

# UX Evaluation of Video Streaming Application with Teenage Users

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**Abstract**—Studies show that YouTube (a video streaming application) is the third most frequently visited website globally. It was created for users to search for, watch and share video online. Statistics show that YouTube runs in more than 88 countries and support 76 different languages and this covers about 95% of Internet population worldwide. Hence, a usability study for a specific class of users such as teenagers for such a top-rated web application with very high user loyalty is necessary. In this study, the authors focused on YouTube website usability for Malaysian teenagers that are currently schooling in a boarding school with limited Internet access. The usability study was carried out in a controlled laboratory environment with devices and software like MacBook, LCD Monitor, and WhatPulse heat map tracker. The usability evaluation was done using the following usability metrics: ease of use, usefulness, learnability, and users' satisfaction. Data was collected using a combination of video recordings, mouse, keyboard heat map and questionnaires. The outcome shows that most of the respondents only use YouTube for watching the video and do not give attention to other features in the application while doing that. In addition, the study reveals that first-time users encounter some difficulties using the application, but however do catch up within a short while. The study further shows that YouTube application is efficient, satisfying, useful, and learnable. Some observed issues with the application were highlighted and useful remedying suggestions for improvement were proffered.

**Index Terms**—Usability Evaluation; Teenage Users; Video Streaming App.

## I. INTRODUCTION

The YouTube application was launched on the 14<sup>th</sup> of February 2005 by Steve Chen, Chad Hurley, and Jawed Karim. Today, this application has become the third most frequently visited online application globally, implying that it has an enormous user loyalty. The main functionalities that YouTube offers enable users to search for, watch, and share video. In addition, YouTube provides forum services to connect users worldwide. Statistics indicate that YouTube runs in more than 88 countries, and support 76 different languages which cover 95% of Internet population globally [1]. YouTube's annual revenue for the year 2015 was 9 Billion. This was an increase from the 4 Billion made in the year 2014. Meanwhile, a 2016 Social Media Marketing Industry report states that there is a decline of 2% of YouTube usage. This indicates that there might be some weaknesses in the application that warranted the drop-in usage and loyalty. Thus, this necessitates a further investigation especially in the aspects that concern usability. Despite the popularity and the global recognition that YouTube has gained over the years,

there is still room for the enhancement and improvement of the website and application.

Usability studies are usually considered especially for different kinds and classes of users that range across all demographics such as age, culture and location. There are always inherent gaps that need to be discovered and evaluated particularly for features that appear very good but that still attract low usage and loyalty from current users and a certain class of users. Those that are familiar with YouTube might be conversant with its features, but the case is not the same with teenagers (especially in Malaysia) who have limited access and time to the application. There is the need to evaluate the application's video uploading feature in terms of usability especially as the users have to first login with their Google account. Other functions such as subscribe, share and change language, content location, and restricted mode components also have to be evaluated as well. The focus of the study is on Malaysian teenage YouTube users.

This paper aims on addressing gaps in the usability of YouTube application especially for the main features and functions such as login, upload, share, subscribe and change language, content location, and restricted mode among teenage users. The remaining parts of the paper are as follows: part two is the methods section, part three is the results section, and part four is the discussions section, while part five is the conclusion section.

## II. METHODS

There have been some works on the YouTube application's usability, however, a lot more still needs to be done. In this paper, the YouTube's usability study focused on Malaysian teenagers in boarding school. The usability test was conducted at Al-Maad School in Arau, Perlis on the 27<sup>th</sup> of October 2016 from 7.00 am to 2.00 pm. The participants were 13 to 15 years old and were all male students. Also, all of them were resident and quartered in the school's hostel. Ten random respondents were selected as part of this usability study based on Nielsen's proposal [2] that suggests 5-15 respondents as being sufficiently okay for a usability test of this nature. In addition, the purpose of this study was to evaluate the usability of five features in YouTube (i.e., Login into YouTube account, upload video, subscribe a channel, share a video, and change language, content location, restricted mode options). Each individual session lasted approximately twenty-five minutes and seven hours is used to complete the usability test.

