# Social Media User Study

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***Abstract*—Social media is a popular pastime in our current society. There are numerous and diverse social media applications available to use. The study presented in this paper aimed to determine which application is easiest to use and most preferred by users. The apps considered were four of the most popular existing social media applications: Facebook, Twitter, Instagram, and TikTok. The participants in the study were timed while publishing a picture, a text, and a video using each application, and were asked to comment and provide their level of linking on each post they made. Post-questionnaire answers reveal that the majority of participants found Facebook the easiest and more preferable application to use. Experiment results also show that publishing videos on Facebook is quicker than on the other three media apps. On the other hand, publishing pictures and liking/commenting take about the same time on all four apps considered in our study.**

**Keywords: Human Computer Interaction (HCI), Social Media, Apps, User Interface Evaluation, Facebook, Twitter, Instagram, TikTok, Time-based Evaluation, Heuristic Evaluation.**

## I. Introduction

Throughout the years the way people communicate has changed. People used to write handwritten letters or use the telephone to communicate before the creation of the Internet. The Internet allowed for the exchange of messages to become much quicker, using an electronic medium and format. This has been further supported by the creation of a vast number of social media platforms [1]. There are many different types of such platforms, catering to the many diverse interests of the users. Some applications and associated platforms include Facebook [2], Twitter [3], Instagram [4], and TikTok [5]. All these apps have one thing in common: they offer modern means of communication that greatly support interaction among users. People are able to communicate with anyone around the world thanks to these applications. Among the numerous existing apps, Facebook is the most popular, as shown in Figure 1. However, considering human computer interaction (HCI) principles we still don't know exactly which application is the most preferred.

Many social media related topics have been explored and researched throughout the years [1] [6] [7], mainly in the area of information systems. These topics vary but, in the end, undertaking them has had the purpose of improving social media. The topics included looking at the behavioral aspects of social media [8], providing reviews and recommendations, using social media for organization purposes, and using it as a marketing tool [9]. Other topics focused on online blogs and communities, risks related to them, positive and negative effects, the relationship between usage and value creation, the use of social media to share information during disasters, traditional versus social media, utilization in a political context and public administration, and looking at the existing social media models [10]. This means social media has proved to be significant and useful in our society. However, there has not been a lot of research when it comes to the user interface of social media apps [11]. Yet, it is well known that the interface can make or break a user's experience. Evaluating a user interface can be done through timing tasks, but it can also be done heuristically. The heuristic evaluation consists of evaluators commenting on the interface in question. Through some experiments, Jakob Nielsen and Rolf Molich found that this evaluation is easy to plan for, inexpensive, fairly quick, and people can be more motivated to do it. The downside is since there are only comments from participants, they may not always help on how to fix potential problems [12].

We decided to use timing and heuristic evaluation in a user study focusing on social media apps. The apps that have been used were Facebook, Twitter, Instagram, and TikTok. At the same time, with the popularity of social networks, different social apps reflect different social characteristics. Take content as an example: Facebook and Twitter focus on the delivery of text messages, Instagram is used for image sharing, and TikTok focuses on the sharing of short videos. For instance, some famous people like to express their opinions using Twitter and Instagram is famous for celebrities sharing their pictures. If we take the social type as an example, Facebook and Instagram are mainly used to socialize with friends that they already know in real life, while Twitter and Tiktok are more inclined to share content between strangers. The authors of this paper wanted to see which one of these four major social media apps is the easiest to use and which is the most preferred by users. Therefore, we decided to conduct a user study involving Facebook, Twitter, Instagram, and TikTok. The main goal was to analyze the differences between these social applications and identify the deeper reasons for their popularity.

The remaining of this paper is structured as follows: The user study methodology is described in Section II, results and discussion are provided in Section III and conclusions are presented in Section IV.

## II. Methodology

There are several components of this study that we designed, as described in detail in this section.

