**Usability Test for Adobe Photoshop: Recommendation Report**



**Submitted to:** Adobe Photoshop Developer

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# Executive Summary

Usability and accessibility test for Adobe Photoshop was conducted on October 7 and 8, 2018 consecutively at Curtis Laws Wilson library, Missouri University of Science and Technology, room number 103 with five participants. The purpose of this report is to communicate recommendations and report findings to the Adobe Photoshop developer team for improving usability of this software.

Before the test, the background and history of Photoshop was analyzed thoroughly and then the rhetorical situation was examined to conduct usability test for this software and lastly the problem statement i.e. what the reason was to conduct the test was taken into consideration. After that, the test objectives were decided which helped me to test those features and tools of this software application that created confusion, satisfaction and dissatisfaction among the users. Then audience analysis was done, and a persona was created based on the student population focused in the test. Five participants with two backup participants were recruited through screening questionnaire sent via Google forms to prospective candidates to see if they were fitting my criteria to be a participant for this test. On the test day, pre-test questionnaire was filled out by the users that helped to understand their requirements and expectations more deeply. GoPlay screen recording software was used to record the entire session of the test. Besides, think aloud protocol was explained to the users to motivate them to share their feelings and comments during the test.

During the test, a scenario and some related tasks were provided to the participants to perform. After the test was over, post-test questionnaire was given to the participants to fill for getting feedbacks from them about the software. Both qualitative and quantitative method of data collection was resorted from this test. Quantitative data was collected on the basis of time on task, number of errors, error recovery time, success or completion rates, failure and use of help and documentation. Qualitative data was obtained from post-test questionnaire, think-aloud process, and observation. All these data helped me to analyze the findings obtained from the test and later make a final recommendation report about the usability of Adobe Photoshop. Determination of success or failure of task was based on the task completion within or beyond predetermined time frame and user’s giving up on task respectively.

Findings were organized based on top-down method where predetermined codes were used to do the logging process. From the log, both quantitative and qualitative data were collected. Problems related to test were analyzed based on scope and severity. Scope included global and local problem and severity included catastrophe, major, minor and cosmetic problem. Similar kind of problem encountered by three or more participants was categorized as trend. Top positive and top negative findings and top surprises were jotted down from the log form.

Catastrophe problem was encountered for placing graphics into the rectangle and four out of five users failed to accomplish the task. Major problems were encountered for creating and resizing rectangles, applying blending effect to the rectangles and anchoring the image into a certain position on the canvas. Minor problem was encountered for expanding the image size and applying color border to the text box. Cosmetic problem was noticed for finding ‘canvas’ option to change the size of the canvas. Local problem was noticed on tasks 2, 3, 7, 8 and 10 whereas global problem was noticed on tasks 4 and 5.

To fix those issues, some recommendations were given.

* Hover feature should be there over the tools so that it can create a pathway for the user.
* Tools should be available from menu as well.
* Customizing option of rectangle should be there within rectangle tool.
* Resizing option should be there to change the size of any shape such as rectangle, square and so on.
* “Blending” option should be available at “edit” menu and there should be an indication that Photoshop works in layer as users find it difficult to do any sort of editing without using layer option.
* Color change option of text box should be available at the general “color” option and background color and image color options should be separated.
* “Insert” option should be there as it is easier to understand by users than “place” and there should be confirmation or indication after the graphics are placed.
* A separate menu of “Canvas” should help users find that option easily and do all sort of editing within canvas.
* Anchoring option should be workable without selecting the image and this option should be available by right clicking on the image.

# Introduction

Adobe Photoshop is a raster graphics editor or image and graphics editing software whose main functions are to transfer or alter images, crop, resize or correct color on digital photos, compost 2D and 3D images, change background and to some extent edit videos. It is developed and published by Adobe Systems for macOS and Windows. Photoshop was developed in 1987 by the American brothers Thomas and John Knoll, who sold the distribution license to Adobe Systems in 1988. At the time of pursuing his PHD at University of Michigan, Thomas Knoll began writing a program on his brand-new Apple Mac Plus (Macintosh plus) to help out with his thesis, but he was dismayed to find it could not display grayscale images on the monochrome monitor. So, he set about writing his own code to do the job which caught the attention of his brother John Knoll, who was then an employee of Industrial Light and Magic. Both of them then decided to turn the monochrome display into full-fledged image editing program. Photoshop was initially named by Thomas as ‘Display’; then it was renamed by him as ‘ImagePro in 1988 and finally it was named as Photoshop. In 1988, Barneyscan, a scanner manufacturer, decided to distribute the copies of this program and then later in that year John gave a demonstration about Photoshop to engineers in Apple and Russell Brown, an art director in Adobe, who later on decided to purchase the license for Photoshop to distribute. Adobe published thirteen versions (major and minor changes) before the October 2003 introduction to Creative Suite branding. After that total eleven major versions were published from Adobe. They were Photoshop CS, CS1, CS2, CS3, CS4, CS5, CS6, CC, CC 2014, CC 2015, CC 2017 and CC 2018. The first release of Adobe Photoshop was in February 1990. At that time Adobe’s agenda was to propagate digital imaging for everyone, so its key marketing decision was to present Photoshop as a mass market, fairy simple tool for anyone to use rather than most graphics of the time, which was aimed at specialists. During that time image or graphics editing was only possible with thousands of dollars of advanced equipment, therefore it created a need for Adobe to make it possible for non-professional users like college students, to achieve the same things on their home desktop Mac. After that new tools and features had been continuously added to it to open a new market for professionals with every new version of Photoshop.

A rhetorical situation is the context of a rhetorical act, made up (at a minimum) of a rhetor (a speaker or writer), an issue (or exigency), a medium (such as a speech or a written text), and an audience. The exigency to test this software was although it was designed initially for non-professional users such as students, home enthusiast and so on, but at present Photoshop had become more or less restricted to professional users such as photographers, artists, web designers, illustrators, digital marketing and print media employees and so on due to high cost incurred to get Photoshop license and high-end features which takes long time to learn for an amateur or beginner user. Furthermore, at present it was important for almost every student to work with images for their projects and assignments particularly for technical communication, digital media or computer science students and for that Photoshop was a great option to make their projects attractive and professional. But, in realty, many students, I saw in my university, struggle to use Photoshop and show concerns to use it because of its high-end features which took long time to learn and multiple steps involved achieving one task compared to its competitive products such as Paint Shop Pro on Windows. Also, many times they encountered errors while creating background by importing picture from different file format, inserting one picture into another image, merging two pictures, anchoring the image into canvas and exporting it by converting into another file format. They also got confused by the languages and wordings used in this software such as ‘place’ which was usually known as ‘insert’ in all other software applications. So, I tested Photoshop to see whether a novice user could accomplish the task of importing, editing and exporting pictures without any assistance, how much time one took to finish one task, how many errors they encountered and so on. My primary audience who read and reviewed my test plan was Dr. Wright. The findings obtained from the test was analyzed to see how beneficial it would be for those students and non-professionals who were associated with image editing and art related projects and courses and interested in playing with images and turning their digital artwork from ordinary to extraordinary. Recommendation report would be delivered to the software developer for making modifications on different tools and features to improve user satisfaction and retaining those tools and features which created user satisfaction. There were few constraints and limitations for the usability testing of Photoshop as many aspects of it could not be tested due to lack of time of the students and inability to access legacy pages. Financial issues associated with this software were also difficult to test. So, the main problem statement was to see what barriers to usability existed in Photoshop that was associated with user dissatisfaction and reluctance to use this software.

# Test Objectives

The test objectives for the usability test of Photoshop were based on Quesenbery’s “5 E’s” for usability. These 5E’s were effective, efficiency, engaging, error, tolerant and easy to learn. Testing goals were based on my own exploration of the software and the concerns expressed by the students. Each goal was related to one of the 5E’s. The test goals for Adobe Photoshop were as follows:

Table 1: Test Objectives

|  |  |
| --- | --- |
| **Test Objectives** | **5 E’s** |
| Can users create a background from importing picture from different drive or folder to Adobe Photoshop without assistance? | Efficient  Effective |
| Can users export picture converting the file format from .psd to other file formats such as .jpeg without assistance? | Efficient  Effective |
| Can users place multiple images on the same frame and edit it within a predetermined time frame? | Effective  Efficient |
| Can users successfully merge, edit, expand and export the image for a specific assignment like making posters or flyers? | Effective |
| How confusing or satisfying is it for novice users to edit, insert and export images on Photoshop? | Engaging  Easy to learn |
| Which tools and features on Photoshop are most confusing or satisfying for them? | Engaging  Efficient |
| How many errors do users experience and which step does create more errors while manipulating and exporting images? | Error tolerant |
| Do users need any assistance to recover those errors and how long does it take for users to recover them? | Error tolerant |
| Does working with Photoshop and the system architecture match the users’ mental models for the way they expect the system to work? | Easy to learn |
| Is it easy for the users to learn the languages and wordings used on Photoshop? | Easy to learn  Efficient |

# Audience Analysis

The major function of Photoshop is to edit images or graphics, so it is mostly popular among audiences who are associated with professions like photography, web designing, print media etc. and pursuing their education related to digital or photographic art or related department. My test objective was to test student population who were reluctant to use Photoshop due to many challenges such as time required to learn the software, number of steps associated with it to achieve one task, languages and vocabulary used in this software etc. So, I created a persona based on the student population who was focused in this test.

## Persona

|  |
| --- |
| **Name:** Mr. / Ms. X |
| **Gender:** Male/Female |
| **Age:** 19-30 |
| **Language:** Must be native/fluent English speakers |
| **Education:** Pursuing undergraduate or graduate studies |
| **Major:** No restrictions |
| **Work experience:** 0-1 years |
| **Expertise:** Basic computer education, expert in using digital camera, smart phones, fascinated in surfing internet, basic idea of digital painting and editing image, familiar with similar kind of software, no experience in Adobe Photoshop, proficient in using MS office particularly MS word and power point and familiar with downloading and uploading images. |
| **Motivations and goals:** Interested in creating and editing images or graphics for assignments or personal motivations, needed to create more professional and attractive images or graphics, interested in photography and digitalize images to turn ordinary into extraordinary, motivated to play with colors and create digital masterpiece, interested in animation work and enthusiastic in making and editing 3D artwork.  **Challenges and Fears:** Time consuming to learn, disturbance with recognizing new cameras’ raw files, difficulty in installing older versions of Adobe software, trouble with looking for updates, difficulty in handling many tools, experiencing unexpected results and slow performance, interference of third-party extensions, loss of original work, manipulation of images without permission, failure to identify the persons who creates or manipulates unauthorized images or videos and failure to understand any hidden agenda or see the real picture behind any attractive advertisements or promotions. |

# Test Plan

## Methods

In order to achieve these above-mentioned test objectives, I gave a scenario and certain tasks to the participants to perform after selecting participants through screening questionnaire. Scenarios and tasks were designed in such a way that those helped to test certain features and tools of the software such as importing options, different tools such as lasso tool, move tool, zoom tool, hand tools and so on, editing options, converting file format process and so on. I recorded the entire session through GoPlay, a screen recording and video editing software, while participants were completing their tasks on Adobe Photoshop. So, before testing, I gave them consent forms, briefed them about the test and explained them the think-aloud process. All the participants were using my laptop to complete the task. The test was conducted in Missouri S&T library, room number 103, which was a quiet place free from any distraction.

