

FINAL PROJECT-PHASE 1

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A STUDY OF USABILITY OF E-LEARNING APPLICATIONS

ABSTRACT:

User interface (UI) is a source of interaction between user and computer software. Feasibility of using software, easy use, and learning are issues influenced by UID. E-learning does not function accurately if the system is not per user requirements. The UI is important in designing educational software (e-Learning). To study user behavior in the e-learning context, an empirical usability study on a specific e-learning tool is conducted. The analysis is performed using usability evaluation questionnaires collected from three different groups of actual platform users; one group is primary and pre-primary, the second is college and university students, and the other is disabled people. We show how to use UI to improve learning and motivate the learners and improve the time efficiency of using e-learning software.

INTRODUCTION:

Kids and adults are becoming more and more techno-savvy, especially the kids who are used to all kinds of gadgets from a very young age. Over the years, there have always been numerous definitions to define what eLearning really is or how eLearning is conducted effectively. It always concentrates on the particular needs of an individual or an organization. eLearning is a learning process with the combination of content delivered digitally and through face-to-face learning. Suited for all levels of education, from grade school to graduate degrees, e-learning is versatile enough to support all learning techniques. E-learning has personalized for students, focused on students, and is directly controlled by themselves. It occurs only when required and has the strictly necessary duration, communicated by technology because the student has gotten knowledge and needs proactive roles.

E-learning devices should be developed based on the psychology of learners. One of the psychological matters that should be considered is User Interface (UI) in e-learning because User Interface is the point of interaction between the user and educational body. For this reason, the main issues in successful correlations, which should be considered in User Interface Design for E-Learning (UIDEL), are the focal point of this study.

Valid usability in e-learning tools ensures successful and enjoyable learning. If usability issues are not adequately considered in an e-learning environment, it will become an obstacle for pupils. Usability and the design are essential for the designing and development of successful e-learning tools.

To study user behavior in the e-learning context, an empirical usability study on a specific e-learning tool is conducted. The analysis is performed using usability evaluation questionnaires collected from three different groups of actual platform users; one group is primary and pre-primary, the second is college and university students, and the other is disabled people.

METHADODOLOGY:

Participants:

One of the primary concerns for conducting this study is understanding target participants, as it is an important tenet. For the described research, we selected three groups:

The three group are targeted during the experiment:

Group A: Pre-Primary and Primary Students

- Users are new to the app so we encountered the real time experiment.
- They are total 10 in count.

Group B: College and University Students

- Users are already experienced OR already using it.
- The data was collected from 30 users.

Group C: The Disable people.

- Users are tested on the real time experiment, and then interviewed for their experience.
- The two users were selected for this experiment.

Experiment Design:

The experiment is designed based on the 2 factors

- User Journey while achieving the right effect
- The design of application

User Journey:

The user journey of using app is encountered based on affordance (Design tells what to do), Accessibility (Universal Design) and Hack's law and Fitt's law. The result of experiment as whether the provided options are confusing the user or not, how much time does the user take to reach to the target variable.

The design of Application:

The design is evaluated based on Signal-to-Noise (ratio of relevant to irrelevant information in a display), Golden Ration (the icons and layout), and 80/20 rule. The target group is look over based on the consistency, user control and freedom, error prevention in the app interface to calculate their interest rate. This section is particularly based on the app-design's effect on the user. The other elements such as Recognition rather than recall, flexibility, aesthetic and minimalist design were kept in mind.

Group A: Pre-Primary and Primary Students

The experiment was conducted in a separate room. Users were asked to open the e-learning app on PCs. They were asked to do some primary tasks that include reaching their desired videos,

Downloading, or saving videos for offline learning, navigating back and forth, and accessing various options. Then they were asked some questions

Task	Questions
1. Start any course	1. Will you remember it after?
2. Bookmark Video	2. Tries
3. Search for your desired Course	3. Time taking?
4. Sign up/Login	4. Is the required option visible?
5. Navigate across App	5. Have you used it before
6. Deenroll from any course	6. Efficient
7. Locate current Directory	7. Do you use it often?
8. Choose Quiz	8. Do you get confused among options?
9. Locate progress Bar	9. Do you find it easily?