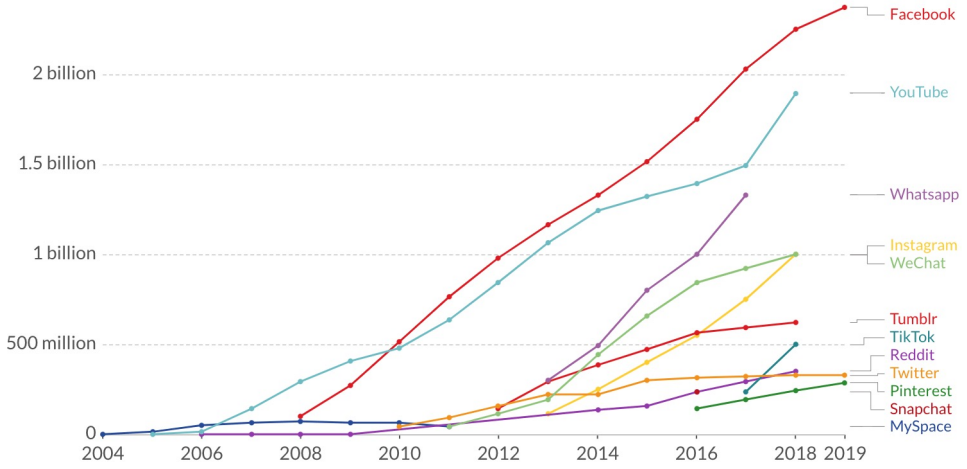


Fig. 1: Popular social media sites between 2004-2019 [13].

### A. Participants

Before the start of the experiment, we had some expectations for the participants. First, to avoid the impact of unfamiliarity with the tools on the experimental results, we hoped that the participants in this study had some experience using the Internet and smartphones. Second, we hoped that the participants can be distributed among different age groups. We believe that there are significant differences in the preferences and interests in social media among different age groups. In the end, we recruited a total of 10 participants – please note this study was conducted during a peak of the pandemic period, hence it was harder to recruit participants. These participants ranged in age from 18 to 45, with the majority in their 20's. Eight participants were female and two were male. The majority of the participants were recruited using Facebook.

### B. Apparatus

The software environments and applications in this study were Facebook, Twitter, Instagram, and TikTok. Their versions of the software were the latest available when the user study took place. The functions of these four social media applications are somewhat similar. For example, they all support the publishing of text, image, and video information. They also have certain differences. Therefore, in this user study, these four apps were used as our research subjects. The study was conducted through Zoom mostly on desktop and laptop computers. This was to protect the participants from the risk of COVID 19. Smartphones were used only when the participants could not complete the user study tasks on a computer web-browser.

### C. Procedure

There were several steps that each participant went through during the experiment. We first explained what the experiment is about and what are the tasks the participants will be asked to execute. The participants were informed that their participation is voluntary and they can terminate it anytime. The participants signed a consent form if they still wanted to continue after the introductory explanation. The experiment started with the participants answering an entry (pre-usage) questionnaire without instructions.

Next, we instructed the participants to publish, as a first task, a given picture and text. This was done with all four apps and time was recorded for how long the publishing process took for each app. The experiment continued onto the second task, which consisted of publishing a given video and text. This process was the same as in the previous task. When this task was finished, participants were asked, in the third task, to view, like, and comment on a publishing of their choosing that included a picture or a video. The three tasks were all done one app at a time so that the participants did not have to constantly change tabs. The experiment ended after the participants finished the exit (post-usage) questionnaire given to them.

### D. Tasks

In this user study, we asked the participants to complete three tasks. The first task (Task 1) was to publish a post with a given picture and text on Facebook, Twitter, Instagram, and TikTok. The given picture and the text, which was "I am doing an HCI experiment. Social media evaluation. HCI is cool!", are shown in Figure 2. The second task (Task 2) was to publish a given video and related text content on each of these four applications. We picked a TikTok video to be published. The video, picture, and text were given to the participants through email. The final task (Task 3) was to browse and interact at will with the content published by other users on the four apps included in the study.

