

# User Experience Evaluation of the Microsoft HoloLens for Student-Related Tasks



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## Introduction

- The Microsoft HoloLens is a hands free, augmented reality headset in which a user can interact with holograms in a real environment.



Figure 1. Microsoft HoloLens

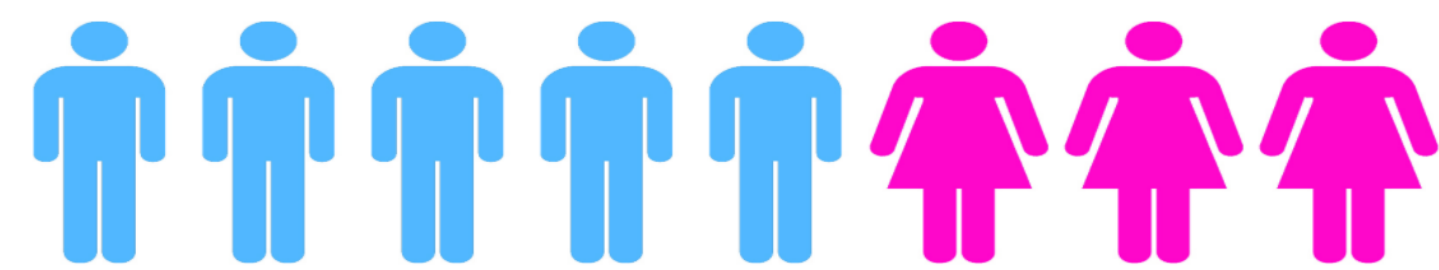
- Sensors map a users' environment, allowing them to overlay holograms on top of what it is in the real world.
- The HoloLens can simulate basic desktop computing, e.g. surfing the web, reading documents, playing games, etc.

### Current Study

- The purpose of this study to investigate the user experience of the HoloLens by college students completing tasks in an office setting.

## Method

8 Participants (5 Male, 3 Female)



Mean Age = 20.6 (1.68)

Figure 2. Demographics.

- Participants were asked to wear the HoloLens and then go through a tutorial and calibration sequence.
- Once completed, they would go through a set list of tasks that were randomized (Table 1).
- Following the tasks, participants completed the:
  - Simulator Sickness Questionnaire (SSQ)
  - User Experience Questionnaire (UEQ)
  - Comfort Rating Scale (CRS)
  - System Usability Scale (SUS)
  - Net Promoter Score (NPS)
- Participants also gave their opinions about the overall experience with the HoloLens and previous experience with augmented/virtual reality devices