In this study, task time, heat map, and task satisfaction were used as metrics to measure usability [7-12]. Precisely, task time and heat map were metrics used to capture the efficiency

of the interface. Furthermore, the survey was carried out using post-task questionnaires that users respond to after every task completion. Task time is used to measure how fast a respondent completes a task while questionnaires are employed to get users responses on the usability of YouTube website based on their level of satisfaction after completing the tasks.

A. Research Questions

Heat map, task time, and task satisfaction were used to evaluate five features/functions: (1) Login to YouTube System (2) Upload Video (3) Subscribe to a channel (4) Share video (5) Change language, change content location, and change restricted mode option. The following two research questions were asked:

- i. How efficient is the YouTube interface when used by teenage users?
- ii. How satisfying is the YouTube interface when used by teenage users?

B. Usability Metrics

Since this usability evaluation involved one of the top websites in the world, therefore time taken for each task is considered crucial even for few seconds. This will indicate how fast users can react to task and how good the website is in terms of efficiency, learnability, and satisfaction. In this study, task time was captured for each task per participants. Also, a post-task questionnaire was administered after every task to every participant to elicit their task satisfaction.

In addition, mouse and keyboard heat map were used as an indicator to ascertain how good the users are in each task. Less heat map implies a better usability results for the given task and a better efficiency of the interface. Most of the users used in the study were computer literate, so there is no issue with technical knowledge on the use of YouTube. The pattern of users focus on the application was self-centred and eye catchy.

The usability metrics captured from the post-task questionnaires are usefulness, ease of use and satisfaction. The study questionnaire was adapted from [3,4] and modified to suit the study's needs. The questionnaires captured the respondents' experiences with the five respective tasks. Observations were also made by the researchers and used in supporting the study's outcomes

III. RESULTS

The descriptive statistics (that is, frequencies) were employed to analyze the demographics of the study. The ten randomly selected participants used in the usability test were all male (100%) and the students were within the age 13 to 15 years of age. Seven (7) (i.e., 70%) of the respondents access the Internet fortnightly and three (3) (i.e., 30%) of the respondents access the Internet daily. Furthermore, all the ten (10) participants (100%) have heard about the YouTube application and most of them, seven (7) (i.e., 70%) do not have prior experience on using any other websites other than YouTube.

The heat map results show that the highest keyboard click by the participants was 116 clicks and the minimum keyboard click was 71 clicks. The average keyboard heat map for all participants was 92.1 clicks. However, the highest mouse click by the participants was 55 clicks and the minimum mouse click was 38 clicks. The average mouse heat map for

all participants is 46.7 clicks. Based on this heat map results, the overall participants' heat map falls below average; only 40% for keyboard heat map and 50% for mouse heat map. In conclusion, these low heat maps automatically reflect and imply that the time taken per task was low, thus, providing an answer to the first research question. This implies that with a low heat map, the YouTube interface is efficient with reference to the five evaluated features.

The mean task time taken for every task is as shown in Table 1. Task 1 (T1) 7 (i.e., 70%), task 2 (T2) 5 (i.e., 50%), task 3 (T3) 7 (i.e., 70%), task 4 (T4) 5 (i.e., 50%), and task 5 (T5) 5 (i.e., 50%) of participants were able to finish below the average time. In addition, all participants agree that they were satisfied with the time taken to complete the five tasks (T1 – T5).

Table 1  
Time Taken versus Task Satisfaction Results

	T1	T2	T3	T4	T5
Overall Mean Task Time	70.80	122.4	34.1	61.1	86.6
Overall Count for Task Time below than mean (Frequencies / %)	7 (70%)	5 (50%)	7 (70%)	5 (50%)	5 (50%)
Overall Mean for Task Satisfaction	6.20	6.00	6.75	6.25	6.30
Overall Task Satisfaction Scale	Agree (6)	Agree (6)	Agree (6)	Agree (6)	Agree (6)

From the results in Table 1, it can be concluded that most of the participants were able to complete their entire given tasks in a short time, that is, below the mean for task time. This implies that the interface is relatively efficient and this again answers the first research question.

