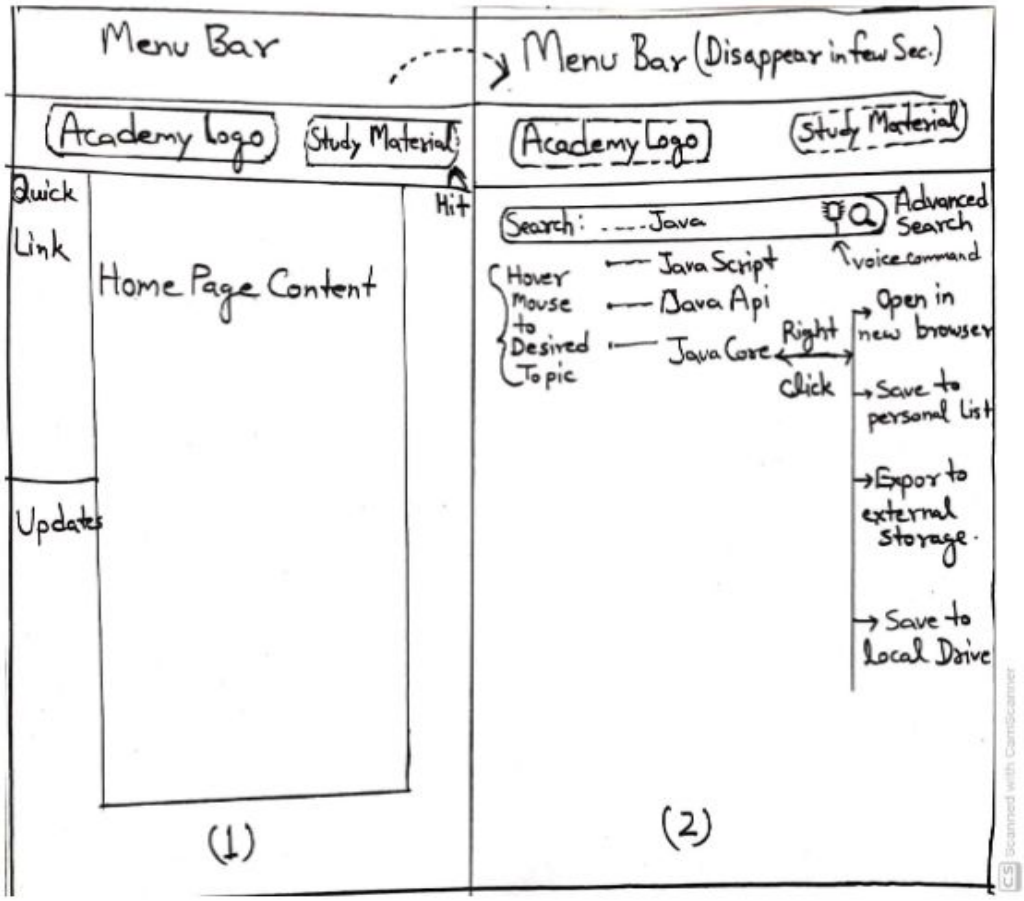

Figure - D