

# 2024-02 Duo Security Usability Study Kit

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**Updated study kit notes:** Here's a summary of changes we made:

- We went through your feedback in detail and made changes using our best judgment.
- In addition:
  - We removed the pre-study questionnaire and integrated it into the recruitment survey.
    - This way, we can gather general sentiment about Duo usability from survey respondents even if they choose not to sign up for a usability study.
  - We've also trimmed questions we considered less relevant to make the survey concise and easy to complete.
  - We've cleaned up the task list, instructions, and order, with updated moderator notes in the test script.

# 1) USABILITY STUDY PLAN

## Background and Purpose

Our group wants to understand Duo Mobile users at educational institutions like UW. In our study we want to understand if users are able to link 3rd party accounts to Duo for 2FA. We will be presenting this to Duo stakeholders to help them understand the needs of the demographic.

## Research Questions

### ★ How is the usability of linking Duo with personal accounts (third-party apps)?

- Are users aware of the ability to add personal accounts?
- How successful are users in linking third-party apps?
- If any usability issues arise, is the usability issue with Duo or the third party app? If with Duo, what is the issue?

### ★ How is the usability of Duo Mobile's interface?

- Can users complete authentication without making any mistakes?

### ★ How is the usability of Duo Mobile's interface among power users?\*

*\*We define power users as Duo users who **purposefully use Duo** to assist in their own privacy needs and have 5+ linked accounts, rather than **users who use it out of necessity/organizational policy**.*

- How do power users navigate the Duo app when needing to log into several applications back to back?
- How do power users find the passcode to a single relevant service when navigating a long list of connected services?

## Ideal Participant Profile(s)

- ★ UW students, faculty, and staff.
- ★ Users of Duo Mobile.
- ★ Ideally, try to find users with ~5+ accounts linked to Duo Mobile (power users)
- ★ Exclude: members from outside the educational field, non-users of Duo
- ★ Age: 18+ (no upper limit)
  - Gender split: aim to achieve a 50/50 split
  - Task experience: irrelevant (will be studied for)

## Method(s)

### ★ Surveying

- a. Sent out to the population of UW students, faculty, and other employees.
- b. This survey will gather user sentiment data about the usability of Duo, while also gathering demographic data and acting as a recruiting tool for participants expressing interest in a usability testing session.
- c. A survey will be written by the date of 02/14 and distributed for data collection through various UW channels over a 7 day period.
- d. Successful completion criteria: >50 data points collected, >12 people expressed interest in participating in a study

### ★ Usability Testing

- a. Run in-person usability testing of the Duo app with survey respondents expressing interest in participating.
- b. Users will be given tasks defined in the Task List below.

## Task List

- ★ **Task:** Think aloud about logging in to UW Canvas. Try to describe every step of the process, including actions taken in with Duo.
  - a. **Starting state:** User begins their think-aloud at their perceived sign-in screen.
  - b. **Success state:** User ends their think-aloud at their perceived signed-in state.
  - c. **Relevant information:** We want to peer into users' mental model of the multi-factor authentication process through a common use case. This helps us compare and contrast whether mental models closely align with actual task steps.
- ★ **Task:** Log in to any of your registered services.
  - a. **Starting state:** User is not logged in.
  - b. **Success state:** User successfully logs in.
  - c. **Relevant information:** The important metrics for this study with regards to power users is the time to completion and actions taken in their Duo app. Login will be done from a browser in incognito mode to reliably trigger the 2FA prompt. This data will also be compared to the user's perceived mental model of signing in.
- ★ **Task:** Link a third-party app you use with Duo.

- a. **Starting state:** The third-party app is not linked to Duo.
- b. **Success state:** User successfully links the third-party app to Duo.
- c. **Relevant information:** Ask the user about a third party service they'd like to link with Duo (Gmail, Twitter, etc). Encourage them to think out loud as they go through each step. Ask for permission to record them before they begin the task.

## **Test Logistics:**

### **Usability Study**

- **Location:** booked room at Odegaard/Sieg/other arranged campus location
- **Alternate:** Live on Zoom mobile app with participant's screen share on.
- **Equipment list:** test phone, microphone, camera, tripod, laptop
- **Test environment:** Duo Mobile app
- **Team roster:** Flexible based on user participant's availability and team member schedule

## **Data Collection and Analysis Plan**

### **Survey**

- The survey will be distributed digitally using Google Forms
- The data will be recorded in the team's Google Drive, which is shared with the client
- Data will be analyzed for any patterns using an Excel spreadsheet
- Any additional findings will be formatted into a shareable Google Sheets document

### **Usability Test**

- Record the session on video for further analysis
- Record observations inside of our data logging sheet
- Take notes on insights that emerge
- The collected data will be organized with procedural analysis
- Affinity map responses into groups
- Code the data into a general spreadsheet