We provided the same text, pictures, and videos to the participants of the user study, and did not introduce the user interface of the four apps in advance. In the process of publishing pictures and videos, we divided users into experienced and inexperienced categories, and recorded the time of their publishing process. Also, we studied the user-friendliness of the different applications for publishing new content. Furthermore, we designed a questionnaire to assess


Fig. 2: The picture [14] published by participants in Task 1.

the participants' experience of interacting with other users on the four apps.

We believe that these three tasks can simulate the daily behavior of most users on social apps, so the results of this user study could be meaningful and representative.

### *E. Design*

We designed this user study to address the research questions at hand. The independent variable was the type of social media app, with factors (or levels) the four social media apps studied. The dependent variable was the time taken to complete the posts. This metric and the participants' written preferences helped identify which of the applications was the most preferred. We used an analysis of variance (ANOVA) [15] to determine the level of preference for each of the four applications. This user study had also some random and confounding variables. The random variable was the participants' experience with the applications. Some participants knew more about the applications than others. We wanted this because we intended to see the preferred application among all users, not just the experienced ones. The confounding variables were the internet speed and the type of technology the participants used. These two factors can cause a delay in publishing times when they should be small. This is because internet speed can slow down publishing a post to an application or a small screen can increase the typing time. We tried to minimize the influence of these confounding variables as much as possible. The user study was evaluated using the within subjects method. This required all participants to complete all the tasks on all apps.

## III. Results and Discussion

The collected data represents the time, in seconds, it took to each participant to complete each task on each of the four social media apps. Tables I-III show how much time took each participant to perform on each task. Figures 3-5 are the graphical representations of the results shown in the tables mentioned above. Participant 1 was unable to complete any of the three tasks on TikTok. This problem resulted because we did not have all suitable materials at the time to complete the tasks. To keep this participant's data in the calculation, we decided to replace its times with the mean of all the participants' TikTok time.

The time it took for different participants to complete the same task varied greatly, most likely due to the following reasons: 1) There are different ways to try to complete the tasks. For example, Instagram does not support uploading pictures and videos on the web. The first participant used the developer mode of the Chrome browser to simulate the mobile phone on the web to complete the task, while other participants used their mobile phones to complete the task. 2) The internet speed of different participants had certain differences. For example, the Wi-Fi of the fourth participant encountered some minor problems when participating in this user study, which affected the time to complete the task. 3) Differences in the user interface are likely causes as well. TikTok's web interface is not friendly for uploading, and participants tended to fail to find the uploaded page in time. TikTok's website was updated when participants 8-10 were performing their user study. They were able to do every task on their web browsers while the other participants had to comment using their phones.

TABLE I: Publishing image and text times (in seconds) for each participant (Task 1).

| Participant ID | Facebook | Instagram | Twitter | TikTok |
|---|---|---|---|---|
| 1 | 57 | 373 | 53 | 70 |
| 2 | 37 | 109 | 38 | 104 |
| 3 | 41 | 30 | 12 | 80 |
| 4 | 50 | 47 | 30 | 51 |
| 5 | 35 | 79 | 28 | 63 |
| 6 | 71 | 27 | 23 | 77 |
| 7 | 54 | 18 | 12 | 46 |
| 8 | 126 | 128 | 49 | 72 |
| 9 | 27 | 63 | 21 | 53 |
| 10 | 35 | 73 | 21 | 80 |