The data obtained from recording helped me to collect accurate data and did findings analysis later. From the given tasks both qualitative and quantitative results were obtained. Performance and preference data were particularly quantitative and were obtained on the basis of several metrics such as time on tasks, number of errors, recovery from errors, success or failure at task, post-test questionnaire etc. Qualitative feedback was obtained by observing participants constantly while performing their tasks, post-test questionnaire and also taking field notes of non-verbal cues such as facial expressions, body language, laughing, sighing, giggling etc. Pre-test questionnaire was filled before the test and post-test questionnaire was filled after the test by the participants.

## Consent form

As I was the only one who was conducting the test, I had to do multiple tasks of moderator, logger, or facilitator at a time. So, I used “GoPlay” (screen video capture software) to record the entire session of testing. The recording helped me to analyze my data accurately after the test, look for any statement or data that I missed taking note of and keep the pace of my test without slowing down by stopping the participant, obtain the exact time of every task the participant spent on and so on. This recording also helped me to avoid any missing body language and other facial expressions such as smile, sighing, moaning etc of the participant. I logged the information on my notebook during the test also. After the test I reviewed the loggings. Before test, I asked every participant to sign a consent form giving me permission to screen record them for the test. Consent form can be found in Appendix A.

## Briefing

It was very important to make briefing of the test process to participants after welcoming them and making them comfortable before the test. It gave participants an idea about what they would be doing during the test, how much time it would take to finish the test, if there could be any unexpected occurrences while going through the test, if they would be alone in the test or I would be with them, if they would be allowed to share their feelings or experiences during the test etc. It was also helpful for the participants to know during briefing was that they would not be judged during the test, but the test was all about judging the product. As a moderator I maintained professional body language although not very stiff, motivated the participants, asked relevant questions and intervened when required. Briefing script can be found in Appendix B.

## Screening questionnaire

In order to prepare for the test at first, I recruited participants for it personally. As I had been given responsibility to conduct the test solely, I did not go for any external agency to find my participants. For that I used screening questionnaires to choose my participants. These questionnaires were used to determine whether the particular person was fitting my criteria to be a user or not. I asked the candidates to fill out the questionnaires in order to choose the right participants for my test. Questionnaires were sent via Google forms. Screening questionnaires can be found in Appendix C and the screener data for each user can be found in Appendix C.1.

## Pre-test questionnaire

I designed pre-test questionnaires for my participants and I asked them to fill it before test on the test day. The pre-test questionnaires helped me to dig more into each and every one of them and understand what their requirements were and what exactly they wanted to achieve or accomplish by using this software. According to the participants’ preferences, test equipment and set up were prepared. Pre-test questionnaire can be found in Appendix D.

## Think out loud protocol

In think-out loud protocol participants shared their experiences and positive or negative feedbacks during the test with me without bias. It was illuminating to hear from the participants while he or she was working with the product and learn what pleased, frustrated, or confused him or her about the product. Although it could have been quite uncomfortable and unnatural for the participants, but I convinced them about this protocol as their thoughts were really helpful to test the usability of this product. Instruction given for think out loud protocol can be found in Appendix E.

## Metrics

I resorted to a combination of both quantitative and qualitative collection methods of data to understand fully the experience and satisfaction level of users. Usually performance and preference data were quantitative in nature and were counted and measured against metrics established to determine success or failure of tasks. Performance data were collected on the basis of measurements of users’ actions such as time on task, number of errors, number of recoveries from errors, success or failure at task completion and use of help and documentation. Table 2 shows the quantitative metrics, the unit for recording the metrics and how the metrics will be recorded.

### Quantitative Data

Quantitative data was collected based on following metrics, unit, and method:

Table 2: Quantitative Data (Performance)

|  |  |  |  |
| --- | --- | --- | --- |
| **Metrics** | **Unit** | **Method** | **Recording Method for later logging** |
| Time on task | Seconds | Time on task was measured by analyzing few questions:   * How long did it take to create a background on Photoshop? * How long did it take to place images into the rectangles? * How long did it take to expand the image and canvas size and edit it? * How long did it take to export the picture into different file format? | Start and end time were recorded by video recording. Time for each task was collected using the codes and timestamps. Besides, stopwatch was used to keep track of each task. |
| Number of errors | Numeric | Number of errors were counted by analyzing following questions:   * How many errors did occur while creating a background? * How many errors did users face while placing images on the same frame? * How many errors did users encounter while saving and exporting the image into different file format? * How many wrong clicks were clicked by the user? | Errors were collected from video recording and then counted. I also personally took note of number of errors on my notebook as well. |
| Error recovery time | Seconds | Error recovery time was measured by carefully observing the time when an error was encountered and then again recovered by a user. | The error start time and recovery time were coded from the video recording. Then the recovery time was calculated using the codes and timestamps. |
| Success at task completion | Numeric | Success of a particular task was determined on the basis of whether a task is completed within a predetermined timeframe or beyond the predetermined timeframe. | It was written by me after each task on my log form. |
| Failure at task completion | Numeric | Failure of a task was determined on the basis of whether a participant is not able to complete the task knowingly or unknowingly. | It was noted by me after each task on my log form. |
| Use of help and documentation | Numeric | It was determined on the basis of how many times a participant calls for help and uses documentation during task completion. | Number of times candidates asked for help and documentation was recorded by me on my notebook. |

Preference data was collected on the basis of responses to questions on post-test questionnaire. Both qualitative and quantitative data were obtained by analyzing post-test questionnaire. Table 2 shows the preference data.

Table 3: Preference Data

|  |  |
| --- | --- |
| **Preference Data** | **Method** |
| Quantitative | Quantitative data was obtained by analyzing the rating scale used by the user. |
| Qualitative | Qualitative data was collected on the basis of comments, opinions and perceptions given in post-test questionnaire. |

Metrics was set before the test for time on task to determine success or failure of a task and also to see how many users could finish the task within predetermined time frame and beyond predetermined time frame.

Table 4: Pre-set Metrics for Time on Task

|  |  |
| --- | --- |
| **Task** | **Time (Seconds)** |
| 1 | 60 |
| 2 | 90 |
| 3 | 180 |
| 4 | 180 |
| 5 | 240 |
| 6 | 60 |
| 7 | 180 |
| 8 | 120 |
| 9 | 30 |
| 10 | 120 |
| 11 | 60 |
| 12 | 30 |

### Qualitative Data

Qualitative data or feedback was collected from observing participants carefully and taking field notes throughout the test. All non-verbal cues were noted such as facial expressions, body language, and non-verbal utterances including laughing, sighing, giggling, moaning, groaning and so on. Also, participants’ comments while thinking out loud were a good source of collecting qualitative data. Post-test questionnaires were designed to obtain suggestions and candid feedbacks of the participants.

## Scenarios

I gave my participants a specific scenario in order to test Photoshop. This was as follows:

“You have been recently assigned a project on Harry Potter movies in your Digital Marketing course in Missouri S&T. You want to create a poster with the image of Harry Potter and other graphics related to Harry Potter movie series for this assignment. But the effects and background you are looking for are not available on other image editing software. So, you have decided to use Photoshop to manipulate your photos or images. You have already collected few graphics and photos of Harry Potter in a folder on the desktop of this laptop called ‘Harry Potter’. Your goal now is to create a poster that looks professional and spectacular and demonstrates what your assignment will be all about. After you are done with the project you have to export it by converting into another file format such as .jpeg or.png, so that you can use it for your assignment. Please feel free to use the graphics from that folder while creating your poster. Adobe Photoshop is open in front of you and ready to use on my laptop.”

## Tasks

I gave a list of tasks to my participants. These were as follows:

1. Create a background for the entire page with the image of Harry Potter.
2. Expand the image by adjusting width and height.
3. Create four rectangles, one in each corner of the page and expand it by changing width and height.
4. Apply a blending effect of your choosing in each rectangle.
5. Place four different graphics of your choice within the rectangles and center it.
6. Place text of your choice in the box.
7. Apply a color border to the text box.
8. Change the canvas size by changing the unit into pixels from inches.
9. Expand the canvas size by adjusting the width to 1000 pixels and height to 1200 pixels.
10. Anchor the entire image to the upper left corner of the canvas.
11. Change the canvas color according to your choice.
12. Export your final project changing the file format from .psd to .jpeg.

## Post-test questionnaire

Participants were asked to fill a post-test questionnaire after they were finished with all the tasks. This questionnaire was meant for the participants to rate the overall experience of using the software. I designed a post-test questionnaire that typically mapped to the goals of the test. I used a combination of both closed-ended and open-ended questions. Post-test questionnaire can be found in Appendix F and answers given by each user can be found in qualitative data.

## Log form

I kept log forms ready with me in order to avoid cluttered logging. A good log form helped me to keep in mind what information should be noted down and how to organize the logging. From the log form both quantitative and qualitative data were obtained. In the log from time taken for each task, number of errors, error recovery time, codes, moderator comments, user comments and non-verbal cues were noted down for analyzing the findings to prepare final recommendation report. Outlier data was also recorded in the log form. Outlier was the single instance of finding, whose result was different from others. I considered three important points while reporting outlier data. These were whether the participant was true representative of the target users, if others faced the same problem and whether the result was useful for further study. Outlier data was presented in numbers. Completed log form can be found in Appendix G.

# Organizational Method

Findings from the test were organized based on the top-down method. In top-down method, a set of heuristics i.e. rules, guidelines or codes were pre-shaped or predetermined before the test and used to do the logging process. It helped me to log the findings from the screen recording software ‘GoPlay’ and to sort the findings from the logs on the basis of codes. The codes used for findings analysis are listed in table 3.

Table 5: Codes

|  |
| --- |
| **Codes** |
| S = Start |
| F = Finish |
| Q = Quote |
| T = Terminology |
| UA = User action |
| MM = Mental Model |
| H = Help |
| E = Error |
| R = Recovery |
| FF = Failure |

S and F were used to denote the beginning and end of a task, respectively. Q was used to code important quotes from the users. T was used to denote certain terms or words used in Photoshop that were not understood by user. MM was used to denote when a user did not understand the concept of a part of Photoshop software or when Photoshop did not meet their expectations or fit the mental model of what any application or tool or option should be. H was used to note any time user asked for help and I helped or prompted the user. E and R were used to note when an error began and when the error was recovered respectively. FF was used to denote the failure of any task.