Figure 1 Task List for Group A

Figure 2 Questions For Group A

Group B: College and University Students

A usability questionnaire was used to collect data. The questionnaire consisted of 20 questions, including multiple choices, checkboxes, linear scale, and multiple-choice grid. In total, we received 30 responses from the target group.

Group C: Disabled People:

We selected two disabled person for our group of study, the student had a deaf impairment, the experiment was based on using real-time application within a controlled environment. The student had to use the app and understand the learning process along with the transcript available with the videos. The user was asked to navigate through the interface and cover any one topic for the understanding. The student was then asked to fill the survey about his experience of using the app.

Analysis:

Group A: Pre-Primary and Primary Students

The parameters which are identified after the experiment are as follow:

- Efficiency
- Memorability
- Usability
- Simplicity
- Effortless
- Visibility
- Affordance
- Accessibility

- Now according to the data collected from the participants, the option of “Starting and course” is efficient and the entire process is effortless but the feature on the interface of the application is not visible enough which in return make it less usable and affordable.

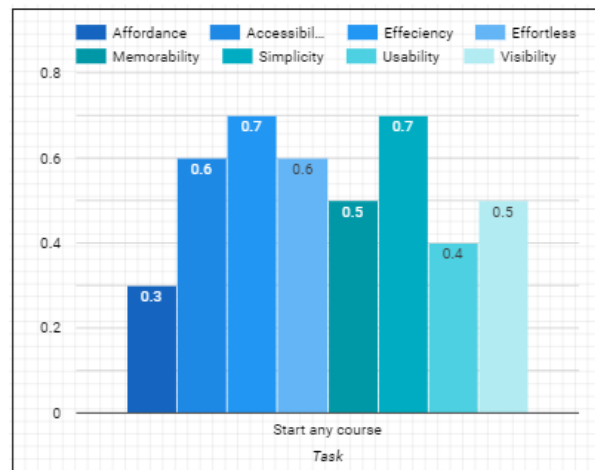


Figure 3 Parameters assess by Start any Course task

- According to users, they can easily login or sign up in the app because the option is visible on the interface, which enhance the simplicity of the interface along with affordability. But the lack of current directory header and further complex process make it less memorable and efficient.

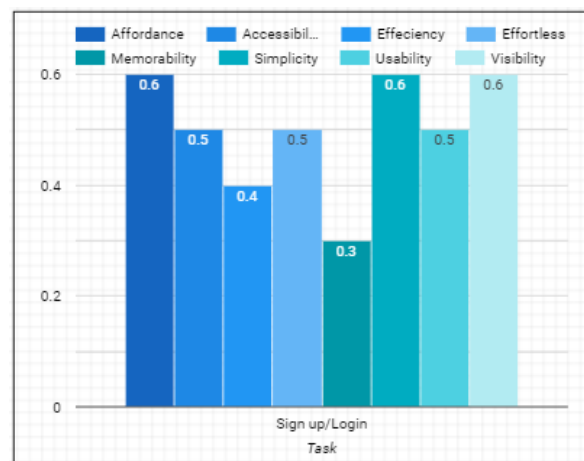


Figure 4Parameters assess by "Sign up/Login" Task

- The navigation across the app is less efficient and visible. It lacks in accessibility and efficiency while the options to navigate are visible.

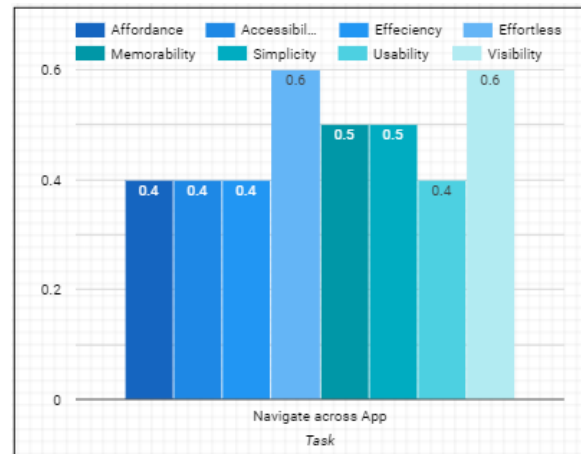


Figure 5 Parameters assess by Navigation

- Most of the participants were unable to locate current directory or page. The feature is not visible and accessible, which confused the users a lot.