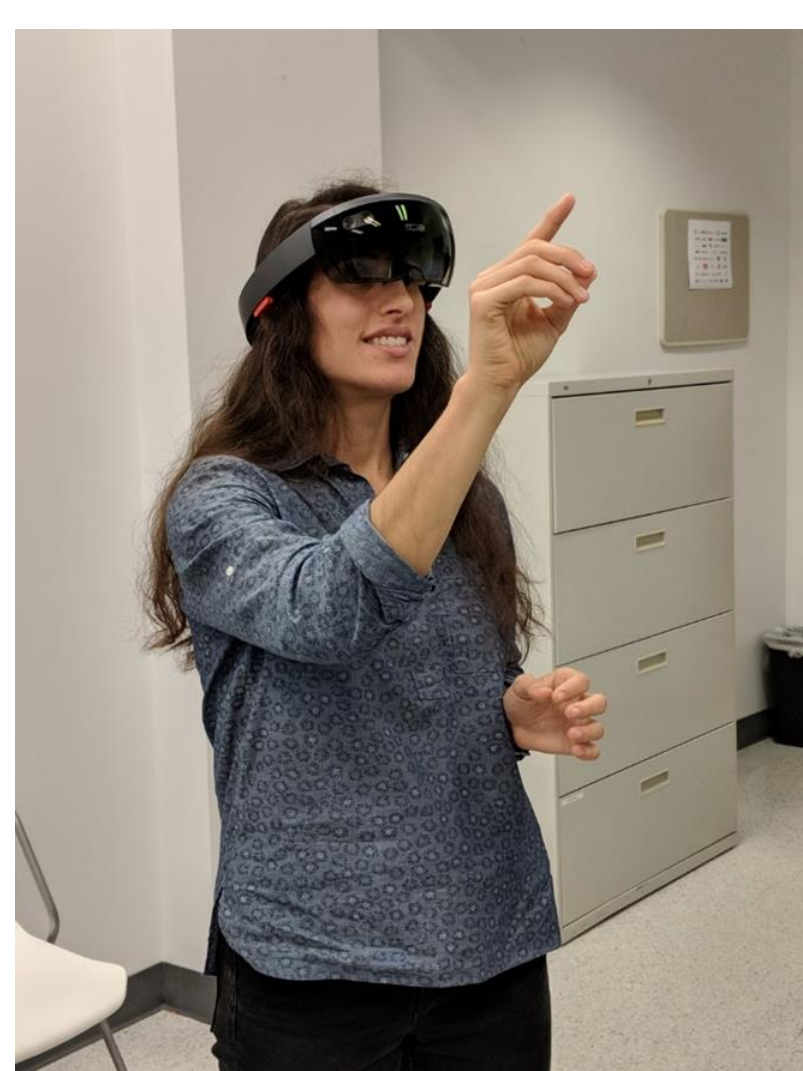


Figure 2 & 3. Selecting gesture (left). Bloom gesture (right).

Table 1. List of the tasks that the participants completed.

Task	Tasks	Difficulty 10 = easy
Task 1	You have just arrived at work and entered your office. You want to setup your office space so you can begin working. Begin by opening up a few applications like PowerPoint Preview, Outlook, and Microsoft Edge. Place them however you would like.	8.5 (1.3)
Task 2	You have received an email from a co-worker. Check Outlook to see the email and reply to it.	8 (1.9)
Task 3	After working for a while, you want to relax by playing a game. Open up the Tic Tac Toe app and play three rounds of the game.	10 (0.4)
Task 4	A co-worker told you about a movie coming out soon and wanted you to watch the trailer. Find and watch the trailer for "Ready Player One" on Youtube.	7.5 (2.3)
Task 5	You have been working so long, you have forgotten what time it was. Use Cortana to check the time.	9 (1.5)
Task 6	You have to deliver a package to a coworker. Take the package to the break room and leave it in the mailbox.	10 (0)
Task 7	You need to start working on a PowerPoint for work. Create a PowerPoint and title it with your name and create an ending slide that says "Thank you".	7.5 (2.2)