The mean for each task that has been carried out using each of the usability metrics: usefulness, ease of use and satisfaction shows that all participants agree and are satisfied that all the five tested features in YouTube app were useful, easy to use, and satisfying, with the overall rate above six. Refer to the Table 2 for details on usability metrics results.

Table 2  
Usability Metrics Results

	Mean Usefulness	Mean Ease of Use	Mean Satisfaction
Mean	6.1250	6.1500	6.5286
N	10	10	10
Minimum	4.75	5.30	5.71
Maximum	7.00	7.00	7.00

Further still, the reliability test for the study instrument reveals that the Cronbach's alpha coefficient for 35 items was 0.929. This suggests that the instrument (that is, the post-task satisfaction questionnaire used) has a very high internal consistency, and is able also to replicate similar results in a similar research context. Thus, the instrument is reliable.

IV. DISCUSSIONS

From observations made, it was found that some users had difficulty performing task one (that is, login to YouTube) because this task required every participant to have a Google account. Other than this, most of the participants also had difficulties performing task two because the process of uploading video takes a long time and task five which is the change language, change content location and change

restricted mode feature because all of this feature uses small fonts and are located at the bottom of the YouTube page. Overall all participants were able to finish their test tasks and also provided a positive feedback and found all five tested features usable. However, the researchers found and highlight a few issues and made some suggestions for future improvement on the YouTube interface as shown in Table 3 below:

Table 3  
Identified Issues and Suggestions

Highlighted Issues	Suggestions for Improvement
i. No sign-up button on homepage	i. Researchers suggest adding a sign-up button on the homepage. Because new users will keep looking for the sign-up button to create a new account.
ii. YouTube registration feels like Google registration	ii. Users required having Google account in order to create YouTube account. This is a weakness for those users that do not have Google account. Researchers suggest applying new function where users able to sign up using existing social media account. Once users click on the "Sign Up with" button then it will get users information from their existing social media account and automatically create a new YouTube account for the users. So next time when users want to access YouTube they can manually sign in or click again "Sign In with" their social media account. The system will verify every time users login whether the account existed or not.
iii. Videos cluttered with advertisement	iii. Researchers suggest to properly design YouTube video playback which reduces or not interrupt users with the advertisement when users watching the video.

The results of this study have shown that the task times used by most participants to complete tasks were either equal to or less than the mean task time and the mean for the task satisfaction shows that all respondents were satisfied with the time taken to complete the tasks. Overall, the study outcome shows that all of the participants found the YouTube interface useful, easy to use and satisfying with regard to all the features that were evaluated.

### V. CONCLUSION

Studies show that YouTube (a video streaming application) is the third most frequently visited website in the world. This indicates a huge user loyalty. It was created for users to search for, watch and share video online. Statistics show that YouTube can be accessed in more than 88 countries and support 76 different languages which covered about 95% of Internet population worldwide. Hence, a usability study for a specific class of users such as teenagers for such a top-rated web application is very necessary. In this study, the authors focused on YouTube application's usability for Malaysian teenagers that are currently schooling in a boarding school with limited Internet access. The usability study was carried out in a controlled laboratory environment with devices and software like MacBook, LCD Monitor, and WhatPulse heat

map tracker. The usability evaluation was done using the following usability metrics: task time, heap map, ease of use, usefulness and users' satisfaction. Data was collected using a combination of video recordings, mouse and keyboard heat map and questionnaires. The outcome shows that most of the respondents only use YouTube for watching the video and do not give attention to other features in the application while doing that. In addition, the study reveals that first-time users encounter some difficulties using the application, but however do catch up within a short while. The study also shows how usable YouTube application is with respect to usefulness, efficiency, satisfaction, and learnability.

In conclusion, most of the respondents found that YouTube websites are well organized, clean, very useful, and easy to use. Overall, participants were able to learn and memorize the task within a short time which implies the YouTube application is highly learnable. Some issues, however, were identified and some suggestions proffered for the future improvement of the YouTube interface. Implementing these will lead to the application having a competitive advantage over other similar competing streaming applications.

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