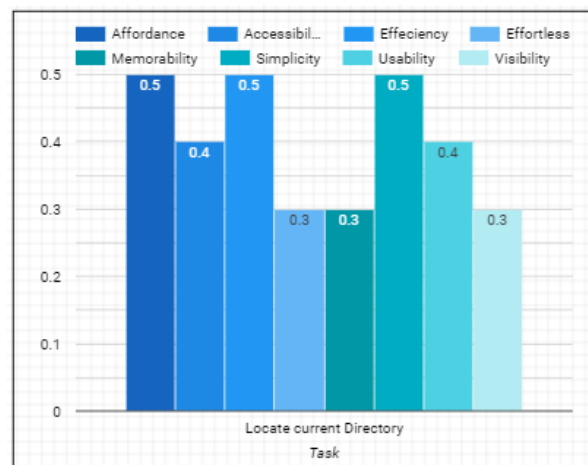


Figure 6 Parameters assess by Locating Current Directory

There were some other tasks too, and conclusively the required features are present in an e-learning app, but they are not much visible. Users of Group A who are new to this environment got confused due to this invisibility, affecting the efficiency, affordance, and accessibility of the system.

Group B: College and University Students

Since users who belong to Group B are already the users of E-learning app, they are pretty much clear about what features need to be included in the interface of any e-learning app so they would be visible and accessible. Below are the features they want to be included.

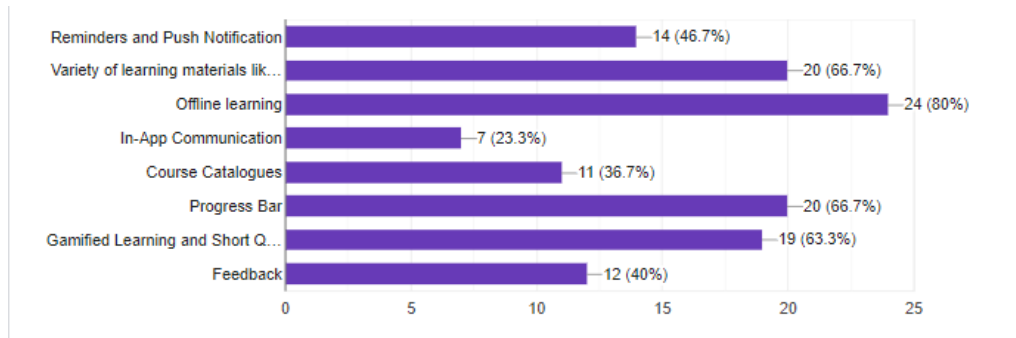


Figure 7 Features needed in an E-learning application

Around 56.7 % of them are comfortable in using web application while 43.3% are mobile app users.

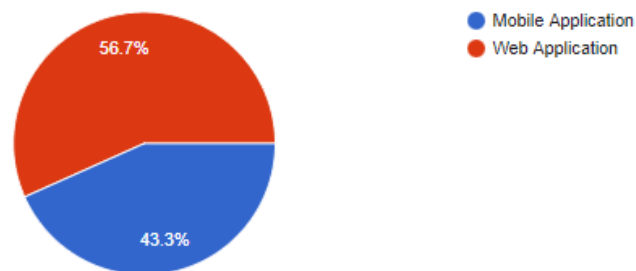


Figure 8 Usage of platform

Since progress bar is the indicator of how much you have learned from the desired course, 86.7 % user wants that progress bar should be visible on the app. Furthermore 96.6 % users believe that there should be quizzes and gamified assessments options in the app so that the learning can be interactive.