## Project Timeline

*We're defining the end of each week on Thursdays to facilitate logistics with class time.*

|                         |                                                                                                                                                                                                                                                |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 4<br>(1/16 - 1/25) | <ul style="list-style-type: none"><li>• Meeting with sponsor to review research questions and a research plan.</li><li>• Complete <b>usability study plan</b> (1/24)</li></ul>                                                                 |
| Week 5<br>(1/26 - 2/1)  | <ul style="list-style-type: none"><li>• Meeting with the sponsor to review our usability study plan and align/revise.</li></ul>                                                                                                                |
| Week 6<br>(2/2 - 2/8)   | <ul style="list-style-type: none"><li>• Final sponsor alignment meeting - receive confirmation to begin the usability study.</li></ul>                                                                                                         |
| Week 7<br>(2/9 - 2/15)  | <ul style="list-style-type: none"><li>• Complete <b>usability study kit</b> (2/9)</li><li>• Progress check-in with sponsor.</li><li>• Begin recruitment.</li><li>• Begin scheduling.</li></ul>                                                 |
| Week 8<br>(2/16 - 2/22) | <ul style="list-style-type: none"><li>• Progress check-in with sponsor.</li><li>• Send out survey.</li><li>• Continue recruitment.</li><li>• Continue scheduling.</li><li>• Begin running studies.</li><li>• Begin initial analysis.</li></ul> |
| Week 9<br>(2/23 - 2/29) | <ul style="list-style-type: none"><li>• Progress meeting with sponsor.</li><li>• Finalize remaining studies.</li><li>• Finalize results.</li><li>• Complete analysis.</li><li>• Begin work on report.</li></ul>                                |
| Week 10<br>(3/1 - 3/7)  | <ul style="list-style-type: none"><li>• Complete <b>study results presentation</b> (3/7)</li><li>• Complete <b>Duo-facing stakeholder presentation</b> (3/7)</li></ul>                                                                         |
| Week 11<br>(3/8 - 3/14) | <ul style="list-style-type: none"><li>• Present findings with internal Duo stakeholders (tentative date)</li><li>• Complete <b>study results report</b> (3/14)</li></ul>                                                                       |



## 2) RECRUITMENT SURVEY

Link to survey: **REDACTED**

Hello! We are HCDE Master's students at the University of Washington. We are running a study on the mobile app Duo and are looking for current UW students, professors, and employees to take part. We'd like to gather thoughts on your experiences with Duo Mobile, with the opportunity to participate in a usability test if you'd like.

### Page 1 - General Questions

**How frequently do you use Duo Mobile for authentication purposes?**

- Less than once a week
- 1-2 times a week
- 3-4 times a week
- 5+ times a week

**Approximately how long have you been using Duo Mobile?**

- Less than 6 months
- 6 months to 1 year
- 1 year to 2 years
- More than 2 years
- Not sure

**On average, how many third-party apps have you linked to Duo Mobile for authentication?**

- None
- 1-2
- 3-5
- 6 or more

**Are you aware of the ability to add personal accounts (third-party apps) to Duo Mobile for authentication?**

- Yes
- No

**Have you linked any personal accounts (e.g., social media, email) to Duo Mobile?**

- Yes
- No

**Have you encountered any challenges or difficulties when linking third-party apps to Duo Mobile? If yes, please describe.**

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## **Page 2 - Demographic Questions**

**Do you identify as Male, Female, Non-binary or would prefer not to say?**

- Male
- Female
- Non-Binary
- Prefer not to say

**What is your age?**

- 18-29
- 30-39
- 40-49
- 50+

**Is your phone an Android or an iPhone?**

- Android
- iPhone

**Are you a student, professor or an employee at UW?**

- Student
- Professor



- Employee
- Other

**What year did you join the University of Washington?**

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## **Page 3 - Study Screener**

In addition to our survey, our team is also interested in running a usability study on some of Duo Mobile's features.

The study will be conducted at *<Location>* and we will need you to attend at a scheduled time. It will be conducted on *<trial dates>* and will take approximately *<Time>* minutes.

You would be doing a few tasks using your mobile phone and the Duo app. Throughout the test, we will be asking you questions about your experience. We are interested in how you use the Duo app and how the experience can be improved.

**Would you be interested in helping us with this research?**

- Yes
- No

**Are you 18 years of age or older?**

- Yes
- No

**Are you currently a student, administrator, professor, or employee of the University of Washington?**

- Yes
- No

**Do you have the Duo app on your cell phone?**

- ☐ Yes
- ☐ No

**Besides logging into UW, are there other sites or applications where you log in that you would be interested in adding additional security?**

- ☐ Yes
- ☐ No

(If all questions are answered with Yes, we can select them for recruitment.)

