# Course Finder for Executive Education

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***Abstract*—**For the M Assignments I will be investigating & designing an interface which will help users:
* explore *Executive Education Courses* offered on timestsw.com.
* filter the courses basis various relevant parameters.
* shortlist course(s) most suited to their profiles and/or needs.
TimesTSW is a prominent operator in India offering Executive Education course from premier Indian institutions. There has been a significant surge in demand amongst working professionals to up skill. Hence the number of courses being offered is steadily increasing, thereby overwhelming users with excessive options. A *"Course Finder"* functionality will benefit users & enhance the appeal of the website.

## 1 QUALITATIVE EVALUATION

Qualitative Evaluation was planned for the Verbal Prototype using the Think-Aloud Protocol. (Refer to Assignment M4)

**Evaluation Report**

***How many Participants?—***

For this evaluation, the plan as per Assignment M4, was to have 10 participants. But I was able to execute the evaluation with **8 participants**. The participants where a mix of friends (5) & colleagues (3).

***How well did the sessions go?—***

The sessions did not go as planned. Due to COVID-19 restrictions in India, the plan was to execute the evaluation via Online Meetings (Google Meet or Microsoft Teams) hosted by me separately for each participant. Covid infections coupled with some extreme weather & incessant rains led to power & internet outages which affected the execution of the evaluations.

***Were all sessions run the same, or changes made between participants?—***

As mentioned above, the sessions were affected by unforeseen & uncontrollable

circumstances. 70% of the sessions, had to be split over 2-3 meetings instead of 1 continuous session. This also included the original participant becoming unavailable. For some I was able to substitute the individual & had to start all over again. Accordingly I adapted the flow of the 'Think-Aloud' sessions for example I included *recaps* at times etc.

***Anything can be done differently purely organizationally next time?—***
Yes, allocating a larger time frame would help manage contingencies much better. Also pre-planning with a larger pool of participants to be able to accommodate drop-offs would have made the process smoother.

***Reporting Raw Results—***
Excerpts of the notes from the evaluation are documented and can be viewed in *Appendix 4.1 Raw Results of Qualitative Evaluation*.

**Analysing the Feedback**

***Takeaways for improving the interface—***
From the exercise, I could extract a few good takeaways that can be taken into consideration to further enhance the interface. These are:

- Giving the users a count of courses in each category will help paint a better picture of the scope & availability of the courses.
- Explore the feasibility of incorporating a filter that can take multiple inputs at a time rather that a one-by-one approach will help speed up the shortlisting process.
- It would make sense to explore some sort of 'recommendation approach' that would help users who are not sure about the path they want to pursue.

***Feedback that was Surprising—***
Two comments were quite unexpected. The first was the need to have an option of executing multiple filters at one go. The second was the feedback about having assistance to make the choice.

***Expected Feedback—***
The feedback that was expected was that users would ask for the count of courses under each *Course Category*. This could be extended to the count of courses post every filter step.

***Summary of Feedback about the Interface—***
The following inferences can be drawn from the feedback received from the

participants:
• At the start, participants are interested in knowing the count of courses in the different course categories.
• Participants are also interested in knowing the count of courses in the different categories after the filters have been applied.
• Overall, it was easy for the users to understand how the interface works & how it was to be used.
• For some participants, the quantum of options were overwhelming & users would prefer to have some sort of a guidance system rather than making manual choices.

**Changes Suggested by the Feedback**
The feedback suggests certain changes that can be taken into consideration. These are:

1. The count of courses under each Category can be added.
2. The count of courses under each Category can decide the order of listing of the Course Categories. The Categories with more courses get listed first.
3. After every filtering step, the count of courses can be displayed.
4. To assist users we can display the option most selected by users at that step. This will act like a 'crowd sourced guide'.

