

# Usability Evaluation of Mobile Learning Applications

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## Abstract

Mobile learning is creating new opportunities for learning anytime, anywhere by using mobile devices. Mobile learning supports continuous access to the learning process and with the arrival of mobile learning, educational systems are changing. The availability of mobile applications is increasing speedily and with the increased processing power available with mobile devices, developers are increasing the variety of services. The interface of mobile educational apps ought to be compatible with the cognitive skills of children to provide higher learning expertise. In mobile learning apps, students are provided audios, videos, and texts related to the study material with the help of which they can learn their respective subjects and can acquire more knowledge and understanding about the concept. Therefore, this paper will provide the feedback for mobile learning applications using testing method, that is, think aloud testing methodology.

Usability evaluation is done by practitioners to gather feedback from users about a website or application, its focus on how well users are satisfied, how well they can use the product to achieve their goals, how well they can learn from the product, and how well they are able to discover and explore the content. Usability evaluation has a variety of methods to gather feedback from the user. In this paper we are focusing on usability evaluation of mobile learning applications using Think Aloud testing, which is one of the most preferred methods. Think Aloud Testing is one in which the test users are said to verbally express their thoughts, feelings, and opinions while interacting with mobile learning application and a direct observation can be made as the users are asked to think out loud. If a task is complex, then the user can make periodic report to think aloud while performing the task at the same time. Think Aloud is a cheaper method as no special equipment is required for it and the practitioner can simply sit next to the user and can gather the feedback.

**Keywords:** Cognitive Skills, feedback, mobile learning applications, Think Aloud testing, usability evaluation

## I. INTRODUCTION

Mobile technologies will give key support in education and facilitate users to develop new skills. Various results show that students are excited to use mobile devices. For developing mobile learning applications a number of design challenges are to be faced. The interface of M-learning applications ought to be user friendly and additionally compatible with their cognitive skills [3]. The widespread use of mobile applications can solely be accepted by users if their comprehensibility is of acceptable level. Clear and visual navigations, consistent designs and colours, concise content, appropriate help, and simple access are numerous usability factors that affect the end user's satisfaction. A large variety of learning applications are

offered in market, targeting young kids, and also the increasing quality of mobile has prompted a replacement wave of mobile learning in student education [4].

Computer professionals have a requirement for strong, easy to use usability analysis strategies to assist them, and systematically improve the usability of PC artifacts [5]. Conducting usability evaluation can be a crucial step in taking a website to the next level when it involves the target market and involves getting ahead of competition. Usability evaluation helps to eliminate various mistakes like lack of style, categorization, and layout. Usability evaluation provides us a more robust understanding of how the target market thinks and then it shows the best way to develop and optimize the website. By using mobile app, we exactly meant to have an effective, efficient, and client satisfaction via possible use

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of the apps [6]. If the usability of applications is of valuable standard, the users of those mobile applications will effectively attain all their tasks. People who want to develop expertise in usability measure and analysis will examine usability methods find out how to use them, and become skillful in determining whether or not an interactive system or device is usable, and if so, to what extent.

To conduct usability test the first task is to find out the participants who are representative of target market and telling them to use the site with few set tasks in mind. Invigilators are then able to observe, raise questions, and can then make notes. The data gathered after testing is then used to rate the site for customers' satisfaction. Therefore, we can say that the usability evaluation is said to have any one of set of methods that allow a user experience expert to evaluate the usability of a system or of a production to varying levels of detail.

## II. REVIEW OF LITERATURE

The literature review for the paper is done by reviewing research paper based on keywords like “usability evaluation”, “mobile learning apps”, “think aloud testing”, “feedback”, “mobile interface”, and “interface design”. A total of nine research papers and books were studied for the analysis. The study was done to select the relevant material for the research paper. According to [1] the usability, accessibility, and the overview for mobile application has been studied. A case study of mobile learning app in k-12 school has also been studied from [2] to get a clear understanding about the topic. The criteria for design of user interface of mobile applications has been drawn out from [3] in which the paper focuses on user-friendly interface for apps. From [4] and [5], the usability methods and various criteria used for evaluation of application have been drawn out. Points like effectiveness, efficiency, and customer satisfaction have been focused in Duce's research [6]. The way to conduct the usability test using think aloud is also there. The think aloud method is explained in detail in [8] and [9], how it is carried out, who are required to carry out the testing, and how the feedback is gathered, and the results are drawn.

## III. METHODOLOGY USED

Usability evaluation consists of a number of methods to evaluate the product or the system. In this paper we are using the Think aloud testing methodology among the

several usability evaluation methods. Using this method, the invigilators will get the answers to their questions by getting direct insight into how users think. Think aloud testing provides direct data on ongoing thinking process. In a think aloud process, the users or the targeted group is asked to verbalize what they are thinking, doing, and feeling while they complete a task, and the users are also able to explain or justify their thoughts using this technique. The most important advantage of using this methodology is that it provides real-time feedback of the targeted group or the users and helps in gathering data on how to improve the user interface.