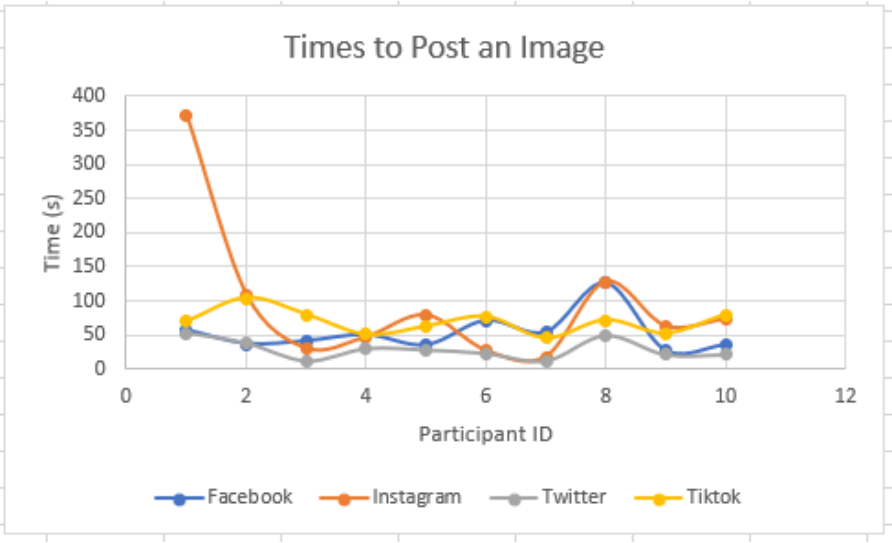


Fig. 3: The results of Task 1.

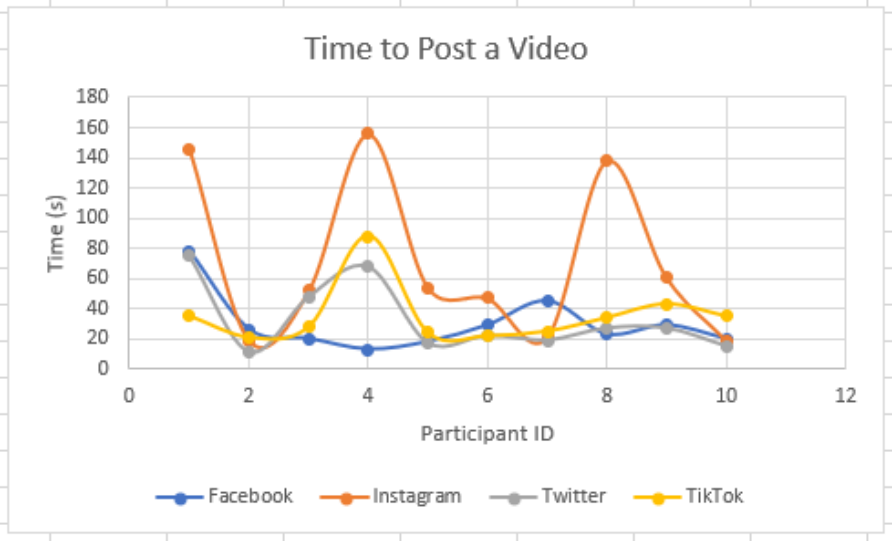


Fig. 4: The results of Task 2.

TABLE II: Publishing video and text times (in seconds) for each participant (Task 2).

| Participant ID | Facebook | Instagram | Twitter | TikTok |
|---|---|---|---|---|
| 1 | 78 | 146 | 75 | 35 |
| 2 | 26 | 19 | 11 | 21 |
| 3 | 20 | 52 | 48 | 28 |
| 4 | 13 | 156 | 68 | 88 |
| 5 | 18 | 54 | 17 | 24 |
| 6 | 29 | 47 | 22 | 22 |
| 7 | 45 | 21 | 19 | 25 |
| 8 | 23 | 138 | 27 | 34 |
| 9 | 29 | 61 | 27 | 43 |
| 10 | 20 | 19 | 15 | 35 |

TABLE III: Liking and commenting times (in seconds) for each participant (Task 3).