## 2 EMPIRICAL EVALUATION

Empirical Evaluation was planned for the Paper Prototype using the Think-Aloud Protocol. (Refer Assignment M4)

**Testing Process Report**
***Did everything go as expected?—***
Yes, overall things did go as planned. As mentioned earlier, due to Covid-19 restrictions in India an in person implementation was not feasible. Hence I had planned for this evaluation to be executed remotely. Since participants did not want to be recorded, I setup a simple but detailed process via Google Forms. These also included instructions & the questions to be answered. Finally, I had arranged a briefing call with the participants to help them understand the process.

***What deviations, if any, did you encounter?—***
I had expected that the participants will execute the sessions immediately after the briefing call so that the instructions are fresh in their mind & the process runs as per the requirements. But in a few cases there was a significant gap between the briefing call & the time the participants actually did the assessment.

***What would you do differently next time?—***
If circumstances are favourable, I would do all participant sessions in person. I would also administer the questions in person.

***Did anything happen that will call into question the results?—***
The idea was that the entire session & answering of all questions happens at one go to get a unbiased or non-influenced feedback for both the approaches being evaluated. Due to the remote execution, it is only the word of the participants that I have that the evaluations happened in this manner, it cannot be ascertained. This aspect & hence the results can be questioned.

**Performance & Report**
***Number of Participants—***
The final sample size for the Empirical Evaluation was **25**.

***Raw Data—***
The data collected during the Empirical Evaluation can be viewed in *Appendix 4.2 Raw Data of Empirical Evaluation*.

***Results of the Statistical Test—***
*Choice of Experimental Method*
The distribution of the responses for the questions is binary i.e. users are either able to do a task or not; like the step or not; favour the New Prototype over the Existing Practise or not. Thus the plan is to use the *Binomial Test* on the results.

*Null Hypothesis*
is that the proposed interface features will not make any difference in the user's experience to filter & shortlist courses.

*Alternate Hypothesis*
is that the proposed interface features will make a difference in the user's experience to filter & shortlist courses.

*Execution & Results*

The Binomial Test helps determine if the proportion of cases in 1 of only 2 possible categories is equal to a pre-specified proportion of 0.05. This pre-specified proportion is selected as there is theoretically an "equal chance" of either category being selected. Then we evaluate the probability of getting that proportion & calculate the p-value. The results are as follows:

***Table 1***—Empirical Evaluation Results

| Aspect of Evaluation | Favouring New Interface | p-value |
|---|---|---|
| **Easy to get sense of expanse of the courses being offered** | 80% | 0.0015834 |
| **Ease of filtering courses basis various relevant parameters** | 88% | 0.00006855 |
| **Ease of shortlisting course(s)** | 88% | 0.00006855 |
| **Overall Preference** | 92% | 0.00000894 |

We see that the p-values are much lower compared to the selected threshold of 0.05. So we can say that the findings are significant & are not due to chance alone. Hence we **Reject the Null Hypothesis**.

Thus, the outcome as per the Alternative Hypothesis is that the proposed interface features will make a difference in the user's experience to filter & shortlist courses.

NOTE - In addition, results from the evaluation of the existing process also shows that users do not find it easy to use. *Appendix 4.3 Results of Empirical Evaluation*.

**Analysing the Results**

***Did Results match Expectations?—***

Overall the results were as what was expected. A slight disconnect was for response to *if it was easy to get a sense about the expanse of the courses offered with the existing process*. 32% of participants agreed to it which was larger than expected.

***Authenticity of the Results?—***

I believe that the results are because of real differences & not because of any lurking variables or experimental errors. On of the primary reason for this is that not only was each (existing vs proposed) approach tested individually, I also looked at the comparison between the two. And at no instance did I find

any discrepancy to question the outcomes.

**Recommendations for the Interface basis the Results**
From the results we learn of the characteristics of the interface that will be carried forward to the next round of prototyping. These are:

1. Include the count of the Total Courses. We can learn from the Qualitative Evaluation & add a split for each Course Category.
2. Include the multiple filter functionality. Add a count of the courses under each filter option.
3. Include the count of filtered courses & the filter summary.
4. Include the list of short-listed courses for final selection.