# Presentation of Data

Both quantitative and qualitative data are as follows:

## Quantitative Data

**Task 1**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00.25 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 2 | 02.14 |  | 0 |  | NA |  | 0 |  | 0 | 0 |
| 3 | 00.27 | 01:04 | 0 | 0 | NA | NA | 0 | 0 | 0 |  |
| 4 | 00.33 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 5 | 00.24 |  | 0 |  | NA |  | 0 |  | 0 |  |

**Task 2**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00:30 |  | 1 |  | 00:05 |  | 0 |  | 0 |  |
| 2 | 01.25 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 3 | 01.06 | 01:38 | 0 | 0.60 | NA | 00:20 | 0 | 0 | 1 | 0.60 |
| 4 | 01.05 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 5 | 01.26 |  | 2 |  | 00:56 |  | 0 |  | 1 |  |

**Task 3**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 03:17 |  | 1 |  | 02:30 |  | 0 |  | 0 |  |
| 2 | 02:08 |  | 1 |  | 00:58 |  | 0 |  | 0 |  |
| 3 | 03:01 | 03:25 | 1 | 1.4 | 01:45 | 01:00 | 0 | 0 | 0 | 0.2 |
| 4 | 05:00 |  | 2 |  | 01:24 |  | 0 |  | 0 |  |
| 5 | 03:01 |  | 2 |  | 01:43 |  | 0 |  | 1 |  |

**Task 4**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 02:53 |  | 2 |  | 00:23 |  | 0 |  | 1 |  |
| 2 | 04:43 |  | 1 |  | 01:08 |  | 0 |  | 1 |  |
| 3 | 03:34 | 03:33 | 1 | 1 | 00:47 | 00:46 | 0 | 0 | 1 | 1 |
| 4 | 03:09 |  | 0 |  | NA |  | 0 |  | 1 |  |
| 5 | 03:30 |  | 1 |  | 00:53 |  | 0 |  | 1 |  |

**Task 5**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 04:20 |  | 1 |  | 01:13 |  | 1 |  | 1 |  |
| 2 | 02:23 |  | 0 |  | NA |  | 1 |  | 0 |  |
| 3 | 03:59 | 04:06 | 1 | 0.8 | 01:19 | 01:45 | 1 | 0.8 | 1 | 0.8 |
| 4 | 04:30 |  | 1 |  | 02:30 |  | 0 |  | 1 |  |
| 5 | 04:00 |  | 1 |  | 01:19 |  | 1 |  | 1 |  |

**Task 6**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation** | **Average** |
| 1 | 00:32 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 2 | 00:18 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 3 | 00:19 | 00:38 | 0 | 0 | NA | NA | 0 | 0 | 0 | 0 |
| 4 | 01:04 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 5 | 00:20 |  | 0 |  | NA |  | 0 |  | 0 |  |

**Task 7**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00.21 |  | 0 |  | NA |  | 0 |  | 1 |  |
| 2 | 01:16 |  | 2 |  | 00:23 |  | 0 |  | 0 |  |
| 3 | 00:19 | 01:24 | 0 | 1 | NA | 00.39 | 0 | 0 | 0 | 0.2 |
| 4 | 02:59 |  | 2 |  | 01:46 |  | 0 |  | 0 |  |
| 5 | 02:07 |  | 1 |  | 00:27 |  | 0 |  | 0 |  |

**Task 8**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00:59 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 2 | 01:58 |  | 0 |  | NA |  | 0 |  | 1 |  |
| 3 | 01:34 | 01:22 | 0 | 0 | NA | NA | 0 | 0 | 0 | 0.4 |
| 4 | 01:29 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 5 | 01:34 |  | 0 |  | NA |  | 0 |  | 1 |  |

**Task 9**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:Ss)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00:26 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 2 | 00:15 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 3 | 00:21 | 00:18 | 0 | 0 | NA | NA | 0 | 0 | 0 | 0 |
| 4 | 00:22 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 5 | 00:10 |  | 0 |  | NA |  | 0 |  | 0 |  |

**Task 10**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00:07 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 2 | 00:37 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 3 | 01:40 | 01.01 | 1 | 0.6 | 00:53 | 00:40 | 0 | 0.2 | 0 | 0 |
| 4 | 01:20 |  | 1 |  | 00:14 |  | 1 |  | 0 |  |
| 5 | 02:00 |  | 1 |  | 00:53 |  | 0 |  | 0 |  |

**Task 11**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00:12 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 2 | 00:23 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 3 | 00:30 | 00.25 | 0 | 0 | NA | NA | 0 | 0 | 0 | 0 |
| 4 | 00:30 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 5 | 00:30 |  | 0 |  | NA |  | 0 |  | 0 |  |

**Task 12**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Time on task (MM:SS)** | **Average** | **Number of errors (numeric)** | **Average** | **Error recovery time (MM:SS)** | **Average** | **Fatal error (numeric)** | **Average** | **Use of help and documentation (numeric)** | **Average** |
| 1 | 00:26 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 2 | 00:11 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 3 | 00:12 | 00.28 | 0 | 0 | NA | NA | 0 | 0 | 0 | 0 |
| 4 | 00:21 |  | 0 |  | NA |  | 0 |  | 0 |  |
| 5 | 00:29 |  | 0 |  | NA |  | 0 |  | 0 |  |

Table 6: Determination of Success or Failure of a Task

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Number of users completed tasks within predicted time (numeric)** | **Number of users completed tasks beyond predicted time (numeric)** | **Task completion percentage (%)** | **Number of users failed to complete task (numeric)** | **Task failure percentage (%)** |
| 1 | 4 | 1 | 100 | 0 |  |
| 2 | 5 |  | 100 | 0 |  |
| 3 | 1 | 4 | 100 | 0 |  |
| 4 |  | 5 | 100 | 0 |  |
| 5 |  | 1 | 20 | 4 | 80 |
| 6 | 3 | 2 | 100 | 0 |  |
| 7 | 4 | 1 | 100 | 0 |  |
| 8 | 1 | 4 | 100 | 0 |  |
| 9 | 5 |  | 100 | 0 |  |
| 10 | 4 |  | 80 | 1 | 20 |
| 11 | 1 | 4 | 100 |  |  |
| 12 | 5 |  | 100 |  |  |

## Qualitative Data

**Task 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 |  | Yes, I forget that ‘import’ option should be there in ‘file’ like other software | This task was quite fitting user’s mental model | Looking confident |
| 2 |  | How can I forget that it should be there in ‘open’ option? | For this user also, this task was quite fitting the mental model; only thing was that she got little bit confused whether to go for image or file | Looking little bit confused |
| 3 |  | I forgot, it should be there on ‘file’ | Initially user was thinking to import the image by clicking on background but then realized that it should be there in ‘file’ |  |
| 4 |  |  | User easily realized that the import option should be there in ‘file’ and easily imported the image |  |
| 5 |  |  | This task was quite easy to do for this user as well and user easily found that ‘import’ option should be there in ‘file’ |  |

**Task 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 | E | How can I forget that the image size can be changed from ‘image’ option? | User was finding difficulty with figuring out how to change the image size | Little bit confused |
| 2 |  |  | User was trying to right click on the image and see if that helped; but it was not allowing her to expand and then finally she found the image option | Struggling to look for the right option |
| 3 | H | Whoever looks for the top tool? I am surprised that I cannot drag it for expanding it. ‘Select’ option is not working | User was trying to drag the image to expand it but failed. It was not matching her mental model | Looking little disappointed |
| 4 |  |  | User was considering going to ‘edit’ option but then realized that it should be there in ‘image’ option. Task was accomplished successfully |  |
| 5 | E2, MM, H | ‘Select’ option is not working | User went to select first and then tried to find it in layer option; the image vanished; user asked for help and I gave him a clue and recovered from error and finished the task | Looking little disappointed |

**Task 3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 | E | I didn’t have any trouble to create those rectangles, but I am having trouble to resize them | User created too many rectangles without realizing and was struggling to delete those rectangles. Finally, user found the delete option but was again struggling with resizing it. | Seem to be tired |
| 2 | E | I don’t know why it did not allow me to duplicate those rectangles | User was considering going to the toolbar option and then decided to go for the ‘rectangle’ tool. User was trying to copy and paste all the rectangles but failed. Two extra rectangles showed up and covered the entire image and then user deleted the extra layers and error recovered | Sighing |
| 3 | E, H | I am not sure how to get my image back | User went to toolbar and then crop tool, so the error occurred. But with my help she recovered from error. User was struggling to resize it but finally made it | Seemed to be angry |
| 4 | E | I thought this tool will create rectangle inside the image | User went to marquee tool and then without realizing went to rectangle tool but created too many rectangles outside the image. Then user recovered from the error by deleting those rectangles. User successfully then resized the rectangle and finished the task | Looking confused |
| 5 | E2, H | This function is not good | User went to marquee tool and then crop tool and the entire image changed. Then user asked for help and with my assistance finished the task | Seemed to be angry |

**Task 4**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 | E, MM, H | I thought ‘blending’ should be there on color | At first user clicked on color and the entire image color changed but it was not blended. User related ‘blending’ with ‘color’ and that’s why it was not matching her mental model; user also asked for help |  |
| 2 | MM, H, E | I am little bit confused between ‘blur’ and ‘blending’; I don’t find any widow of ‘blending’; I thought ‘blending’ should be there in 3D | User was thinking to go to ‘3D’ option and clicked on ‘layer’ and then ‘adjustments. User clicked the ‘blending’ option but without selecting the rectangles; so, all those rectangles vanished. Finally, rectangles retrieved but user struggled a lot to find the ‘blending’ option and it was not fitting her mental model | Continuously sighing and looking frustrated |
| 3 | E, T, MM, H | I am not conversant with the term ‘blending’ and if it has to do with coloring or applying texture with the image, then it should be in ‘edit’ option | User clicked on layer option and the image got transferred to another page; user was not conversant with the term blending, and it was not fitting her mental model. User took my help and then recovered from error | Continuously sighing |
| 4 | H |  | User was considering going to ‘type’ and then ‘filter’. Then user asked for help. User found the ‘blending’ option and then started applying it to all rectangles. Finally, user made it |  |
| 5 | E, T, MM, H | I thought ‘blending’ means adjustment and it should be in ‘edit’ option | User was trying to find it in toolbar section but then he clicked on adjustment and edit option consecutively, so the image got transferred to another page. He had trouble understanding the term and it was also not fitting his mental model. User asked for help to recover from error and was then finally able to accomplish the task | Struggling to recover |

**Task 5**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 | E, T,MM, FF, H | I thought ‘place’ means ‘insert’ but I am wondering why there is no ‘insert’ option. I thought ‘open’ option at least could bring the graphics on the same frame | Task 5 is a fatal error; user didn’t understand the terminology ‘place’. User’s mental model was that ‘insert’ option should be there. After clicking on ‘open’ option separate windows opened for separate graphics | Looking very irritated |
| 2 | E, FF | How come it went behind it? I didn’t expect this to happen; it’s annoying that too many confirmations are needed. I accidentally found the place option, but I didn’t even understand the term | This user also failed this task. Same problem occurred to this user also. Graphics were going behind the rectangle and she was not able to fix it. Then user was not familiar with the term ‘place’ | Looking very dissatisfied with the task |
| 3 | E, T, FF | I thought there should be ‘insert’ option; I don’t know why it is going behind. Why ‘open’ option is not bringing the graphics on the same page? | User failed the task. User clicked on ‘edit’ and then ‘blur. Then the entire image became invisible. After recovering from the error, user was trying to place the image, but images were going behind the rectangle. User gave up on the task | Sighing continuously and groaning |
| 4 | E, MM, T, H |  | User went to ‘edit’ option and then ‘image’; user was not sure where to find ‘place’ option; user was looking for insert option; user asked for help and I gave a clue to go to ‘file’. User thought that the graphics was placed into the rectangle, but it was not; so, whenever he was trying to go to ‘place’ option it was not working; user was not realizing that the image was not selected. Finally, user got the option of selection by chance and placed it properly |  |
| 5 | E, MM, T, FF, H | Ah! It’s there in the file; I never thought it would be in file menu; I thought it would be in edit option. Why there is no insert option? I don’t know how to get it back | User tried to locate ‘place’ option in ‘edit’ and then clicked on ‘blur’ and the entire image became invisible. User asked for help and with the clue found where ‘place’ option was but could not place the graphics within the rectangle and ultimately failed the task | Continuously sighing and groaning |