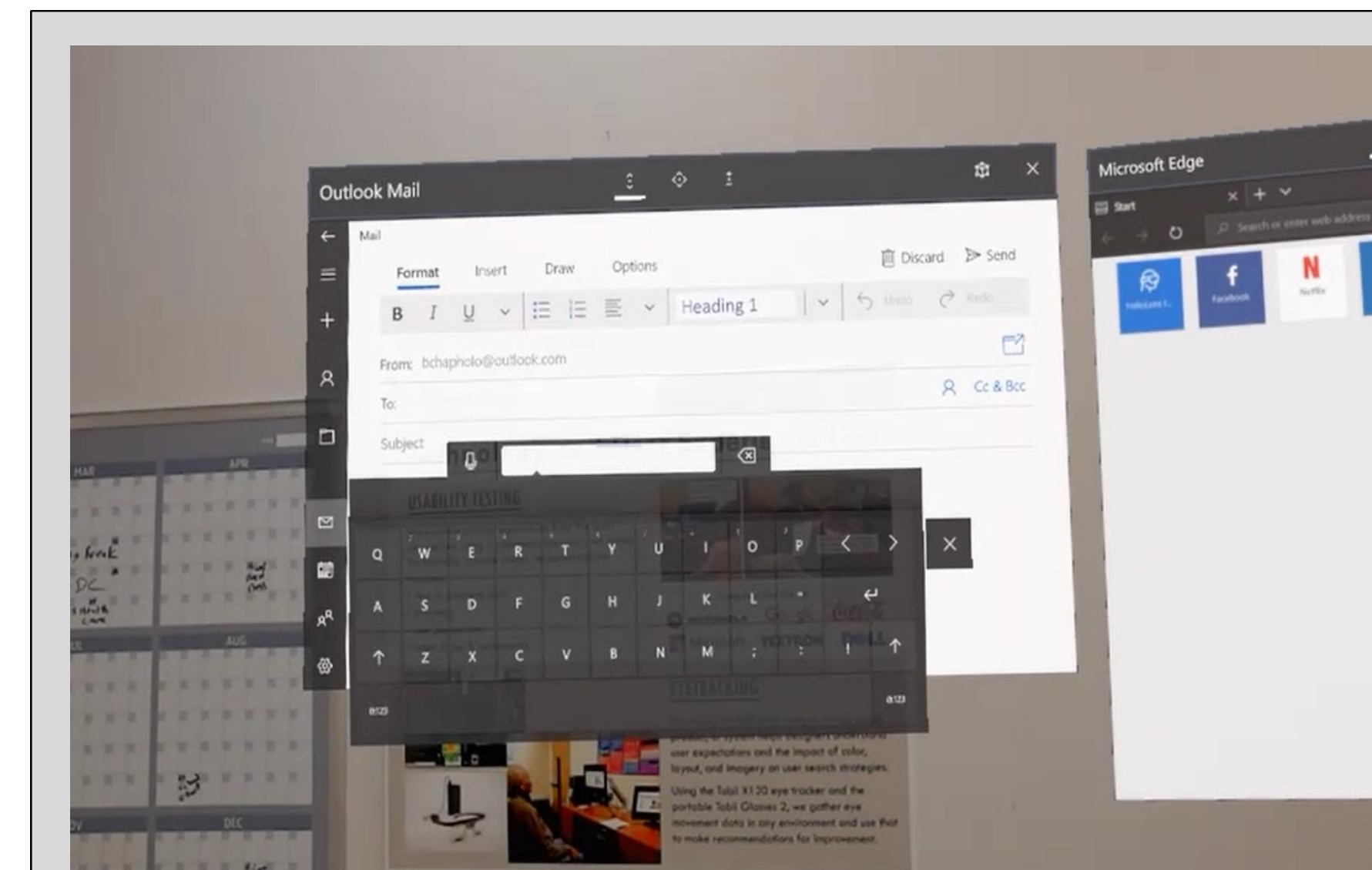


Figure 4. Typing an email task.