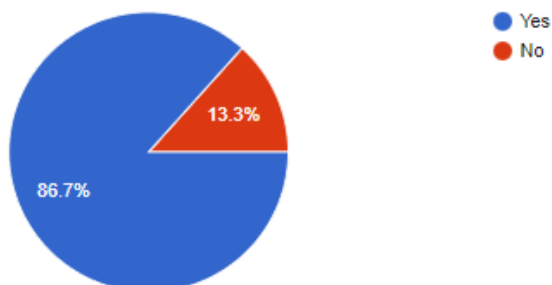


Figure 9 Progress Bar

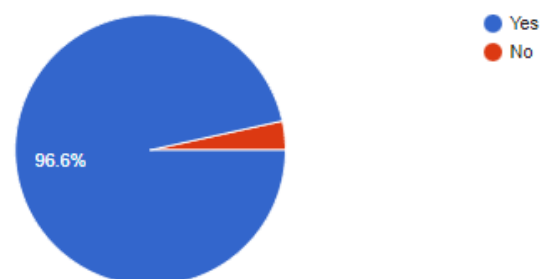


Figure 10 Quizzes and Gamified Assessment

For accessibility, there are some mixed responses. Users are neutral about the ease of content access. About 30% users think that it is quite difficult to access the content on the e-learning application. Since of list of attachments of every course is missing.

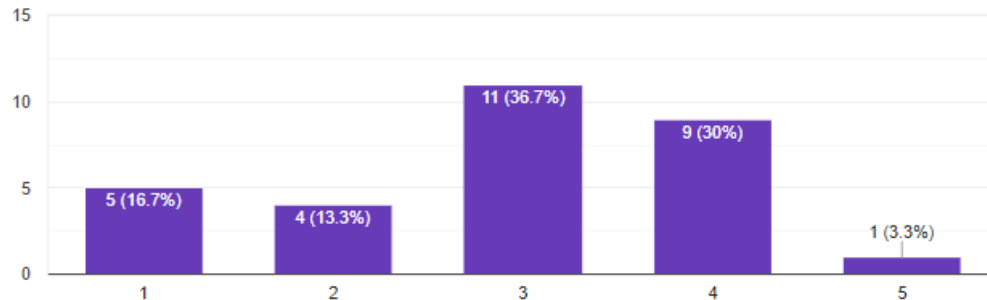


Figure 11 Accessibility

According to the response we have received, users are satisfied with the attractiveness of the application. But there are some problems they have faced while using the application which are as follow.

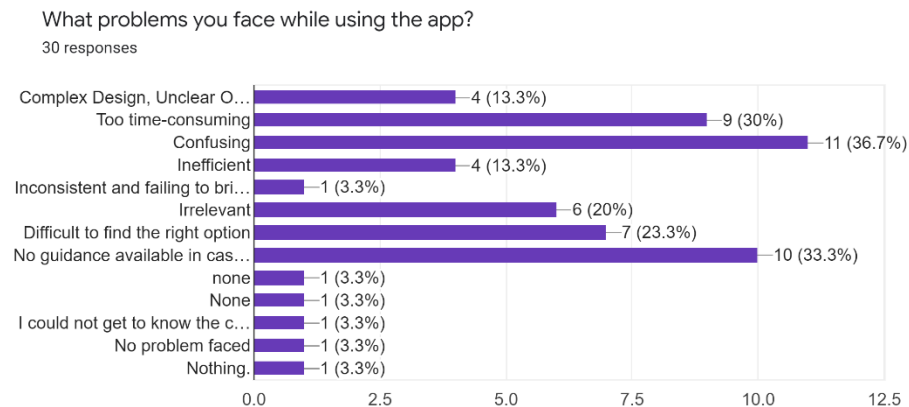


Figure 12 Problems of an E-learning app

Group C: Disable Users

This particular group was targeted to evaluate whether the design is universal or not, we almost get the same response as Group A, because the users were new to the application. According to them, the app does not facilitate any disabled people. They experienced the same User journey and an additional drawback of videos which has a separate file of transcript, to read the captions and see the material on the screens at the same time diverts the focus and makes it harder to follow along the direction.