**Task 6**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 |  | This ‘text’ option is quite similar to other software | User easily accomplished the task as she knew that ‘text’ should be there in the toolbar and ‘T’ denoted text; user was satisfied that this was fitting her mental model | Smiling |
| 2 |  |  | User easily recognized ‘T’ meant text |  |
| 3 |  | I am satisfied with this option as I know that ‘T’ is text tool | User recognized ‘T’ as text. This task was quite fitting user’s mental model |  |
| 4 |  | Yes, I am sure that ‘T’ means text box, I got it | User easily found the ‘text box’ option in toolbar |  |
| 5 |  | I am satisfied with this option | User went to toolbar and found the ‘text’ option |  |

**Task 7**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 |  |  | User easily found the color border option by right clicking on the text | Looking satisfied |
| 2 | E |  | User clicked on ‘color’ option and then selected the background color; so, color of the entire image changed User thought that color option could change the text color as well. User finally recovered the error |  |
| 3 |  |  | User easily found the color border option by right clicking on the text | Looking confident |
| 4 | E | I thought the color border should be there in layer, so I right clicked it but surprisingly it created too many layers | User clicked on layer option and created too many layers and then finally was able to delete it | Looking disappointed and sighed |
| 5 | E | I thought color should be applicable for text box as well | After moving through layer and adjustments, user selected color option and the entire image color got changed. Finally, user undid it and found the text color option in the text box itself and recovered from the error. With little bit struggle user was able to finish the task | Struggling and got shocked |

**Task 8**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 | MM, H | Oh! Canvas is there in the ‘image but I never thought it would be there in the ‘image’ | User never thought that canvas can be related to image and that option would be there in ‘image’. It was not fitting user’s mental model | Looking surprised |
| 2 | H, T | I thought I saw ‘canvas’ in the ‘file’ option before; The vocabularies in Photoshop are so confusing. Why do they use ‘Place, ‘Canvas’? | User thought that canvas should be there in ‘file’ but couldn’t find it. Then I gave her a little clue and she found it in ‘image’ | Groaning |
| 3 | H | I should have remembered that canvas could be there in image | User asked for help and found the canvas option and successfully finished the task |  |
| 4 |  |  | User first tried to look at ‘file’ but then easily found it in ‘image’ menu |  |
| 5 | H | I found this option very easily, but many people might not be able to find it | User asked for as he could not figure out what canvas was and with my clue he was able to find out ‘canvas’ option and accomplished the task |  |

**Task 9**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 |  | If you find the ‘canvas’ option, it becomes easier for you | User was quite comfortable working in the canvas once it is found |  |
| 2 |  |  | User easily changed the width and height of canvas | Looking pleased with this option |
| 3 |  |  | User easily changed the width and height of canvas |  |
| 4 |  | This task is the easiest to do | User easily expanded the canvas size | Smiling and looked satisfied |
| 5 |  |  | User easily changed the width and breadth of the canvas |  |

**Task 10**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 |  |  | User found the ‘anchor’ option within ‘canvas’ so it was easier for her to figure out |  |
| 2 |  | I knew that it must be here in canvas; I have found this anchor option in other image editing software as well in ‘canvas’ | This task was quite fitting user’s mental model |  |
| 3 |  |  | User didn’t select the image so ‘anchor’ option was not working; finally, she found the select option and anchored the image |  |
| 4 | E, FF | I didn’t expect this to happen; Why did it not allow me to select the image? | User didn’t realize that the ‘anchor’ option is there in the ‘Canvas’. So, he closed the window of canvas and tried to anchor the image from ‘image’ option but by clicking two wrong options, image was crashed. Although he recovered it but didn’t finish the task | Looked very disappointed |
| 5 | E |  | User didn’t select the image before applying ‘anchor’ option. So, initially he was struggling to anchor it but finally he found the select option and anchored the image to the upper left corner of the canvas easily |  |

**Task 11**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 |  | This is the easiest option I found in Photoshop | Changing the color of the canvas was easiest for the user as the user was already within the canvas |  |
| 2 |  |  | User found the color change option within canvas and changed the color successfully |  |
| 3 |  |  | This task was seemed to be very easy for the user |  |
| 4 |  |  | Once in the canvas, user found it very easy to change the color of the canvas |  |
| 5 |  |  | User easily found the color change option within ‘canvas’ menu and changed the color of the canvas |  |

**Task 12**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **User** | **Codes** | **Think-aloud protocol comments** | **Moderator observations** | **Non-verbal cues** |
| 1 |  | I knew that! In other software also, it’s is in ‘file’ option | Exporting the image was quite fitting user’s mental model | Looking satisfied as she was able to finish the project except just one task |
| 2 |  |  | User found the export option quite easily | Looking satisfied |
| 3 |  | This is quite similar to other software | User easily exported the project by changing the file format | Smiling |
| 4 |  |  | User went to ‘file’ and then exported the project successfully. This task was easy to do for the user |  |
| 5 |  | This option seems to be very easy | User used the ‘save as’ option and exported the project quite easily | Looking satisfied |

## Post-test Questionnaire Data Analysis

Post-test questionnaire data analysis was done based on the overall experience of the users, user’s experience with the editing tools, future possibility of retention and recommendation, and time required to become proficient on Photoshop.

### Overall Experience

43% users said that it was somewhat difficult for them to work on Photoshop and again 43% users said that it was neither easy nor difficult for them to work on Photoshop. On the other hand, only 14% users commented that it was somewhat easy for them to use Photoshop.

Figure 1: Overall Experience of the Users

### User’s Experience with Editing Tools

Using editing tools while importing image, creating background, placing and merging different images into a same frame and editing canvas size on Photoshop were found to be somewhat difficult by 60% users. On the other hand, 20% users said that it was very difficult for them to find out and use editing tools and 20% users said that it was somewhat easy for them.

Figure 2: User Experience with Editing Tools

### Time Required to Become Proficient in Photoshop

80% users commented that it would take more than 4 hours to be proficient in Photoshop whereas 20% users said that it would take 1-3 hours to be proficient in Photoshop.

Figure 3: Time to Learn Photoshop

### Future Possibility of Retention and Recommendation

Regarding future possibility of retention and recommendation of Photoshop software, 60% users gave positive response and 40% users gave negative response.

Figure 4: Future Possibility of Retention and Recommendation

## Suggestions of Future Improvement

Suggestions for future improvement of Photoshop can be found in Table 7.

Table 7: Suggestions for Future Improvement of Photoshop

|  |  |
| --- | --- |
| **User** | **Comments** |
| 1 | Make undoing task easier and there should be insert option to place different graphics. |
| 2 | Guide or training along with the software. |
| 3 | Hover feature over the tools to create a pathway. |
| 4 | Tool box items should be available from menu as well and instead of place there should be insert option. At least there should be some information about what this place option does. |
| 5 | Looking for basic function for non-professional users. Some vocabularies are difficult to understand like canvas. Place etc. |

# Top Findings and Surprises

Top findings and surprises are recorded in Table 8.

Table 8: Findings and Surprises

|  |  |  |  |
| --- | --- | --- | --- |
| **User** | **Top positive finding** | **Top negative finding** | **Top surprise** |
| 1 | User was mostly satisfied with tasks 6, 7, 11 and 12 which were associated with placing text and applying color border to the text, changing the canvas color and exporting the project | User was dissatisfied with tasks 3, 4 and 5 which were associated with creating and resizing rectangles, applying blending effect and placing different graphics into the rectangles | User was surprised to see that there was no insert option and canvas option could be there in the image |
| 2 | User was satisfied with tasks 10, 11 and 12 which were associated with anchoring, changing the canvas color and exporting the project | User 2 also gave negative feedback on tasks 3, 4 and 5 | User was surprised with the vocabularies in Photoshop such as ‘place’ , ‘canvas’ etc. |
| 3 | User 3 gave positive feedback on tasks 6, 7 and 12 | User 3 also was disappointed with tasks 3, 4, and 5. User 3 gave negative feedback about expanding the image (task 2) | User was surprised that for expanding the image she was not able to drag it and she had to look for top tools |
| 4 | User gave positive feedback for task 6 and task 9 which were associated with placing text and expanding the canvas size. User said these were quite easy to do | User gave negative feedback for task 10 as he was not able to figure out why Photoshop didn’t easily allow him to select the image and then anchor. He failed the task | User was surprised to see that rectangles were created outside the image and for applying color border when he clicked on layers, too many layers got created and he was not able to understand in which layer his project was |
| 5 | User gave positive feedback for task 6 and 12 which quite fitted his mental model | User gave negative feedback about ‘select’ option as it was not working when he was trying to expand the image for task 2; for task 3 user said that function was not at all good as it created too many rectangles; he said ‘blending’ should be there in edit menu | User got surprised when he saw that the ‘color’ option was not working for applying color border to the text box |

# Problem Analysis

The problem analysis for this test is presented in Table 7. Problems were characterized by scope and severity. Scope included global and local findings. Global findings affected the entire system or architecture of the software and local problems affected a particular screen or page or image. Severity included catastrophe, major problem, minor problem and cosmetic problem. In catastrophe, user gave up on the task and showed extreme irritation at the process. Major problem was associated with not finding the right option at right place and without moderator’s help user could not get through the task. Minor problem was concerned with little frustration from the user side to finish the task and facing inconvenience to complete the task. In cosmetic problem, user might hesitate or pick the wrong option but without affecting the system or the existing screen or page user corrected it. It was associated with minor irritation. When three or more than three participants showed the similar type of concern for completing the task or faced with same kind of error or majority of them failed the task, it set a trend among the problems. In Photoshop, major problems were associated with placing graphics, blending and resizing the rectangles and anchoring the image. Minor and cosmetic problems were associated with expanding the image, applying color border to the text and finding canvas option. One of the catastrophes was users could not place the graphics within rectangles.