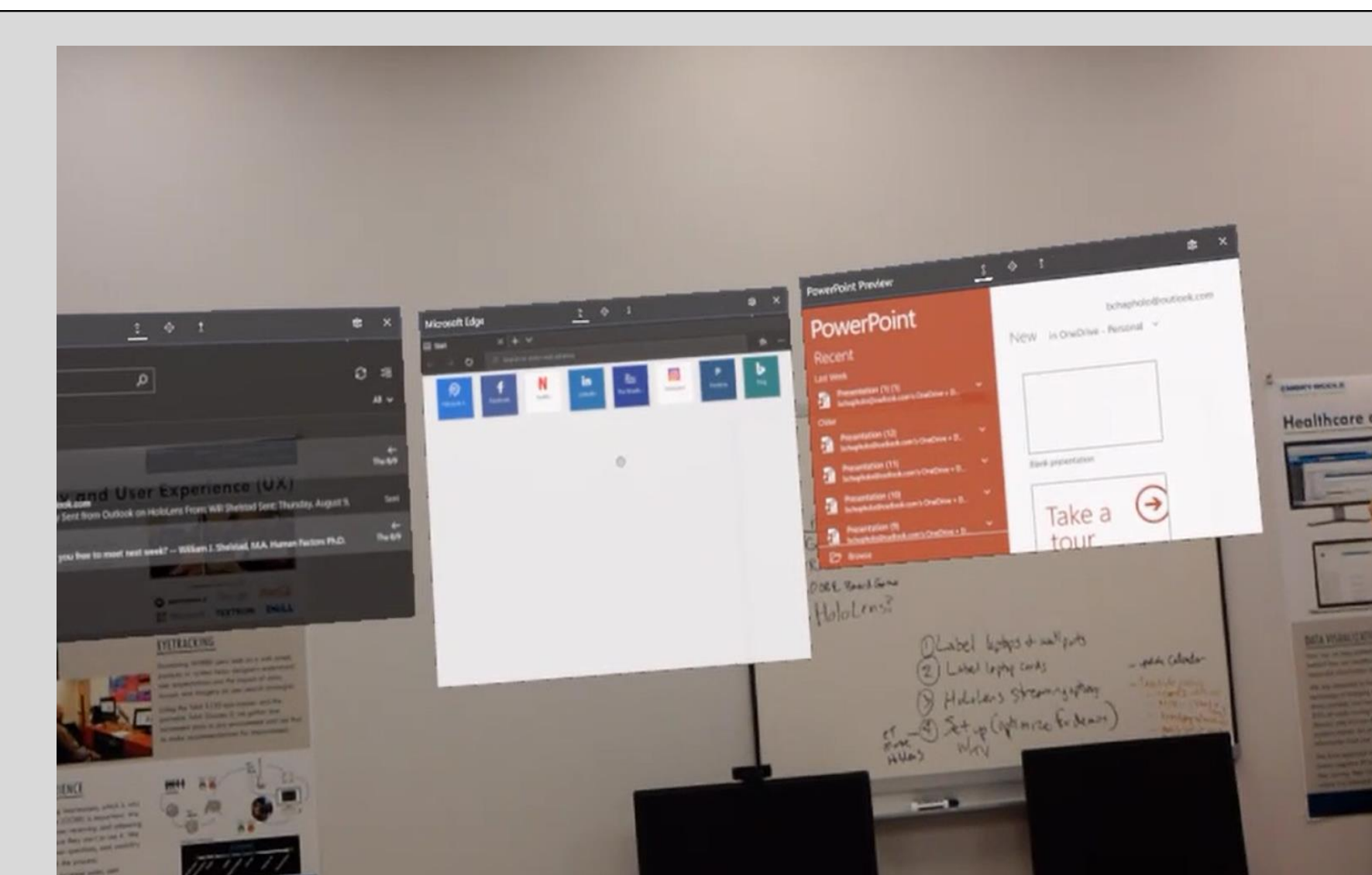


Figure 5. Making a PowerPoint slide task