| Participant ID | Facebook | Instagram | Twitter | TikTok |
|---|---|---|---|---|
| 1 | 33 | 107 | 35 | 50 |
| 2 | 30 | 125 | 139 | 113 |
| 3 | 33 | 11 | 48 | 85 |
| 4 | 115 | 50 | 19 | 10 |
| 5 | 118 | 45 | 44 | 67 |
| 6 | 68 | 51 | 15 | 37 |
| 7 | 29 | 5 | 8 | 19 |
| 8 | 22 | 8 | 25 | 41 |
| 9 | 53 | 45 | 82 | 47 |
| 10 | 44 | 20 | 19 | 30 |

### *A. Data analysis*

From the collected data, there are certain differences in the completion of a given task on different software by the same participant. To analyze this difference, we used a one-way ANOVA test. Table IV shows the one-way ANOVA analysis

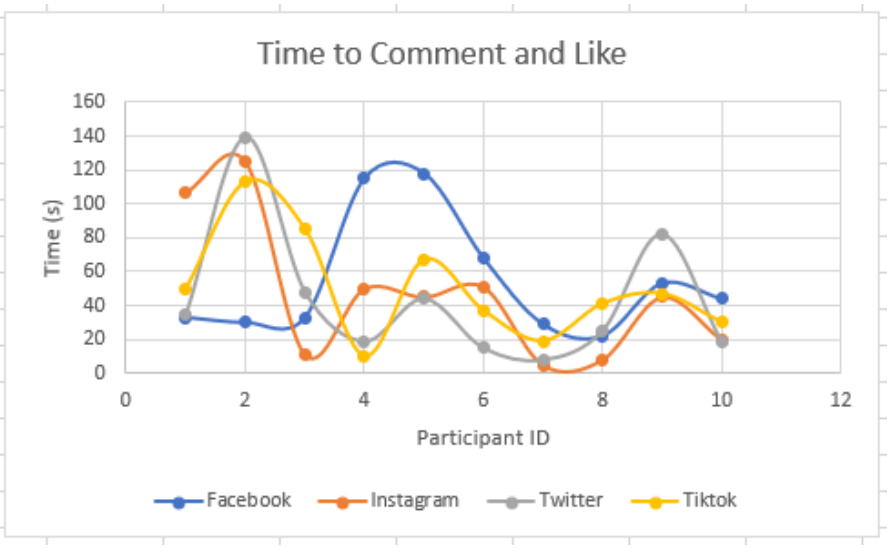


Fig. 5: The results of Task 3.

results of Task 1.

TABLE IV: Task 1 one-way ANOVA results.

| | SS | df | MS | F | p-value |
|---|---|---|---|---|---|
| Condition | 23094.09 | 3 | 7698.03 | 2.54 | 0.07 |
| Error | 109253.80 | 36 | 3034.82 | | |
| Total | 132347.89 | | | | |

According to the results of the one-way ANOVA (shown in Table IV), the f-value was 2.54 and the p-value was 0.07. With a p-value greater than 0.05, the null hypothesis could not be rejected. Thus, we concluded that there was no significant difference in the time taken by the participants to complete the task of publishing posts with pictures on the four apps.

By inspecting the data, we observed that it usually took 15-35 seconds for a participant to complete Task 1. On some apps, the participants may have spent more time due to their unfamiliarity with the user interface. But, in general, the user interface of each of the four apps may have caused the participants to take more time to complete Task 1. At the same time, according to the pre-questionnaire, most participants indicated that they have more experience with Facebook than with other apps. However, from the ANOVA results, Facebook was not significantly different from the other apps. Hence, it can be considered that the support for publishing posts with a picture was very good on all four apps.

Task 2 was similar to Task 1, in that the same text was published, but the pictures were replaced by videos. Table V shows the one-way ANOVA analysis results of Task 2.

According to the results of the one-way ANOVA (shown in Table V), the f-value was 3.58, and the p-value was 0.02. With a p-value smaller than 0.05, the null hypothesis could be rejected. This means that the time for participants to complete Task 2 was significantly different on the four apps.