Table 9: Problem Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **Problem** | **Scope** | **Severity** | **Trends** |
| Task 2 | User 1could not find the ‘image’ option to expand the image size and clicked on the image itself; so, image disappeared and went to another window. User 5 unknowingly clicked two wrong options by first wrongly selecting and then clicking on wrong layer; the image vanished and with my help retrieved the image. | It affected that page where the user was working; so, it was a local problem | Users were bit frustrated with the task that they couldn’t drag the image to expand it. They were looking for help and expressed little irritation to finish the task. Although other users finished it without error, but they were also bit upset finding out the right options to expand the image; so it was a minor problem. |  |
| Task 3 | All five users struggled with creating and resizing rectangles. Four out of five of them created extra rectangles and was finding it difficult to delete it. Two out of five users used marquee tool and the entire image changed. Nobody could finish the task within predetermined time period. | This problem caused problem on the existing page but didn’t affect the entire system; so, it was a local problem. | It was a major problem in Photoshop as there is no clear option to resize rectangles and other tools like marquee if clicked on the wrong place entire image got changed. | All five users found the similar kind of problem of creating and resizing the rectangles. Particularly, most of them created too many extra rectangles which were getting difficult for them to delete and eventually completely make all the rectangles of same size. So, this problem indicated towards the similar kind of problem faced by the user and became a trend. |
| Task 4 | Four out of five users found the ‘blending’ option in task 4 was not matching their mental models. They tried to click on color, adjustments, 3D option but were struggling where ‘blending’ option could be. The color of the image also got changed for one user and the entire image got transferred to another page for one user. | Users could not find the ‘blending’ option without my help as that option was not clearly seen or that was in wrong place. If it was somewhere in the edit option, it would have been easier for the user to find out. So, it was a global problem. | This problem was a major one as no users could not find it without my help, faced errors and got frustrated to recover from those errors. It suggested that others might be less inclined to put up with the inconvenience. | Blending those rectangles also became a mental model issue for each and every user and everybody was struggling with the same problem of finding ‘blending’ option. So, it indicated towards a trend observed in each user. |
| Task 5 | Four out of five users failed this task of placing graphics into the rectangle. Five of them at first could not understand the term ‘place’ and it was not also fitting their mental model as there was no ‘insert’ option. So, both terminology and mental model issues were there. Also, users applied ‘open’ option to import the graphics for placing them onto the existing image but for every graphics separate windows opened and users were unable to figure out how to bring those graphics back on the existing image. For most of them the graphics went behind the rectangle and initially they thought that the graphics were placed but these were not placed in the rectangle. Users asked for help several times but once the graphics went behind the rectangle they were unable to got it back in the right place. From think-aloud protocol and post test questions also it was clear that they were disappointed and dissatisfied with this task and continuously they were groaning and sighing. | User could not find the ‘place’ option without my help and four of them could not retrieve those graphics from rectangles. This problem affected the entire system and throughout working on Photoshop it persisted. It was a system or architecture related problem, so it should be categorized as global problem. | Four of the five users could not complete the task and expressed extreme irritation and dissatisfaction at the process. Also, every user needed my assistance to find the option of ‘place’. So, it was a catastrophe. | This problem created a trend as four out of five users failed the task and five of them could not find the ‘place’ option. It was not only error, but it was associated with terminology and mental model issues for each user. |
| Task 7 | Three out of five users faced error while giving color border to the text. They thought that the general ‘color’ option would change the text color, but it changed the entire image color. One of them thought background color should change the text color. Only one of them mistakenly created too many layers while giving color border to the text. | This problem didn’t affect the entire system but for some time it affected the entire page on the existing page. So, it was a local problem. | Users were little frustrated with the ‘color’ option but got through it and finally able to figure out how to give color border to the text. It could be considered as minor problem. | As three out of five users faced the same problem of coloring the text and thought that ‘color’ option would change the text color as well, it set a trend for this problem. |
| Task 8 | Although any user did not face any error with task 8 of changing canvas size but it became mental model and terminological issues for them as they could not believe that ‘canvas’ option could be there in ‘image’ option. | This problem did not impact the user experience and was easy to fix. So, it was a local problem. | Users were hesitating to pick up the wrong option but corrected it without incident. Users showed minor dissatisfaction, but it didn’t affect ability to complete the task. So, it was a cosmetic problem. |  |
| Task 10 | One out of five users failed this task of anchoring the image to the upper left corner of the canvas. Three users faced the problem because they did not select the image before applying ‘anchor’ option. They were little bit struggling to select but two of them figured out how to select but one of them due to not selecting it failed the task. Another problem was that after coming out from the ‘canvas’ option, users faced difficulty to go back and again fix something like anchoring, changing color etc. for the project. | It was a local problem as it only affected the page users were working with. | As one user completely gave up on the task and showed extreme irritation, it should be considered as catastrophe problem but remaining four users were able to finish the task and two of them showed frustration to select the image. So, it could be considered as major problem. One user who could not complete the task could be considered as outlier. | Three of the five users almost faced similar kind of problem of anchoring the image as they did not select the image beforehand. So, it created a trend. |

# Recommendation

One of the objectives of usability test for Adobe Photoshop was to see how efficiently and satisfactorily users could use various tools such as rectangle tool, move tool, marquee tool, and crop tool and so on and features such as blending effect, color change options and so on of Photoshop. To achieve this, third, fourth, sixth and seventh tasks were designed which were associated with creating rectangles, one in each corner of the page and expanding or resizing those rectangles by changing width and height, applying blending effect in each rectangle, placing text in those boxes and applying color border to the text box.

Results showed that all five participants struggled with both creating and resizing rectangles for the third task. Four out of five users created extra rectangles and were having difficulty to delete it. Two out of five users mistook rectangular marquee tool as rectangle tool and after applying marquee tool entire image got changed. Everyone was having difficulty to find the correct tool and use it effectively and also many of them were trying to look for tools from menu option. Nobody could finish the task within predetermined time. This problem created a trend among the users. In response to this, I recommend taking following actions. They are,

* Hover feature should be there over the tools so that it can create a pathway for the user to understand what tool it is and what it is used for.
* Tools should be available from menu as well as users usually first go to menu to look for editing tools and features.
* Customizing option of rectangle should be there within rectangle tool. Users usually look for rectangle tool to create rectangle, but they don’t go for custom option to resize that. Also, the delete option should be there when too many rectangles have been created as users usually find it difficult to undo the task such as deleting the extra rectangles. There should be easy and visible option for undoing any task as users find it difficult to select the graphics or other shapes and then undo it.
* There is no resize option in Photoshop to give all the rectangles or squares similar size. So, this option should be there to create flawless and neat image or poster. Also, after placing the rectangles there should be an option to select it and then resize it.

Results showed that four out of five users found the ‘blending’ option in fourth task was not matching their mental models. They tried to click on color, adjustments, 3D option to figure out how to give a blending effect to the rectangles but in most of the cases entire image color got changed and sometimes the image got transferred to another page. Everyone needed my help to find out ‘blending’ option as it was not easily visible. In response to this, I recommend taking following actions. They are,

* There should be an indication that Photoshop works in layers as layers are not highlighted in Photoshop, so users are not able to think that ‘blending’ option can be obtained by right clicking on layers.
* Users have mental models that blending is associated with coloring, so if ‘blending’ can be possible from color option them users might find it easy to use this application.
* Another point is that after creating any image or background, for editing like coloring, applying blending effect, changing size and so forth, users go for ‘edit’ option. So, if ‘blending’ option is there in ‘’edit’ menu, then it would be easier for users to find it out. Finally, all these editing options should be there in a single menu, so that users do not have to go for different places within Photoshop to do different kinds of editing.

Results showed that three out of five users faced error while applying color border to the text in the seventh task. They thought that the general ‘color’ option would work for changing the text color as well. Someone mistakenly thought that background color could change the background of text color. In response to that some changes can be made within Photoshop. They are as follows:

* There should be an option for changing color of the text within the option of ‘color’ apart from the ‘text’ tool, as users have mental models that any kind of color editing can be done from the ‘color’ option.
* Background color option and image or frame color option should be separated otherwise users get confused which option to use for changing background color and which option to go for changing image color.

Another goal of the usability test was to determine how quickly and accurately users could place multiple graphics or images on the same frame and edit or expand it within a predetermined time frame. Also, other goal was to find out how easily users could learn the languages and wordings on Photoshop. To achieve this fifth and eighth through eleventh tasks were designed which were associated with placing four different graphics within the rectangles and centering it and changing the canvas size by adjusting its unit, resizing it, anchoring the image, and changing the color of the canvas.

Results showed that four out of five users failed fifth task to finish. Five of them could not understand initially the term ‘place’, so it became a terminological issue. Also, users were trying to find ‘insert’ option to place those graphics, but there was no ‘insert’ option. So, it became a mental model issue. Users thought that ‘open’ option would help them to import the image from different folder and merge them on the same frame. Most of the users found that the graphics went behind those rectangles. They asked for my help several times. Another issue with placing the graphics was that users could not figure out whether the graphics were placed or not. It became a catastrophic problem. In response to that, I recommend taking following actions. They are,

* There should be ‘insert’ option instead of ‘place’ as on most of the other software, users are familiar with the term ‘insert’. Even if ‘place’ option is there, there should be an indication or information about what the function of ‘place’ option is.
* Users mistakenly go for ‘open’ option to bring and merge different graphics on the same frame and they find that by applying ‘open’ option separate windows open for different graphics. Then it becomes difficult for them to merge those images or graphics. So, I recommend that after clicking on ‘open’ option a pop-up window should appear to check and ask what users want to do with the imported graphics like whether they want to create a new image background, or they want to merge different images on the same frame.
* There should be a confirmation information or indication after placing the image or graphics otherwise users get confused whether that has been placed or not and when they start working on that unplaced graphics, other options such as tools or other features do not work on it. So, it would be helpful for the users to be informed or indicated whether that has been placed or not before working on placed graphics. This option can be helpful to overcome the problem of graphics’ going behind the rectangle or any shape as well as unplaced graphics goes behind the rectangle or any shape.

Result showed that although users did not face any error with eighth task, but it became their mental model and terminological issues. They were not sure where they could find ‘canvas’ option. Regarding this issue one change can be made for improving user satisfaction. But, one of the users failed tenth task and three out of five users faced errors with anchoring the image into a certain position of the canvas. Also, after coming out of the ‘canvas’ option users found it difficult to go back and work on other options like anchoring image, changing color of the canvas and so on. Regarding this issue also one step can be taken on Photoshop.

* On Photoshop ‘canvas’ option is there in ‘image’ menu, so users never think of finding ‘canvas’ in ‘image’ Their mental model is that ‘image’ menu should only deal with working, creating and editing with image. So, I would recommend that there should be a separate menu for ‘canvas’ and all the options such as changing canvas size, changing the color of canvas, anchoring the image into different positions of canvas should be available within the single menu. So, users can satisfactorily and easily work with that option.
* Another change that I would recommend making that anchoring option workable without selecting the image and this option should be available by right clicking on the image. Then it will not create any error and issue even if any user comes out of the ‘canvas’ option and then again wants to go back to manipulate some features regarding that.

# Appendices

## Appendix A: Consent Form

|  |  |
| --- | --- |
| |  | | --- | | **Screen Recording Consent Form**  I hereby give my permission to be screen recorded (as well as audio and video recorded) as part of my participation in the usability test for Adobe Photoshop, which is conducted at library, room no.103, Missouri S&T.    I acknowledge that my identity will be kept secret and I will be referred to by a pseudonym in the data reporting.  I understand and consent to the use of screen recording and audio and video recording to the test conductor. I further understand that the recording and any highlights extracted from it may be used for review and cited in the testing report. I give up any rights to the recording.  I understand that if for any reason I do not want to continue I can leave at any time during this test. I can also deny consent to the recording at any time.  Printed Name:\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |

## Appendix B: Administrator Script

“Hello! Welcome and thank you for coming and participating in this test. My name is Priyanka Ganguly. The test I am going to conduct today is called ‘Usability test for Adobe Photoshop’. Adobe Photoshop is an image or graphics editing software. The main goal of this test is to measure how user-friendly the software is for non-professional users such as college students, home enthusiast etc. In the test, I will give you a specific scenario and several tasks to complete. For example, ‘assume you have been assigned a task of creating a poster of Harry Potter on Photoshop. For that you have to assemble many graphics and manipulate it and then export it into different file format. You will use Adobe Photoshop to perform your tasks and try to make the project more interesting and professional.’ In order to review your responses to the software while using it, I will record the process using screen recording software GoPlay. And before that, I will ask you to fill a consent form. I will be sitting beside you throughout the test while you will be performing your tasks. I will also take some notes during the test. The notes are about your both positive and negative responses and experiences to the feature and uses of software. The notes will help me to analyze my findings after the test. It does not matter whether you can complete the tasks well or not. We are testing the usability of this software, not you. It will be rather helpful to judge the software properly and explore any drawbacks associated with the software if you are unable to accomplish a task. After the test, you will be asked to answer post-test questionnaire. Please feel free to give any negative feedback about the software. We will be extremely happy to hear your honest feedback and suggestion about this software. During the test, you may stop at any time.”