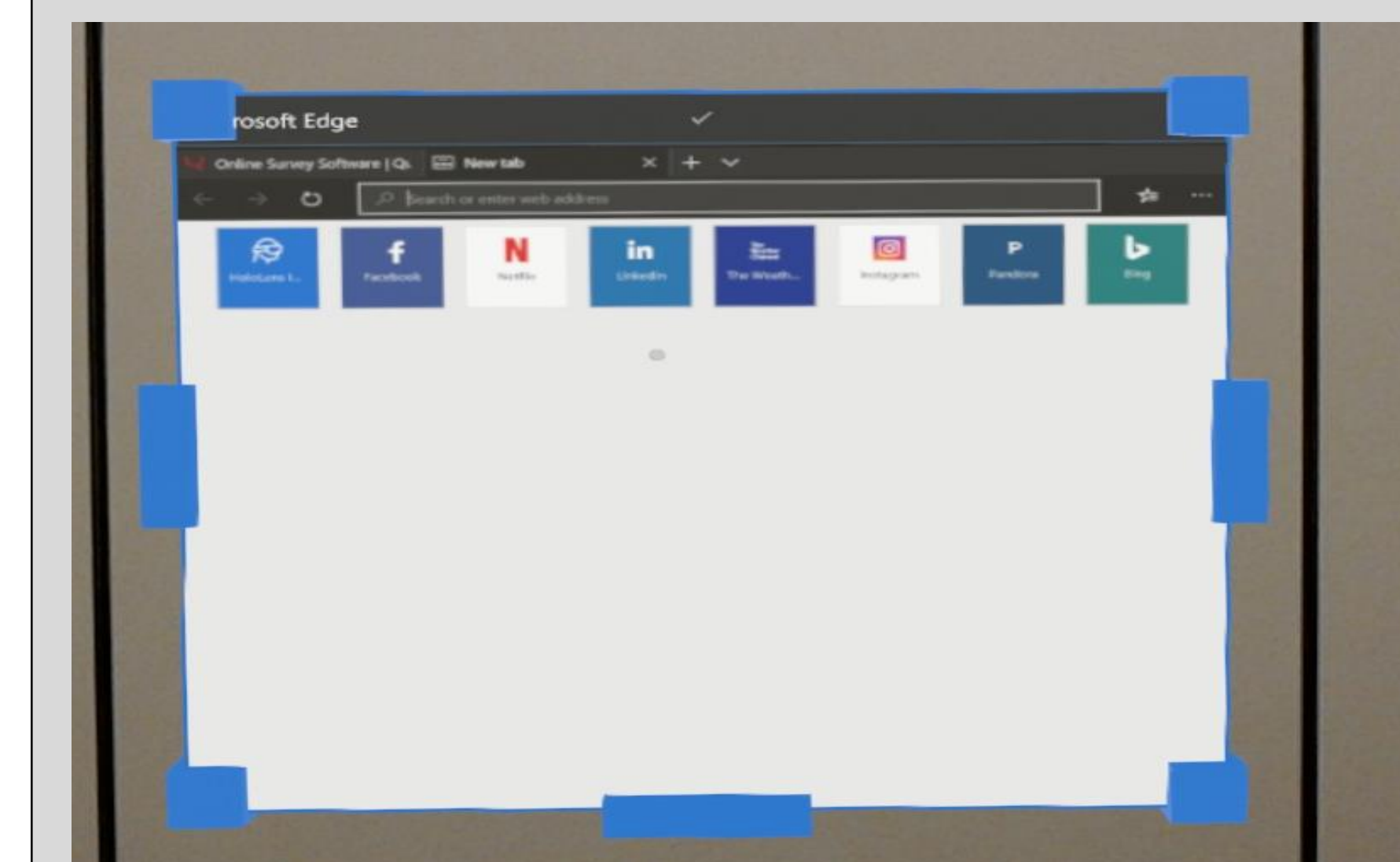


Figure 6. Resizing a window.