### 3) CONSENT FORM

## Information About A UW Research Study

Duo Security Usability Testing

### What is this study about?

You are being asked to participate in a research study about Duo Security by students in the HCDE program and sponsored by Duo Security. It is up to you to decide whether you want to participate. If you decide to enroll, you can stop participation at any time. We are asking you to be in the study because you are affiliated with the University of Washington. Please read this form and ask any questions you may have before agreeing to be in this study.

### What will you be asked to do?

If you agree to be in this study, we will ask you to participate in a study with a researcher to explore different use cases for Duo Mobile with your device. This study will last no longer than one hour.

### What will happen to the information you provide?

The information you provide will be anonymized. This means that your name will not be connected to the data.

### What can you do if you want more information?

**Talk to the study team.** Gavriil Kochevrin is the point of contact at the University of Washington for this study and can be contacted at **REDACTED**.

**Talk to someone else.** If you want to talk with someone who is not part of the study team about the study, your rights as a research subject, or to report problems or complaints about the study, contact the research sponsor at **REDACTED** or the course instructor at **REDACTED**.

## 4) POST-TASK QUESTIONNAIRE

Quick link: **REDACTED**

**How difficult or easy did you find the task on a scale of 1 to 7, 1 being very difficult, and 7 being very easy?:**

- 1 - Very difficult
- 2 - Difficult
- 3 - Slightly difficult
- 4 - Neutral
- 5 - Slightly easy
- 6 - Easy
- 7 - Very easy

**On a scale of 1 to 7, how long or short did you feel this task took, 1 being very long, and 7 being very short?**

- 1 - Very long
- 2 - Long
- 3 - Slightly long
- 4 - Neutral
- 5 - Slightly short
- 6 - Short
- 7 - Very short

**How likely are you to continue using this feature after this session, if you haven't before, on a scale from 1 to 7 with 1 being very unlikely, and 7 being very likely?**

- 1 - Very unlikely
- 2 - Unlikely
- 3 - Slightly unlikely
- 4 - Neutral
- 5 - Slightly likely
- 6 - Likely
- 7 - Very likely

**Was there a situation while completing this task where you were unsure of what to do next? If yes, can you please describe it?**

**Do you have any additional comments?**

## 5) MODERATOR GUIDE / TEST SCRIPT

Moderator's note: This is the study plan in short form.

- Introduction (~5 mins)
- Warmup (~5 mins)
- Task 1 (~5 mins)
- Task 2 (~5 mins)
- Task 3 (~10 mins)
- Debrief (~5 mins)
- Conclude (~2 mins)

### Introduction

Thank you for agreeing to participate in our research study. This should take no more than an hour, and if the time exceeds that then we will stop wherever we are to respect your time. Before we begin, can we confirm that you've completed the consent form for our study, and that you have the phone that you use Duo Mobile with on you?

*(If incomplete, hand them a consent form and ask them to review and sign or verbally consent before proceeding any further).*

**[ Verify consent form and phone on hand. ]**

Great! May we have permission to record this study session?

**[ Verify consent for recording. ]**

**[ Begin recording now, and mark the current time. ]**

Hello! I'm **[researcher name]**, and I'll be your guide through this usability session.

(If observers are present)

I'm also accompanied by a few colleagues. They're just here to observe our session.

For full transparency, I'll be generally following a script to make sure we're giving all participants the same instructions. However, if you have any questions, please feel free to bring them up at any time.

We'll be doing some tasks on the Duo Mobile app today. Duo Mobile is a multi-factor authentication solution that helps users securely log in to their apps and services. It can be connected to other apps as well, acting as a second layer to your login to increase your level of security. Even if a potential intruder has your password, they won't be able to get into your accounts.

The purpose of this study is to understand how Duo users use the Duo Mobile app. In this session, I'll ask you to use the app and some third party applications to complete one to two tasks. I'll be observing and taking notes, but I want you to know that we're not evaluating your performance, we're evaluating the Duo Mobile app.

We'd like you to think out loud while working and do what you would normally do. This will help us understand what you're thinking and feeling, and that helps us find out what works and doesn't work. I want to reiterate that we're testing the application's usability, not testing you. You can be candid about your experience with the application, as it will help the design team improve your experience in the future.

After you complete each task, we'll ask you to complete a short post-task survey.

If at any point you'd like to retract consent or ask questions, you may feel free to do so. Do you have any questions before we begin?

## Warmup

Before we begin, I'd just like to have a brief conversation with you about your current experience with Duo. How do you currently use the tool, and what do you think about it?