## Appendix C: Screening Questionnaire

|  |
| --- |
| **Usability Test Plan for Adobe Photoshop**  Study Dates: Oct. 7-8, 2018  Study Times: 9:00 am- 5:00 pm  Recruiting Goal: 5 participants, plus 2 backups  **Special notes for recruiters:**   * Equal gender distribution * Representative age distribution (19-30) * Representative education mix some college / college degree   **Candidate**  Name:  Gender: Male  Female  **Age:** Under 20  20-40  41-60  Over 60   1. We are going to test and study Adobe Photoshop today. It’s an image or graphics editing software. It is designed for non-professional users who have interest in editing and digitalize images for school assignments or personal purpose to give it a professional and impressive look. Do you have interest in making more professional and attractive image or photo editing?   Yes No   1. We will focus on non-professional users in this test. Are you professional in image-editing? (For example, are you a professional image editor or working in digital media or printer industry or a professor/student majoring in image editing?)   No Yes   1. Are you familiar with computer and conversant with using some common software?   Yes No   1. Are you familiar with uploading and downloading images?   Yes No   1. Have you ever used Adobe Photoshop before?   Yes No   1. I will use “GoPlay Studio” (screen video capture software) to record the process of the test, in order to analyze my findings after the test. If selected, will you allow us to record the process of your activities on computer?     Yes No |

### Appendix C.1: Screening Questionnaire Data

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Gender** | **Age** | **Question 1** | **Question 2** | **Question 3** | **Question 4** | **Question 5** | **Question 6** |
| 1 | Female | 20-40 | Yes | No | Yes | Yes | No | Yes |
| 2 | Female | 20-40 | Yes | No | Yes | Yes | No | Yes |
| 3 | Female | 20-40 | Yes | No | Yes | Yes | No | Yes |
| 4 | Male | 20-40 | Yes | No | Yes | Yes | No | Yes |
| 5 | Male | 20-40 | Yes | No | Yes | Yes | No | Yes |

## Appendix D: Pre-test Questionnaire

|  |
| --- |
| **Pre-test Questionnaire**   1. As a student or a non-professional, how do you plan to use an image editing software?   Answer:   1. Please specify 3 reasons for using any image editing software.   Answer:  I.  II.  III.   1. How much time do you think you can devote to learning any image editing software?   Answer:   1. What specific tools and options are you looking for while working on image editing?   Answer:   1. How much time do you think it can take to create a simple but impressive and meaningful project on any image editing software?   Answer:   1. How do you plan to recover from an error if encountered while editing images on image editing software?   Answer:   1. Which other image editing software have you used before?   Answer: |

## Appendix E: Instruction for Think-out loud Protocol

“Now let me tell you about think out loud protocol. In this process participants can share their feelings and experiences regarding using the software. I want to know what you expect to happen when you make a choice and whether it meets with your expectations or not. It will be helpful to know what surprises, what pleases, what confounds or frustrates you and why, when completing the task. If at any point you find that you are not sure which options to go for or how to go about the tasks, you can share your thoughts with us. It will give me a good understanding of how Adobe Photoshop works for you. For instance, you might say, ‘I am looking for insert option but I am not finding it……..that’s not what I expected in this software’. So, this is all about thinking aloud protocol. It would be helpful if you think out loud during the test.

Do you have any questions or concerns at this point of time?

Thank you again for coming here to participate in this test.

Okay, let’s begin the test now.”

## Appendix F: Post-test Questionnaire

|  |
| --- |
| **Post-test Questionnaire**   1. Overall, please rate how easy or difficult it was for you to use the software Adobe Photoshop.  * very easy * somewhat easy * neither easy nor difficult * somewhat difficult * very difficult  1. How easy or difficult was it for you to figure out the correct tools and procedures at the time of editing?  * very easy * somewhat easy * neither easy nor difficult * somewhat difficult * very difficult  1. How much time do you think you would need before to become proficient in using this software to edit images or graphics?  * 10-30 minutes * 1-3 hours * More than 4 hours   Please briefly explain your response:  Answer:   1. Do you think the entire process of using the software is satisfactory or not?  * Very satisfactory * Somewhat satisfactory * Neither satisfactory nor dissatisfactory * Somewhat dissatisfactory * Not satisfactory at all  1. If you have some images to edit, will you choose this software in future?  * Yes * No   If you answered ‘No’ to the previous question, please explain us why.  Answer:   1. How likely are you to recommend Adobe Photoshop to your friends and relatives? Please briefly explain your response.   Answer:   1. Do you have any suggestion to the designers of Adobe Photoshop?   Answer: |

## Appendix F.1: Post Test Questionnaire Answers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **User** | **Question 1** | **Question 2** | **Question 3** | **Question 4** | **Question 5** | **Question 6** | **Question 7** |
| 1 | Somewhat easy | Somewhat easy | More than 4 hours; I think I would need several hours to learn the more advanced features of the software | Somewhat satisfactory | Yes | Probably likely, because it was relatively easy to figure out | Make undoing a task easier or more intuitive and there should be insert option to place different graphics. |
| 2 | Somewhat difficult | Somewhat difficult | 1-3 hours; Photoshop definitely requires guide or prior training | Neither satisfactory nor dissatisfactory | No; There are image editing tools and software that are much easier to use | Most likely I would not recommend Photoshop to someone because it is not easy for a new person to pick and use unless they have some training | To create a guide or training along with the software |
| 3 | Somewhat difficult | Very difficult | More than 4 hours; It is very frustrating trying to understand what each tool does | Not satisfactory at all | No; I don’t need fancy things, I need quick photo edits | No, I would recommend them to use PP because the tools are labeled | Hover feature over the tools so it will create a pathway for the user |
| 4 | Neither easy nor difficult | Somewhat difficult | More than 4 hours | Neither satisfactory nor dissatisfactory | Yes | I will recommend as it has advanced features of image editing | Tool box items should be available from menu as well and at least there should be some information about what this place option does |
| 5 | Neither easy nor difficult | Somewhat difficult | More than 4 hours; The function of this software is too much, getting proficient in it is too difficult; but I want to use it | Very satisfactory | Yes | Yes, I will recommend it to my friend, but I don’t think they will use it because they already have image editing app on their phones which are easier to use | Hope they will publish some version for non-professionals with some basic function and Some vocabularies are difficult to understand like canvas. Place etc. |

## Appendix G: Log form

**User 1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **User** | **Task** | **Time** | **Code** | **Test Comment** | **User Comments** | **Non-verbal Cues** |
|  | 1 | 02:05 | S |  |  |  |
| 1 |  | 02:11 | UA | User was considering to go to image first but later decided to go for ‘file’ |  |  |
|  |  | 02:13 | Q, MM |  | Yes, I forget that ‘open’ option should be there in ‘file’ like other software | Looking confident |
|  |  | 02:30 | F | Task accomplished |  |  |
|  | 2 | 02:40 | S |  |  |  |
|  |  | 02:48 | E | User clicked on the image and the image disappeared and went to another window |  |  |
|  |  | 02:53 | R | Retrieved the image |  |  |
|  |  | 02:55 | UA | User went to ‘image’ option and found how to expand the image |  |  |
|  |  | 02:59 | Q |  | How can I forget that the image size can be changed from ‘image’ option? |  |
|  |  | 03:10 | F | Task accomplished |  |  |
|  | 3 | 03:22 | S |  |  |  |
|  |  | 03:29 | UA | User was looking at the toolbar and trying to find if there was any shape of rectangle |  |  |
|  |  | 03:50 | E | User created too many rectangles and was unable to resize it |  |  |
|  |  | 04:58 | UA | User was trying to look for option in ‘menu’ option |  |  |
|  |  | 06:01 | Q |  | I didn’t have any trouble to create those rectangles but I am having trouble with resizing |  |
|  |  | 06:20 | R | User found the ‘delete’ option from layer and deleted extra rectangles and resize those rectangles from ‘edit’ option |  | Seem to be tired |
|  |  | 06:39 | F | Task accomplished |  |  |
|  | 4 | 06:49 | S |  |  |  |
|  |  | 07:03 | E, MM | User clicked on color and then again on image and the whole color of the image changed |  |  |
|  |  | 07:20 | Q |  | I thought ‘blending’ option should be there on ‘color’ |  |
|  |  | 07:26 | R | User removed the color applied mistakenly |  |  |
|  |  | 07:48 | H | I prompted that Photoshop works in layer and you have to right click on the layer |  |  |
|  |  | 08:15 | UA | User found ‘blending’ option and started applying blending to each rectangle |  |  |
|  |  | 09:42 | F | Task accomplished |  |  |
|  | 5 | 10:09 | S |  |  |  |
|  |  | 10:14 | UA | User went to ‘file’ and then ‘open’ and imported it |  |  |
|  |  | 10:58 | E, T, MM | Two separate windows appeared and user was not able to figure out how to merge those two images |  |  |
|  |  | 11:24 | UA | User was looking at the toolbar to find the option |  |  |
|  |  | 11:44 | H | User asked for help and I prompted that ‘place’ option can be found in ‘file’ |  |  |
|  |  | 11:55 | Q |  | I thought ‘place’ means ‘insert’ but I am wondering why there is no ‘insert’ option. I thought at least ‘open’ option could bring the graphics on the same page. |  |
|  |  | 12:11 | R | Error was recovered and user was able to figure out how to ‘place’ it |  |  |
|  |  | 12:59 | UA | User was trying to fit the graphics in the rectangle |  | Looking irritated |
|  |  | 13:48 | E | Graphics went behind the rectangle |  |  |
|  |  | 14:29 | FF | User gave up on the task; so task was not accomplished |  |  |
|  | 6 | 14:35 | S |  |  |  |
|  |  | 14:43 | UA | User went ‘text’ tool and easily found it |  |  |
|  |  | 14:59 | Q |  | This ‘text’ option is quite similar to other software | Smiling |
|  |  | 15:07 | F | Task accomplished |  |  |
|  | 7 | 15:13 | S |  |  |  |
|  |  | 15:26 | UA | User right clicked on the text and easily applied a color border |  | Looking satisfied |
|  |  | 15:34 | F | Task accomplished |  |  |
|  | 8 | 15:59 | S |  |  |  |
|  |  | 16:08 | UA | User was trying to look at tools if there was any option of canvas size |  |  |
|  |  | 16:38 | H | User asked for help and I reminded her about ‘image’ option |  |  |
|  |  | 16:40 | Q, MM |  | Oh! Canvas is there in the ‘image but I never thought it would be there in the ‘image’ | Looking surprised |
|  |  | 16:58 | F | Task accomplished; user changed the unit from ‘inches’ to ‘pixels’ |  |  |
|  | 9 | 17:01 | S |  |  |  |
|  |  | 17:06 | UA | User was changing the width and height of the canvas |  |  |
|  |  | 17:10 | Q |  | If you find the ‘canvas’ option it becomes easier for you |  |
|  |  | 17:27 | F | Task accomplished |  |  |
|  | 10 | 17:46 | S |  |  |  |
|  |  | 17:49 | UA | User found the ‘anchor’ option within the canvas and started anchor the image to the upper left corner |  |  |
|  |  | 17:53 | F | User very easily anchored it to the upper left corner; task accomplished |  |  |
|  | 11 | 17:58 | S |  |  |  |
|  |  | 18:02 | UA | User was considering to ‘color’ option within the canvas |  |  |
|  |  | 18:05 | Q |  | This is the easiest option I found in Photoshop |  |
|  |  | 18:10 | F | User changed the color successfully; task accomplished |  |  |
|  | 12 | 18:25 | S |  |  |  |
|  |  | 18:28 | UA | User was considering to go to ‘file’ option and then ‘save as’ |  |  |
|  |  | 18:30 |  |  | I knew that! In other software also its is in ‘file’ option | Look satisfied as user was to able to finish the project except for one task |
|  |  | 18:51 | F | User successfully exported the project; task accomplished |  |  |