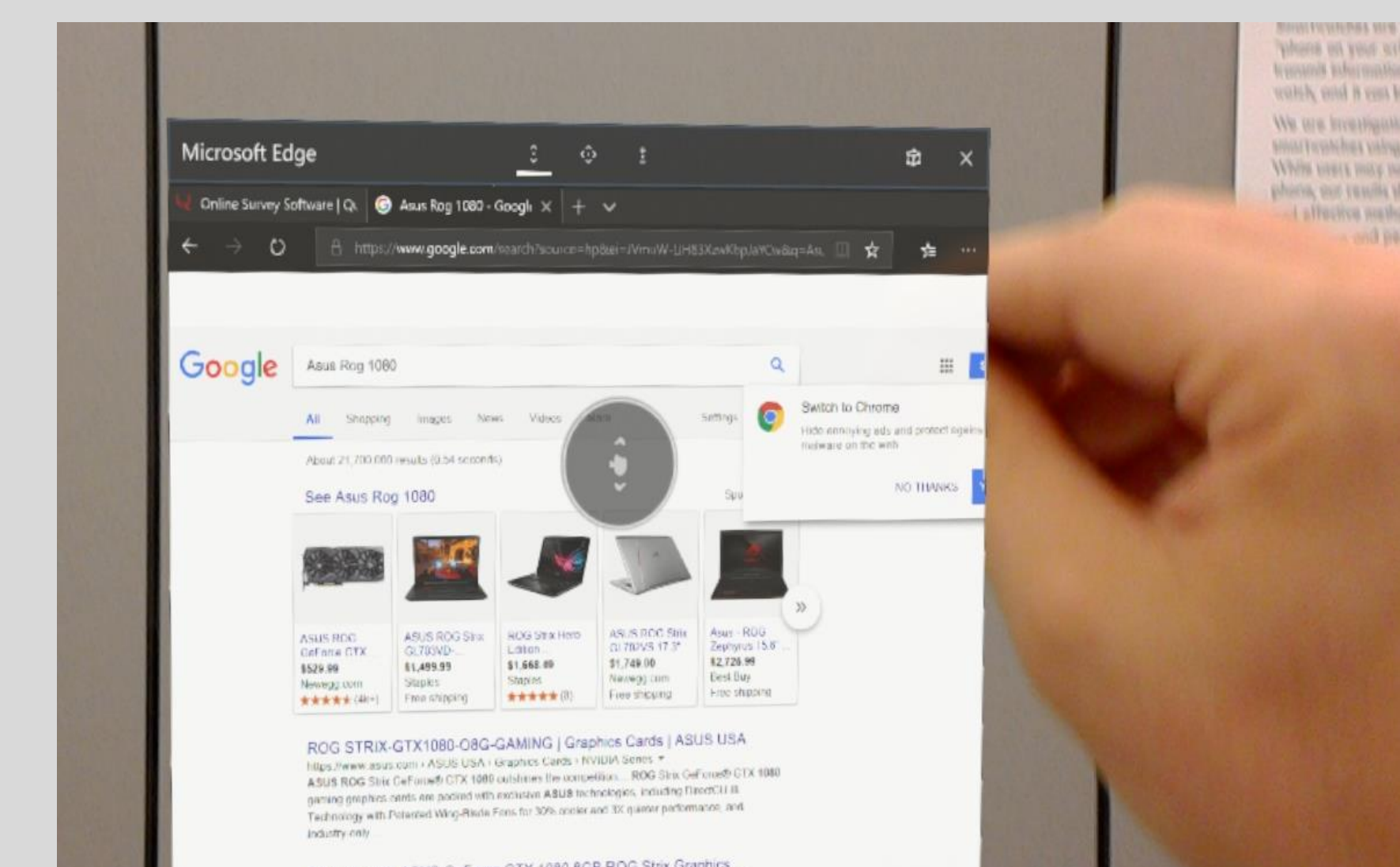


Figure 7. Scrolling through a window.

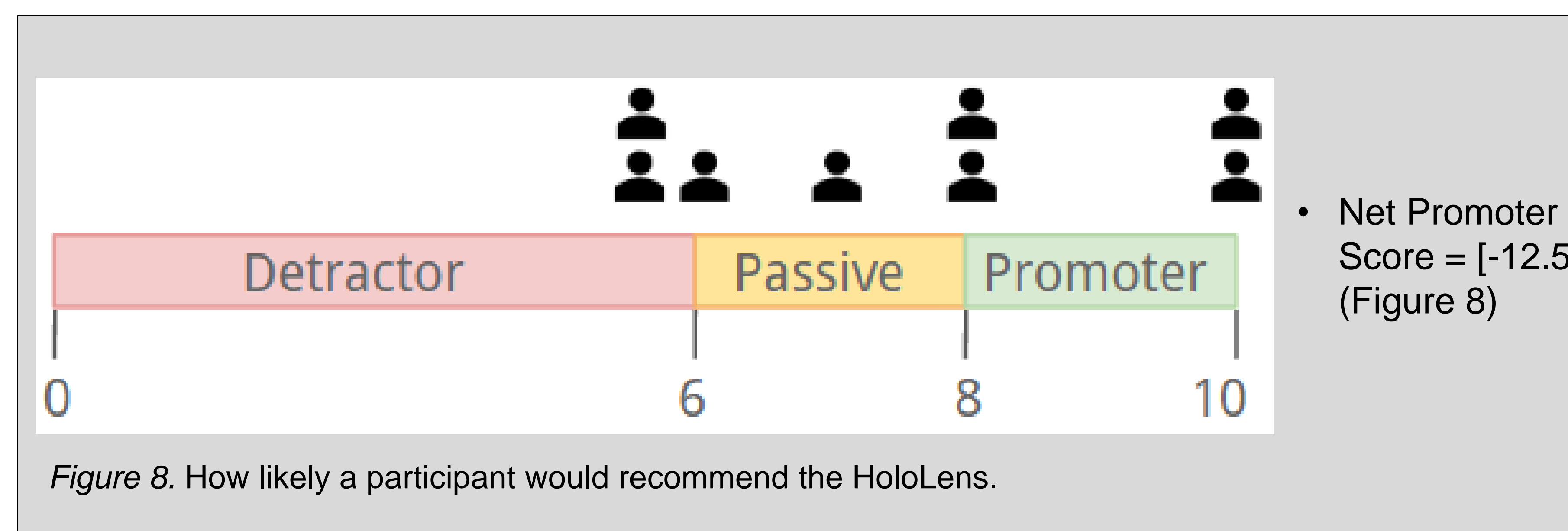


Figure 8. How likely a participant would recommend the HoloLens.