## 3 EVALUATION SUMMARY

### 3.1 Next Iteration

By executing the evaluation, we got certain feedback which will fuel the subsequent need-finding. We came across suggestions & gaps highlighted by the participants which we will have to analyze via need-finding. That will be done via the following process:

1. Revisit the suggestions obtained from the prototype evaluation exercises & finalize the changes.
2. Implement the changes in the prototype.
3. Execute another qualitative evaluation & record the responses.
4. The approach using the Think-Aloud protocol will be repeated (the backup will be a Post-Event Protocol). The idea is to get descriptive information about the users thinking & reasons behind the actions they take.
5. Any useful & feasible changes that we come across will be plugged into the prototype ready for yet another round of evaluation if the need arises.

### 3.2 Need for Further Information & Associated Questions

***User Information that needs Investigation—***
In the evaluation, we came across users who felt the need to have some sort of assistance or guidance to make the decisions regarding the courses. The investigation will be focused on this aspect in the subsequent need-finding exercise.

***Questions that arose basis Evaluation—***

1. How do we know which users need assistance & which ones prefer to execute things manually?
2. At what point should the *assistive element* be brought into the Interface?
3. How much of "assistance" should be provided?
4. How can the efficacy of the *assistive elements* be measured so that it can be continually improved?

### 3.3 Design Alternatives basis Evaluation

Continuing with the *User Information* & *Questions arising basis evaluation* covered in the sections above, we need to evaluate the feasibility of incorporating the guidance or assistive elements. This will be an addition to the existing interface & not a new design. These will be explored in the second iteration.

### 3.4 Brainstorming the Revisions

***Verbal Prototype (Qualitative Evaluation)—***
Revisions to the verbal prototype will occur at 2 levels.
First, the suggestions made to incorporate the counts of courses by categories is easy to implement & can be done without the need for any brainstorming.
Second, to address the requirement of *assistive elements* which came up during the evaluation, a brainstorming was conducted. The equivocal outcome was that implementing assistive elements is foraying into the domain of a Machine Learning powered Chatbot with Artificial Intelligence capabilities. This is beyond the current scope of the project. Hence an option will be provided for users to *Seek Assistance* which will connect the user to a human agent.
The prototype revision will contain both the changes mentioned above. Due to the complexity of building this approach the prototype format (Verbal) will be retained.

***Paper Prototype (Empirical Evaluation)—***
Evaluations for this prototype were quite positive, Hence here we will tweak things a bit by borrowing one learning from the Qualitative Evaluation regarding mentioning the count of courses. We will include the count in the filter options. It is a simple & quick addition which does not need brainstorming.
For the subsequent evaluation, we will raise the fidelity of the prototypes from Paper (existing) to High fidelity Wireframes, ones that users can interact with .

### 3.5 Planning the Next Round of Evaluation

***Verbal Prototype—***
This will be evaluated via *Qualitative Evaluation* primarily due to the complexity of building a high-fidelity prototype for this sort of an interface. Also in my opinion another round of evaluation & qualitative feedback is needed before this can be taken to the next level & subjected to empirical evaluation.

***Wireframes Prototype—***
For this, the *Empirical Evaluation* will be repeated. But this time the new interface will not be compared with the existing process since results of the comparison was fairly conclusive.
Instead, we will focus only on the new Interface & dive deeper to evaluate each element of the interface from the perspective of *Ease of Use*, *Task Completion* & *Time Taken*.

## 4 APPENDICES

### 4.1 Raw Results of Qualitative Evaluation

For the Qualitative Evaluation of the Verbal Prototype of the 'Course Finder Interface', the raw results are available in Qualitative evaluation result.

### 4.2 Raw Data of Empirical Evaluation

For the Empirical Evaluation of the Paper Prototype of the 'Course Finder Interface', the raw results are available in Empirical evaluation result.

### 4.3 Results of Empirical Evaluation

For the Empirical Evaluation of the Paper Prototype of the Results are available at the same link on the sheet labelled 'Results'.