## Task 1 - Think-Aloud

We're going to start off by getting to know how you conceptualize the log-in process with Duo. I'd like you to imagine logging into UW Canvas, beginning with the sign-in screen on UW. Talk me through the process of logging in from start to finish as you remember it in your head.

**(Moderator notes: Feel free to ask questions as participants are doing their think-aloud if you find any interesting thoughts that you'd like to probe further.)**

**End of task/transition:**

Thanks for completing that task and walking us through your thought process! Now, we're going to do this task for real. (Transition to Task 2)

## Task 2 - Log Into UW Canvas

For your next task, **we're going to have you log into UW Canvas for real**. We'll open the sign-in page from an incognito window to make sure you get the Duo security prompt.

Remember, at each step, tell me what screen you're on, and remember to talk out loud about what you're doing and what you're thinking.

**Moderator notes:**

- **For privacy reasons, please don't record them logging in with their passwords.**
- **(From REDACTED: Again, expect to jump in with your own questions when the participant doesn't volunteer information, and probe for clarifying details on what they do say.)**

**End of task/transition:**

Thanks for completing that task and walking us through how you did it! We're going to give you a quick post-task survey about the experience you just had. This should take no more than 5 minutes.

**[ Verbally administer post-task survey questions to the participant. ]**

## Task 3 - Secure a Third Party Service with Duo

Alright! Here's our last task.



In the survey, you responded that you expressed interest in adding multi-factor authentication to a personal account that doesn't have it currently. This could be a Twitter account, Gmail account, Facebook, or any other service. Can I ask you to identify which service you'd like to link in today's session?

**[ Get their response. ]**

Thank you. Here's your first task: **Link Duo with that account**. During each step, tell me what screen you're on, and remember to talk out loud about what you're doing and what you're thinking.

**Moderator notes:**

- **For privacy reasons, please don't record them logging in with their passwords.**
- **Try to keep notes on how they navigate in both Duo and their personal account service - there might be interesting insights we can gather about how users wayfind.**

**End of task/transition:**

Thanks for completing that task and walking us through how you did it! We're going to give you a quick post-task survey about the experience you just had. This should take no more than 5 minutes.

**[ Verbally administer post-task survey questions to the participant. ]**

## Conclusion

That's our last task! Thank you so much for volunteering your time to us today. Your input is very important to us, and we greatly appreciate your participation.

**(From REDACTED: This is a great place to ask them what they thought about the tasks or if anything in particular stood out. You can get a lot of important details from the last few minutes of a session.)**

Before we wrap up, I'd like to open up the room for your thoughts about the session today. What did you think about the tasks? Did anything in particular stand out? Is there anything else that you wanted to comment on?

**After final thoughts have concluded:**

That concludes our usability study! If you have any remaining questions, feel free to ask us now. Otherwise, you can reach out to us at **[insert contact here]** if anything comes up afterwards.

## 6) DATA LOGGING

Data will be stored in this Google Sheets document.

[Data Collecting Log - Google Sheets](#)

## 7) ADDITIONAL MATERIALS

We will be using the live production version of Duo Mobile for this test.

## 8) ADDITIONAL NOTES

### Learnings from first tests:

**Problem:** Zoom won't screenshare sensitive windows (Duo app, Incognito windows)

**Solution:** Either conduct test in-person, or take more diligent notes during these more sensitive sections.

- Encourage them to more verbally walk through what they're doing for more sensitive content, rather than recording it directly.
- Do Zoom call over computer, and share phone screen via webcam.

**Problem:** Participants may not be comfortable adding a third party app

**Solution:** Emphasize this more clearly in the screener and the script **in the introduction**.

- Fail safe: If participant still does not want to complete it, respect their wishes and skip that task.
- Take notes on user sentiment even if they don't complete the task, because it's useful data!
- Have a better introduction on the idea of adding third party apps before starting the task.

**Problem:** Post question survey confusion

**Solution:** Better for data richness and flow to ask survey questions verbally rather than handing them a survey to fill alone.

**Additional Comments:**

- Ask Vanessa about recruitment incentives during tomorrow's meeting?
- Realistically we're probably fine if we're only able to get 5-8 participants (Why You Only Need To Test With Five Users); we should still try to get as many participants as we can though.
- What do we want to present to Vanessa?
  - What we learned during our first round of testing and our results so far.
  - Vanessa's perspective on how many participants we should aim to recruit.
- Start thinking about/working on final presentations.
- Ensure we're being thorough with our usability testing and notetaking.
- It was great to be able to talk in this Zoom format with everyone again :)

**Action Items:**

- Adjust script to clarify third-party app task awareness. - Anushka
- Add an intro to Duo in the intro task script. - Wilson
- Have a copy of the script on its own document.