## Results

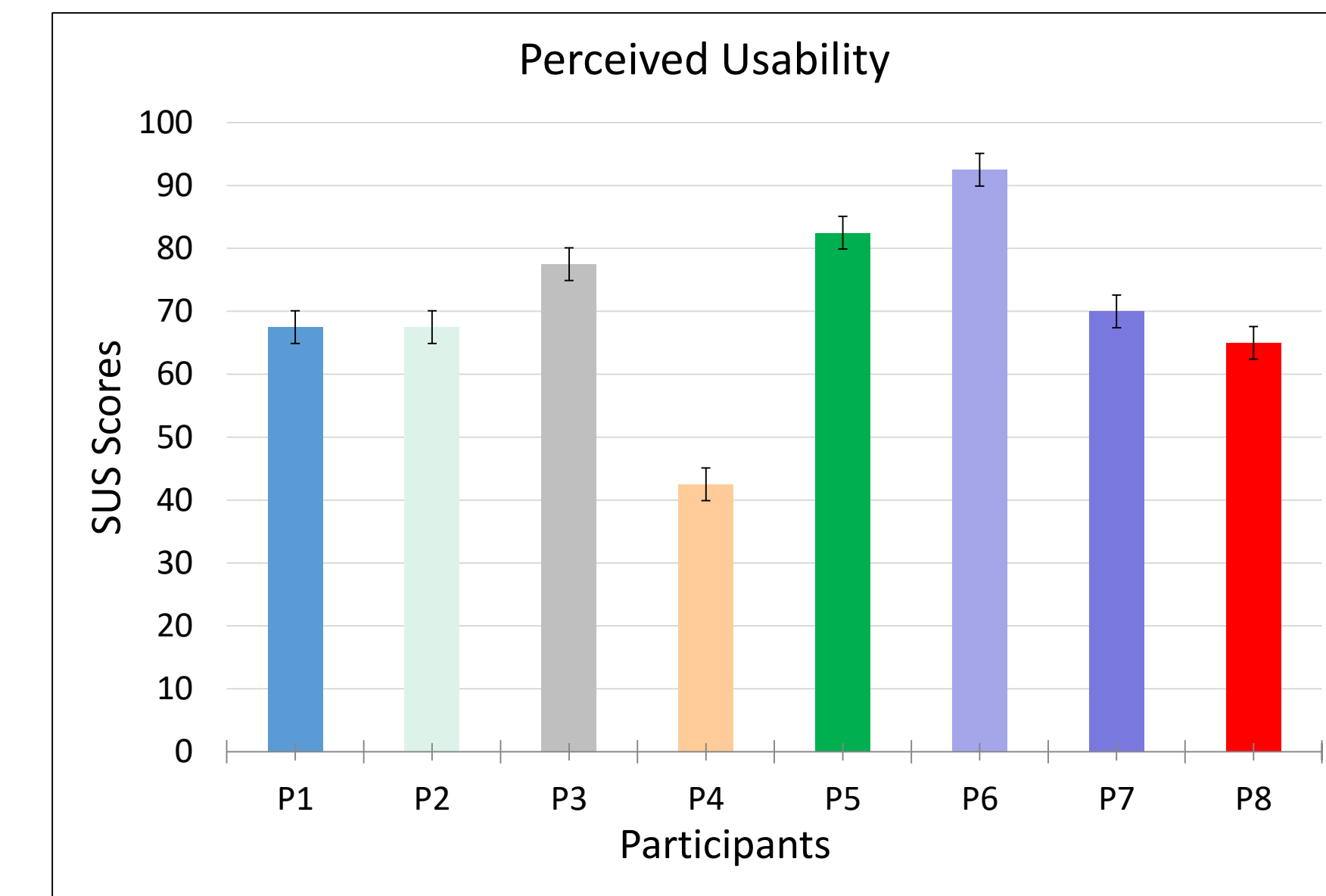


Figure 9. Perceived usability scores from each participant

- Average usability = 70.63 (14.68) (Figure 9)
- Overall rating was acceptable

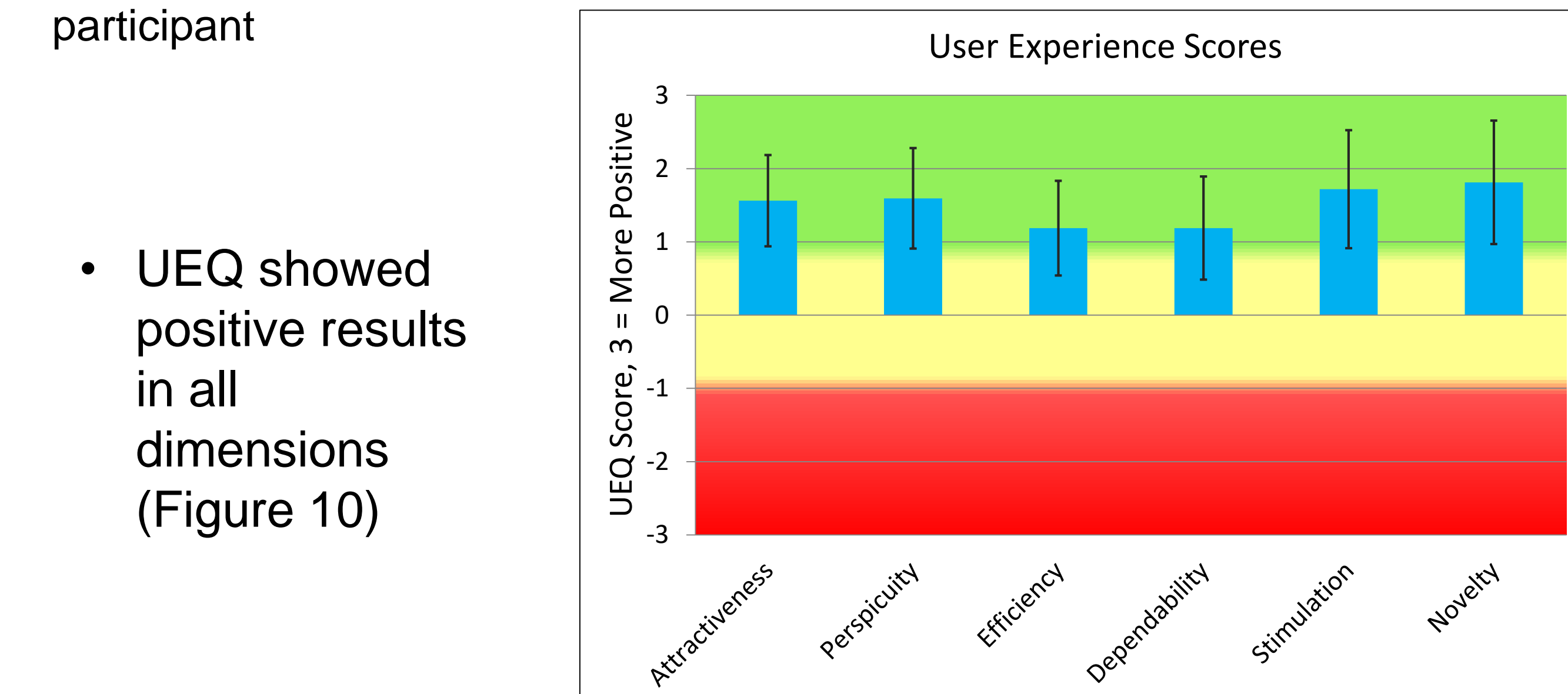


Figure 10. Average user experience scores

- UEQ showed positive results in all dimensions (Figure 10)

## Discussion

- Participants reported the HoloLens was easy to use and intuitive to multitask in different windows.
- Participants enjoyed using the bloom gesture and being able to place windows in a virtual environment (Figure 3).
- Participants had difficulty typing, stating it was slow, inaccurate, and not desirable for typing email or documents (Figure 4).
- Participants preferred using Cortana (voice to text) to type on documents and emails.
- Challenges included resizing the windows, accurately aiming and selecting items, scrolling within a window (Figure 6 and 7).
- Participants noted fatigue in their arm from gesturing and in their hand from selecting items and typing (Figure 2).

### Future Research

- Alternative typing techniques should be investigated.
- Examination of more intuitive gestures to manipulate windows should be examined.

## References

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