TABLE V: Task 2 one-way ANOVA results.

| | SS | df | MS | F | p-value |
|---|---|---|---|---|---|
| Condition | 11294.26 | 3 | 3764.75 | 3.58 | 0.02 |
| Error | 37908.76 | 36 | 1053.02 | | |
| Total | 49203.03 | | | | |

By analyzing the collected data, the average time for participants to complete Task 2 on Facebook, Instagram, Twitter, and TikTok was 30s, 71s, 33s, and 36s, respectively. It can be concluded that the user interfaces of Facebook, Twitter, and Tiktok are roughly equivalent in user friendliness, while the Instagram interface is more difficult for users to publish videos. It is worth mentioning that Instagram is the only one of the four apps that does not support publishing pictures and videos on the web, so the participants had to use their mobile phones to complete this task. It can also be comcluded that Facebook is slightly better at publishing videos than the other apps. Nevertheless, more research needs to be done to further support this conclusion.

Task 3 asked the participants to like and comment on posts of thier interest. Table VI shows the one-way ANOVA results of this task.

TABLE VI: Task 3 one-way ANOVA results.

| | SS | df | MS | F | p-value |
|---|---|---|---|---|---|
| Condition | 671.19 | 3 | 223.73 | 0.16 | 0.92 |
| Error | 49257.88 | 36 | 1368.27 | | |
| Total | 49929.08 | | | | |

According to the results of one-way ANOVA (shown in Table VI), the f-value was 0.16, and the p-value was 0.92. With a p-value greater than 0.05, the null hypothesis could not be rejected. Judging from the results of the one-way ANOVA, the four apps allowed participants to easily like and comment


Fig. 6: The results of Question 2 of the exit questionnaire ("Which of the 4 apps do you prefer?")


Fig. 7: The results of Question 4 of the exit questionnaire ("Which of the 4 apps was the easiest to use?")

on other people's posts. Overall, all four apps seemed to be doing a good job in allowing participants to find content that interests them.

### B. Questionnaire analysis

Besides the one-way ANOVA results of the data, we found interesting the answers to Questions 2 and 4 of the exit questionnaire. Question 2 asked which of the tested social media apps the participant prefers. Half of the responses (5 out of 10) indicated Facebook, as seen in Figure 6. This is not surprising because most of the participants indicated they use Facebook regularly. The results may have turned out differently if participants were recruited using all four apps, not just Facebook.

Question 4 asked which of the tested social media apps the participant found easier to use. Figure 7 shows that the majority of the participants (8 out of 10) indicated Facebook. There were many reasons for this decision. Participant #2 said it was because "It's what I'm used to." Other participants, numbers #4 and #10, noted that on Facebook it is "easier to find how to post" and that its interface is "user friendly and self explanatory," respectively. This makes sense, since Facebook's publishing function was immediately available (right in front of the user) once logged in. Interestingly, Twitter has the same layout as Facebook, but only 1 of the 10 participants considered it the easiest to use. More participants, with different social media experience, are needed to fully confirm that Facebook is the most user-friendly app among those tested.

## IV. Conclusions and Future Work

Social media participation is an important personal activity in people's daily lives. Obviously, given its significance, the users need related apps that are easy to use. This user study showed that Facebook was considered the easiest to use and was the most popular among participants. The reason for this maybe because of the small participant size of this study and our recruiting of participants mainly using Facebook. Note also that based on data analysis all three other apps also fared pretty well. Thus, further research is needed to confirm that Facebook is the easiest to use, which may have also led to it being the most preferred. This extended work could be done by extending the user study described in this paper, with more participants recruited in more diverse ways. Furthermore, the study can have more applications added, such as Reddit or other apps popular in specific countries. Having more research results could be beneficial to many developers and users. The developers could use aspects from the most popular applications to create more user-friendly social media apps. In turn, the users, the ultimate beneficiary of social media apps, could utilize the most popular apps to more effectively publish their content of interest and also to get more followers.

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