# Gesture Interface Magnifiers for Low-Vision Users

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Existing low vision video magnifiers utilize similar types of indirect (i.e., require mental translation between hand and screen) input mechanisms on magnification (e.g., push button, rotate knob) and navigation (e.g., move magnifier) methods. However, studies [1,2] have shown that because indirect inputs require users to translate the physical distance moved to the virtual distance moved on a screen, they may further complicate reading tasks.

In contrast, studies [1-3] have shown that direct inputs (e.g., touch screen) which have no intermediary provide less physical and cognitive demand than indirect inputs. The purpose of this study was to investigate the effects of different direct (pinch gesture) and indirect magnification (push button) and navigation (move magnifier, slide gesture) methods to determine the feasibility of a touch screen gesture interface for low-vision users.

#### **METHODS**

Twenty low-vision adults (9 female; 11 male, mean age = 46.9, 30-63 years) who were prescribed magnifiers for reading participated in the study. They 1) adjusted the magnification until reaching their desired level of magnification and read aloud labels using each of three devices, 2) rated their ease of use, ease of understanding, and satisfaction of each magnification and navigation methods, and 3) ranked order the preference of the magnification and navigation methods on reading.

#### **TEST DEVICES**

**SmartView Pocket** "Pushing" a button movement with tilt





## RESULTS

**Rating** 

**bjective** 

A repeated measures analyses of variance (ANOVA) was used to examine significant

**iPod Touch** pinch gesture slide gesture

# **FINDINGS**

The findings of this study suggest that direct gesture type magnification and navigation

#### Preferences

Thirteen participants (65%) preferred the PINCH gesture the most followed by 25% who preferred the BUTTON and 10% who preferred the KNOB as a magnification method: "It's very unique, it's different than other devices", "very easy to do once I learn", "easier to magnify using fingers than other devices", and "pinch gesture seems more accurate than button."

Seventeen participants (85%) preferred the SLIDE gesture followed by 10% for MWOT and 5% for MWT as a navigation input control: "very easy to move with one finger", "I am totally satisfied with this", "I just need to move my

differences in task performance, subjective ratings on ease of use, ease of understanding, satisfaction between magnification and navigation input controls.

Magnification adjustment speed showed a statistically significant difference (p = .047) between the pinch gesture interface and both the button and knob controls.

User satisfaction and preferences for pinch and slide gestures were remarkably high.

methods are potentially more effective methods of input for the low vision participants.

Surprisingly, despite the fact that participants had no experience using gestures for magnification or navigation, they were faster and more satisfied when using a gesture on magnification than the indirect input methods, pushing a button or rotating a knob, which had already been familiar to them from other electronic devices.





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Ease of Satisfaction understanding (p=.024)

#### Magnification input controls

Ease or Satistaction understanding (p=.001) (p=.015) (p=.043)

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Interaction of navigation

### REFERENCES

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