Results:

The Major Insights from the Analysis:

Usability is a core terminology in HCI, which shows how a specific user can use a product to achieve the goals with effectiveness and satisfaction in a specified context of use.

The usability ensures effectiveness, efficiency (how fast the user can get their job done), satisfaction, utility, learnability, memorability, and engagement. Our focus of the study was to conclude the usability of the app in terms of user experience. When it comes to evaluating whether users are satisfied or have a terrible experience, it isn't easy to objectively measure. This is where the user experience needs to be encountered.

The above experiment's analysis and our cognitive walkthrough found that users are highly influenced by the perception biased by the experience and goals while achieving the right effect.

All the problems are identified in Gestalt perception and visual theories, interaction design, and observational methods. We analyzed the application as;

The alignment of objects like buttons, text, icons does not seem like a group that diverts the user's attention, which is the Gestalt principle of proximity. The text box alignment, page setup does not follow the principle of Similarity, which says that the Objects that look similar appear grouped, which helps the user create a consistent flow while navigating to different pages.

The other rules like Foreground/Background and Combined principles seem scattered throughout the user journey.

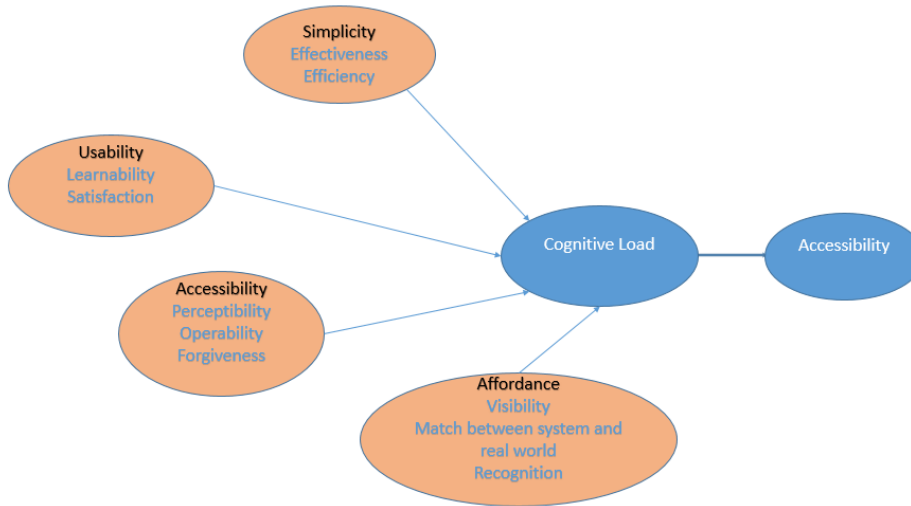
The other significant problem that we encounter through our experiment is Consistency. The Consistency of applications says that the user should experience the journey while using it should remain the same, so the user does not have to recall but recognize the steps.

Navigation Infrastructure:

The application Khan Academy follows the Hub and Spoke, with no quick access to different features. The icons seem misplaced and inaccurate. The user had to explore other options by multiple tries as the information was jumbled with no explicit target variable available. The inadequacy of affordance and accessibility of app design makes it difficult for users to navigate between features.

Model:

To solve all the encountered problems, we have designed a new application to fill the gap of user experience of using the interface. The redesign is kept Universal so that all the targeted groups are covered under one umbrella. Our new proposed model works as:



To achieve the right effect, the Gestalt Principles and Interaction design methodologies are encompassed to achieve the universal design; By universal design means creating products that are accessible by as many people as possible. For the user diversity, in addition to the original design, our proposed models contain the Usability Heuristics such as visibility of system status, Match between the system and real-world, user control, and freedom as the design of applications does not follow the standards. The new interface has a minimalist design so that the irrelevant information does not create chaos.

In the prototype, we have covered 3-4 user Journey as an idea of redesigning the current app.