**User 2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **User** | **Task** | **Time** | **Code** | **Test Comment** | **User Comments** | **Non-verbal Cues** |
|  | 1 | 01:45 | S |  |  |  |
| 2 |  | 01:52 | UA | User tried to look for ‘image’ option and then went to ‘file’ and then discovered that ‘open’ option should work |  | Looking little bit confused |
|  |  | 03:40 | Q |  | How can I forget that it should be there in ‘open’ option? |  |
|  |  | 03:59 | F | User imported the image |  |  |
|  | 2 | 04:32 | S |  |  |  |
|  |  | 04:37 | UA | User was trying to right click on the image and see if that helped |  | Struggling to look for the right option |
|  |  | 05:57 | F | User finally expanded it; task accomplished |  |  |
|  | 3 | 06:24 | S |  |  |  |
|  |  | 06:38 | UA | User was considering to go to the toolbar option and then found the ‘rectangle’ tool; |  |  |
|  |  | 06:53 | UA | User was trying to copy and paste all the rectangles but failed |  |  |
|  |  | 07:01 | E | Two extra rectangles showed up and covered the entire image |  |  |
|  |  | 07:59 | R | User deleted the extra layers and error recovered |  |  |
|  |  | 08:10 | Q |  | I don’t know why it did not allow me to duplicate those rectangles | Sighing |
|  |  | 08:32 | F | User successfully resized the rectangle and accomplished the task |  |  |
|  | 4 | 08:58 | S |  |  |  |
|  |  | 09:10 | UA | User was thinking to go to ‘3D’ option |  |  |
|  |  | 09:20 | Q, MM |  | I am little bit confused between ‘blur’ and ‘blending’ |  |
|  |  | 09:35 | UA | User clicked on ‘layer’ and then ‘adjustments’ |  |  |
|  |  | 10:06 | Q |  | I don’t find any widow of ‘blending’ | Continuously sighing and looking frustrated |
|  |  | 10:49 | UA, Q, MM | User again considering to go to ‘3D’ option | I thought ‘blending’ should be there in 3D |  |
|  |  | 11:05 | H | User asked for help and I gave her a clue about that |  |  |
|  |  | 11:24 | E | User clicked the ‘blending’ option but without selecting the rectangles; all those rectangles vanished |  |  |
|  |  | 12:32 | R | Retrieved those rectangles |  |  |
|  |  | 13:02 | UA | This time user selected the rectangles and started applying ‘blending’ effect to each rectangle |  |  |
|  |  | 13:41 | F | Task accomplished |  |  |
|  | 5 | 13:54 | S |  |  |  |
|  |  | 14:00 | UA | User right clicked on the layer and got a clue about ‘file’ option. |  |  |
|  |  | 14:20 | UA, Q, T | User found the ‘place’ option and was trying to place all those graphics in each rectangle | I accidentally found the ‘place’ option but I didn’t even understand the term |  |
|  |  | 15:06 | E | Graphics went behind the rectangle |  |  |
|  |  | 15:07 | Q |  | How come it went behind it? I didn’t expect this to happen |  |
|  |  | 15:55 | UA | User was trying to click on those rectangles but failed |  | Looking very dissatisfied with this task |
|  |  | 16:01 | Q |  | It’s annoying that too many confirmation are needed |  |
|  |  | 16:17 | FF | User gave up on the task, so task was failed |  |  |
|  | 6 | 17:36 | S |  |  |  |
|  |  | 17:41 | UA | User clicked on the ‘text’ option from the toolbar |  |  |
|  |  | 17:54 | F | User successfully wrote in the text box and task was accomplished |  |  |
|  | 7 | 17:57 | S |  |  |  |
|  |  | 18:14 | E | User clicked on ‘color’ option and then selected the background color; so color of the entire image changed |  |  |
|  |  | 18:37 | R | User undo the color and recovered from error |  |  |
|  |  | 18:49 | UA | User went to ‘text’ option again and found the path to apply color on the text |  |  |
|  |  | 19:13 | F | Task accomplished |  |  |
|  | 8 | 19:22 | S |  |  |  |
|  |  | 19:33 | UA | User clicked the ‘file’ option and was trying to look for ‘canvas’ option |  |  |
|  |  | 19:50 | Q |  | I thought I saw ‘canvas’ in the ‘file’ option before |  |
|  |  | 20:15 | H | User asked for help and I gave her a clue that ‘canvas’ is related to image |  |  |
|  |  | 20:20 | T, Q | User got confused with the word ‘canvas’ | The vocabularies in Photoshop are so confusing. Why do they use ‘place, ‘canvas’? | Groaning |
|  |  | 21:19 | F | Task accomplished; user successfully changed the unit into ‘pixel’ from ‘inches’ |  |  |
|  | 9 | 21:35 | S |  |  |  |
|  |  | 21:40 | UA | User clicked on ‘width’ and ‘height’ button respectively |  |  |
|  |  | 21:50 | F | Task accomplished; user successfully and very easily changed the width and height |  | Looking pleased with this option |
|  | 10 | 22:01 | S |  |  |  |
|  |  | 22:10 | UA | User clicked on ‘anchor’ button within ‘canvas size’ option |  |  |
|  |  | 22:12 | Q |  | I knew that it must be here in canvas; I have found this anchor option in other image editing software as well in ‘canvas’ |  |
|  |  | 22:38 | F | Task accomplished; user successfully anchored the image to the upper left corner of the canvas |  |  |
|  | 11 | 22:58 | S |  |  |  |
|  |  | 23:08 | UA | User clicked on the color option within canvas and was trying to change the color of the canvas |  |  |
|  |  | 23:21 | F | Task accomplished; user changed the color successfully |  |  |
|  | 12 | 23:30 | S |  |  |  |
|  |  | 23:37 | UA | User selected ‘file’ option and then ‘save as’ |  |  |
|  |  | 23:41 | F | User successfully changed the file format and exported it; task accomplished |  | Looking satisfied |

**User 3**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **User** | **Task** | **Time (MM:SS)** | **Code(s)** | **Test Comment** | **User Comments** | **Non-verbal Cues** |
| 3 | 1 | 02:25 | S |  |  |  |
|  |  | 02:31 | UA | User clicked on the background and was thinking how to import image to that background |  |  |
|  |  | 02:40 | Q |  | I forgot, it should be there on ‘file’ |  |
|  |  | 02:48 | UA | User clicked ‘open’ option and imported the image |  |  |
|  |  | 02.52 | F | Task accomplished; user successfully imported the image from different folder |  |  |
|  | 2 | 03:10 | S |  |  |  |
|  |  | 03:15 | UA | User right clicked on the image and was trying to expand it |  |  |
|  |  | 03:24 | H | User asked for help and I gave her the keyword ‘image’ |  |  |
|  |  | 03:40 | Q, MM | User thought that by dragging she could expand the image as this was common in other software | Whoever looks for the top tool? I am surprised that I cannot drag it for expanding it | Looking little disappointed |
|  |  | 03:45 | Q |  | ‘Select’ option is not working |  |
|  |  | 04:01 | UA | User found the ‘image size’ option and clicked on it |  |  |
|  |  | 04:16 | F | Task accomplished; user successfully expanded the image |  |  |
|  | 3 | 04:59 | S |  |  |  |
|  |  | 05:10 | UA | User went to tool bar section to find the option |  |  |
|  |  | 05:20 | E | User selected ‘crop’ tool and the entire image was changed |  | Seemed to be angry |
|  |  | 06:10 | H | User asked for help and I prompted, ‘whatever you do to ‘undo’ in other software, you have to do the same thing’ |  |  |
|  |  | 06:15 | Q |  | I am not sure how to get my image back |  |
|  |  | 07:05 | R | User recovered the error and then it was quite easy for the user to create the other three rectangles |  |  |
|  |  | 07:10 | UA | User was struggling to resize it but clicked on each rectangle and found the ‘resize’ option |  |  |
|  |  | 08:00 | F | Task accomplished |  |  |
|  | 4 | 09:10 | S |  |  |  |
|  |  | 09:15 | UA | User clicked on hand tool and but did not find any difference on the image |  |  |
|  |  | 09:42 | E, T, MM | User went to ‘layer’ option and then edit option; the image got transferred to another page; user was not conversant with the term ‘blending’ |  | Continuously sighing |
|  |  | 09:58 | H | User asked for help and I gave her keyword ‘blending’ and said that Photoshop worked in layers |  |  |
|  |  | 10:03 | Q, T, MM |  | I am not conversant with the term ‘blending’ and if it has to do with coloring or applying texture with the image, then it should be in ‘edit’ option |  |
|  |  | 10:29 | R | User retrieved the image and error was recovered |  |  |
|  |  | 10:35 | UA | User right clicked on the ‘layer’ and found ‘blending’ option |  |  |
|  |  | 12:44 | F | Task accomplished’ user successfully blended the rectangles |  |  |
|  | 5 | 13:13 | S |  |  |  |
|  |  | 13:24 | UA, T | User clicked on ‘edit’ option and was trying to locate ‘insert’ option there |  |  |
|  |  | 13:36 | E, T | User clicked the ‘blur’ option and set it in such a way that entire image became invisible |  |  |
|  |  | 14:55 | R | Recovered from error |  |  |
|  |  | 15: 10 | H | User asked for help and I gave her the keyword ‘place’ |  |  |
|  |  | 15:20 | Q |  | I thought there should be ‘insert’ option. Why the ‘open’ option is not bringing the graphics on this page? |  |
|  |  | 15:30 | E, Q | Graphics went behind the rectangle | I don’t know why it is going behind | Sighing continuously |
|  |  | 17:12 | FF | User couldn’t fix the problem and then gave up; Task failed |  | Groaning |
|  | 6 | 18:19 | S |  |  |  |
|  |  | 18:25 | UA | User went to toolbar and easily found the ‘text’ option |  |  |
|  |  | 18:30 | Q, MM |  | I am satisfied with this option as I know that ‘T’ is text tool |  |
|  |  | 18:38 | F | Task accomplished |  |  |
|  | 7 | 18:54 | S |  |  |  |
|  |  | 19:00 | UA | User right clicked on the text and got the option of how to color border of the text |  | Looking confident |
|  |  | 19:13 | F | Task accomplished; user successfully applied color border |  |  |
|  | 8 | 19:56 | S |  |  |  |
|  |  | 20:11 | H | User asked for help |  |  |
|  |  | 21:01 | UA | User clicked on ‘image’ and found the ‘canvas size’ option |  |  |
|  |  | 21:05 | Q |  | I should have remembered that canvas could be there in image |  |
|  |  | 21:30 | F | Task accomplished |  |  |
|  | 9 | 21:40 | S |  |  |  |
|  |  | 21:45 | UA | User clicked on width and height |  |  |
|  |  | 22:01 | F | Task accomplished |  |  |
|  | 10 | 22:30 | S |  |  |  |
|  |  | 23:03 | E | User did not select the picture so ‘anchor’ function was not working; border of the image vanished |  |  |
|  |  | 23:56 | R | User found the select option and then recovered the error |  |  |
|  |  | 24:10 | F | Task accomplished |  |  |
|  | 11 | 25:40 | S |  |  |  |
|  |  | 25:55 | UA | User went to ‘canvas size’ option again and clicked on the color box |  |  |
|  |  | 26:10 | F | Task accomplished |  |  |
|  | 12 | 26:30 | S |  |  |  |
|  |  | 26:35 | UA, Q | User selected ‘file’ and then ‘export’ | This is quite similar to other software | smiling |
|  |  | 26:42 | F | Task accomplished |  |  |