To run a think aloud test there should be a moderator and a group of test users. The test users are told to say everything they think throughout the test, and are also told to say why he or she is doing. This will assist the moderator to visualize how the test user might use the technology in various ways, how they anticipate it, and also interpret the reason behind this. The product will then be reformed based on the feedback. Think aloud testing provides numerous benefits like it is cheap as no special equipment is needed to conduct testing. It is robust and flexible as it can be used at any stage in the development lifecycle. It is convincing and easy to learn.

In this research paper we performed the think aloud testing on application X. App X is being tested by considering some test users and moderators. The students from various colleges were taken to conduct the test.

## IV. RESULT

TABLE I.  
SURVEY RESULT

	Very Good	Good	Average	Bad	Very Bad
Ability to share the link for downloading the app	13	5	2	4	8
Ability to mark subjects as favorites	14	5	7	2	4
Ability to mark videos as favorite	14	4	3	0	11
Ability to download videos	10	4	5	5	8
Ability to chat on screen with others while watching a video	8	5	3	6	10
Ability to access videos related to a subject	12	3	6	4	7
Ability to add videos to playlist	7	5	5	5	10
Ability to share videos	12	4	5	3	8
Ability to search for a					

particular subject	12	7	2	2	9
Ability to search for a lecture	13	4	5	3	7
Account setup	9	13	8	2	0
Login process	8	11	7	4	2
Visual interface ("look and feel" of the application)	8	5	12	5	2
Icons for video downloading and sharing	8	6	10	5	3
Icons for adding to favorites and adding to playlist of videos	4	9	9	7	3
Icons for home, navigation, notification, settings	8	9	5	7	3
Enrolling in a course	8	11	7	6	0
Rating a video	9	10	9	3	1
Rating the application	11	9	6	4	2
In-class activities and assignments	11	10	7	1	3
The relationship of the virtual instructor with students	8	12	7	3	2
Your understanding about the subject	10	9	6	4	3
Your ease of using a mobile learning application	10	7	6	7	2
Your ease of using the application	7	11	5	3	6
Using the downloaded					

The result of the survey is given in Table I.

## V. CONCLUSION

In this paper, the think aloud testing is carried out on an app X. We took 32 students from various colleges for carrying out the testing. Among these 32 students, 90% are female, 10% are male, 84% people are bachelors, 12% are masters students, and 3% are doctorate students. Among 32 students, 83% students belong to age group 18-24, and 13% belong to age group 25-34. The students who accessed app X from home are 38%, from work are 9%, from campus classroom are 28%, from other campus are 15%, and from another place are 9%. From 32 students 46% people who used the app X rarely are 46%, regularly are 31%, frequently are 18%, and never are 3%. 53% of students among 32 students rate the experience of using app X as good.

It was found that among these 32 students

- ◆ 40% of students find that the ability to share link of downloading the app is very good.
- ◆ 44% of students find that the ability to mark subject

as favorite is very good.

- ◆ 44% of students find that the ability to mark video as favorite is very good.
- ◆ 31% of students find that the ability to download videos is very good.
- ◆ 31% of students find that the ability to chat on screen with others while watching a video is very bad.
- ◆ 37.5% of students find that the ability to access video related to a subject is very good.
- ◆ 31% of students find that ability to add video to playlist is very bad.
- ◆ 37.5% of students find that ability to share the video is very good.
- ◆ 37.5% of students find that ability to search for a particular subject is very good.
- ◆ 40% of students find that ability to search for a lecture is very good.
- ◆ 40% of students find that account setup is good.
- ◆ 31% of students find that login process is good
- ◆ 38% of students find that visual interface is average.
- ◆ 31% of students find that icons for video downloading and sharing are average.
- ◆ 28% of students find that icons for adding to favorites and adding to playlist of videos is good and average respectively.
- ◆ 28% of students find that icons for home, navigation, notification, and setting are good.
- ◆ 34% of students find that enrolling in a course is good.
- ◆ 31% of students find that rating a video is good.
- ◆ 34% of students find that rating the application is very good.
- ◆ 34% of students find that in-class activities and assignments is very good.
- ◆ 37.5% of students find that the relationship of the virtual instructor with students is good.
- ◆ 31% of students find that understanding about the subject is very good.
- ◆ 31% of students find that ease of using mobile-learning application is very good.
- ◆ 34% of students find that using the downloaded video for later reference is good.
- ◆ 31% of students find that sharing the videos with the friends is average.

Therefore, from the observations made using usability evaluation, we can conclude that app X is useful as the percentage of the app on basis of the criteria 'very good' is the highest in maximum number of questions. From the results based on various criteria, we can say that

maximum number of students found the app useful. Many students rated the overall features of app as good and they found that the interface is also good and average. Overall, this mobile learning application X is found to be useful by many students from various colleges.

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