**User 4**

|  |  |  |  |  |  |  |
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| **User** | **Task** | **Time** | **Code** | **Test Comment** | **User Comments** | **Non-verbal Cues** |
|  | 1 | 01:22 | S |  |  |  |
|  |  |  | UA | User used the ‘File’ menu and imported the image from another folder |  |  |
|  |  | 01:55 | F | Task accomplished |  |  |
|  | 2 | 02:15 | S |  |  |  |
|  |  | 02:21 | UA | User was thinking to go to ‘edit’ option, but he didn’t find the ‘expand’ option; so, he went to ‘image’ option and found how to expand it |  |  |
|  |  | 03:20 | F | Task accomplished |  |  |
|  | 3 | 03:38 | S |  |  |  |
|  |  | 03:46 | UA | User was planning to go to ‘marquee’ tool, but he didn’t click it |  |  |
|  |  | 03:56 | E | User finally clicked on marquee tool and again clicked the wrong option and then created too many rectangles outside the image and the image went to next page |  |  |
|  |  | 04:30 | Q |  | I thought this tool will create rectangle inside the image | Looking confused |
|  |  | 05:20 | R |  |  |  |
|  |  | 06:10 | UA | User was trying to resize it but not able to make all the rectangles same size |  |  |
|  |  | 08:38 | F | Task accomplished |  |  |
|  | 4 | 08:50 | S |  |  |  |
|  |  | 08:56 | UA | User was considering going to type and then filter |  |  |
|  |  | 09:58 | H | User asked for help |  |  |
|  |  | 10:01 | UA | User found the ‘blending’ option and then started applying it to all rectangles |  |  |
|  |  | 11:59 | F | Task accomplished |  |  |
|  | 5 | 12:10 | S |  |  |  |
|  |  | 12:59 | UA | User went to ‘edit’ option and then ‘image’; user was not sure where to find ‘place’ option; user was looking for insert option |  |  |
|  |  | 13:40 | H | User asked for help and I gave a clue to go to ‘file’ |  |  |
|  |  | 13:59 | E, MM, T | User thought that the graphics was placed into the rectangle but it was not; so whenever he was trying to go to ‘place’ option it was not working; user was not realizing that the image was not selected |  |  |
|  |  | 16:29 | R | Finally, user got the option of selection by chance and placed it properly |  |  |
|  |  | 16:40 | F | Task accomplished |  |  |
|  | 6 | 16:55 | S |  |  |  |
|  |  | 17:10 | UA | User looked into the toolbar and found the ‘text box’ option |  |  |
|  |  |  | Q |  | Yes, I am sure that ‘T’ means text box, I got it |  |
|  |  | 17:59 | F | Task accomplished |  |  |
|  | 7 | 18:12 | S |  |  |  |
|  |  | 18:40 | E | User clicked the ‘layer’ option twice and unnecessarily created too many layers |  |  |
|  |  | 19:55 | Q |  | I thought the color border should be there in layer, so I right clicked it but surprisingly it created too many layers | Looking disappointed and sighed |
|  |  | 20:26 | R | User was able to delete those layers and got his image back |  |  |
|  |  | 21:11 | F | Task accomplished |  |  |
|  | 8 | 21:31 | S |  |  |  |
|  |  | 21:59 | UA | User first tried to look at ‘file’ and then easily found ‘canvas size’ option in ‘image’ menu and changed the unit |  |  |
|  |  | 23:00 | F | Task accomplished |  |  |
|  | 9 | 23:13 | S |  |  |  |
|  |  | 23:15 | UA | User easily found the option to change in the same menu |  | Smiling and looked satisfied |
|  |  | 23:31 | Q |  | This task is the easiest to do |  |
|  |  | 23:35 | F | Task accomplished |  |  |
|  | 10 | 23:59 | S |  |  |  |
|  |  | 24:12 | UA | User went to ‘image’ option again and then tried to anchor, it but he did not select the image so ‘anchor’ function was not working |  |  |
|  |  | 24:59 | E | User consecutively clicked two wrong options by going to ‘color’ and ‘adjustments’; entire image crashed |  |  |
|  |  | 25:01 | Q |  | I didn’t expect this to happen | Looked very disappointed |
|  |  | 25:05 | UA | User was trying to recover then he realized that it was on different window |  |  |
|  |  | 25:13 | R | User found his project |  |  |
|  |  | 25:19 | FF, Q | User gave up on the task, so task was failed | Why did it not allow me to select the image? |  |
|  | 11 | 25:40 | S |  |  |  |
|  |  | 26:01 | UA | User found the ‘color’ option and then changed it |  |  |
|  |  | 26:10 | F | Task accomplished |  |  |
|  | 12 | 26:21 | S |  |  |  |
|  |  | 26:31 | UA | User went to ‘file’ and then exported the project into different file format |  |  |
|  |  | 26:42 | F | Task accomplished |  |  |

**User 5**

|  |  |  |  |  |  |  |
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| **User** | **Task** | **Time (MM:SS)** | **Code(s)** | **Test Comment** | **User Comments** | **Non-verbal Cues** |
|  | 1 | 02:26 | S |  |  |  |
|  |  | 02:30 | UA | User clicked on ‘file’ and then ‘open’ |  |  |
|  |  | 02.50 | F | Task accomplished |  |  |
|  | 2 | 03:10 | S |  |  |  |
|  |  | 03:40 | E2, MM | User went to select first and then tried to find it in layer option; the image vanished |  | Looking little disappointed |
|  |  | 03:45 | Q |  | ‘Select’ option is not working |  |
|  |  | 03:50 | H | User asked for help and I gave him a clue |  |  |
|  |  | 04:25 | R | Finally recovered the error |  |  |
|  |  | 04:36 | F | Task accomplished |  |  |
|  | 3 | 04:59 | S |  |  |  |
|  |  | 05:10 | UA | User went to tool bar section to find the option |  |  |
|  |  | 05:20 | E2 | User selected marquee tool and then crop tool; entire image was changed |  | Seemed to be angry |
|  |  | 06:10 | H | User asked for help |  |  |
|  |  | 06:15 | Q |  | This function is not good |  |
|  |  | 07:03 | R | User recovered the error and then it was quite easy for the user to create the other three rectangles |  |  |
|  |  | 07:10 | UA | User was struggling to resize it but failed to resize it completely |  |  |
|  |  | 08:00 | F | Task accomplished |  |  |
|  | 4 | 09:15 | S |  |  |  |
|  |  | 09:20 | UA | User wanted to find it in toolbar section but was hesitating to click anything as user was afraid that the image would be distorted |  |  |
|  |  | 09:42 | E, T, MM | User went to ‘adjustment’ option and then edit option; the image got transferred to another page; user was not conversant with the term ‘blending’ |  | Struggling to recover |
|  |  | 09:58 | H | User asked for help |  |  |
|  |  | 10:03 | Q |  | I thought ‘blending’ means adjustment and it should be in ‘edit’ option |  |
|  |  | 10:35 | R |  |  |  |
|  |  | 12:45 | F | Task accomplished |  |  |
|  | 5 | 13:10 | S |  |  |  |
|  |  | 13:34 | UA | User was trying to locate it in edit option |  |  |
|  |  | 13:36 | E, MM, T | User clicked the ‘blur’ option and set it in such a way that entire image became invisible |  |  |
|  |  | 14:55 | R | User undo the blur option and recovered the error |  |  |
|  |  | 15: 10 | H | User was unable to find the ‘place’ option and asked for help. I gave him the keyword ‘place’ and gave a clue of file menu |  |  |
|  |  | 15:20 | Q |  | Ah! It’s there in the file; I never thought it would be in file menu; I thought it would be in edit option. Why there is no insert option? |  |
|  |  | 15:30 | E | Graphics went behind the rectangle | I don’t know how to get it back | Sighing continuously |
|  |  | 17:10 | FF | User couldn’t fix the problem and then gave up; Task failed |  | Groaning |
|  | 6 | 18:20 | S |  |  |  |
|  |  | 18:25 | UA | User went to toolbar and easily found the ‘text’ option |  |  |
|  |  | 18:30 | Q |  | I am satisfied with this option |  |
|  |  | 18:40 | F | Task accomplished |  |  |
|  | 7 | 18:55 | S |  |  |  |
|  |  | 19:00 | UA | User was trying to find in toolbar option; then user kept moving on to layers, adjustments and again trying to select, but user didn’t click anything |  |  |
|  |  | 19:45 | E | User clicked the color and then the entire image color changed; user tried to undo it but failed; then user selected the layer and undo it |  | Struggling and got shocked |
|  |  | 19:55 | Q |  | I thought color should be applicable for text box as well |  |
|  |  | 20:13 | R | User recovered the error and found the correct option |  |  |
|  |  | 21:02 | F | Task accomplished |  |  |
|  | 8 | 21:56 | S |  |  |  |
|  |  | 22:57 | H | User asked for help as he was not sure what canvas size was |  |  |
|  |  | 23:15 | UA | User recollected that he found canvas option in image menu, so he found it easily |  |  |
|  |  | 23:18 | Q |  | I found this option very easily, but many people might not be able to find it |  |
|  |  | 23:30 | F | Task accomplished |  |  |
|  | 9 | 23:40 | S | User found the change option for canvas size very easily |  |  |
|  |  | 23:50 | F | Task accomplished |  |  |
|  | 10 | 24:10 | S |  |  |  |
|  |  | 25:03 | E | User did not select the picture so ‘anchor’ function was not working; border of the image vanished |  |  |
|  |  | 25:56 | R | User found the select option and then recovered the error |  |  |
|  |  | 26:10 | F | Task accomplished |  |  |
|  | 11 | 26:40 | S |  |  |  |
|  |  | 26:55 | UA | User went to ‘canvas size’ option again and clicked on the color box |  |  |
|  |  | 27:10 | F | Task accomplished |  |  |
|  | 12 | 27:30 | S |  |  |  |
|  |  | 27.36 | UA, Q | User exported the picture quite easily as he was conversant with “save as” option | This option seems to be very easy | Looking satisfied |
|  |  | 27:59 | F | Task accomplished |  |  |