

Exploring the Basic Interaction with Projector Phones – A User Study

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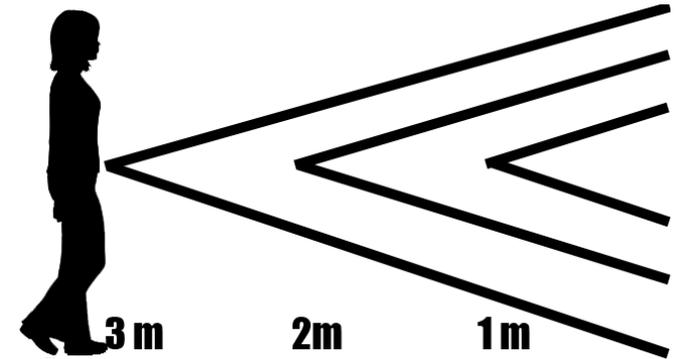
Setup 1/2

- 8 users tested and interviewed
 - 4 male, 4 female, age average of 22.6
- Projector phone, 640×480 resolution projection
- 90 second long video
 - Enhanced with fake control buttons
- Asked to imagine that buttons are active and could be used
- Asked to use the controls projected by simply pointing at them



Setup 2/2

- Three different **distances**, two **lighting conditions**
 - 1, 2 & 3 meters
 - No light, little light
- Phone given in **hand of their choosing**
- Additionally instructed to try using other hand for holding the device
- And placing phone on a table



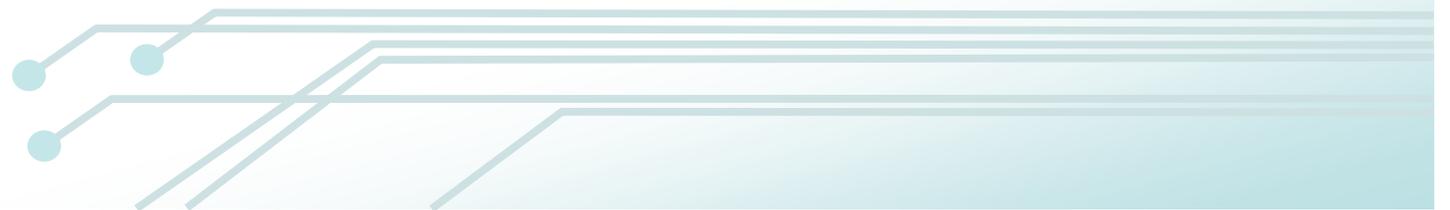
What we wanted to understand

- **Opinions and feelings** towards pointing at a button
- Felt accuracy of pointing
- **Comfort**
- **Ability to see** where they are pointing
 - Use of squirming, tilting of head etc
- Level of ease
- Difference between distances and lighting condition



Results

Based on observations and on user feedback



Seeing the target vs. seeing your finger

- **Darker lighting** offered better ability to **see the target**
 - Negative impact on seeing the pointing finger
 - In longer distances the **glow of the projection** was not enough to make the user's finger visible
 - In shorter distance the glow of the projection made the **finger's shape visible**
- With **little light**, the users were able to see the **pointing finger** better at all distances
 - Pointing at 1 and 2 meters easy
 - At 3 meters the quality of the projection decreased heavily making pointing more difficult
- At 1 meter two users reported difficulty seeing the picture, especially the icons, clearly



Which Hand to Use

- When given the device, **all** took it into **dominant hand**
 - Secondary hand for pointing
- **When asked to switch hands**, all users stated the experience being **better after switching**
 - No apparent impact on the comfort on holding
 - But made the **pointing feel easier**



Perceived Benefits and Cons of Point-to-Click

- Perceived as **easy**
- Would **not** require taking their **eyes off the content itself**
- Using **dominant hand for pointing**, secondary for holding device
- When device **on a table**, method being at its **best**
 - No reaching
 - Finding the correct buttons to press
- On-device buttons preferred if any weakness present when pointing
 - Too dim target, hard to see pointing finger etc
- At 1 meter use was simple and clear

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Next steps

- Based on findings trying out different UI solutions for pointing
 - Gestures, buttons, etc
 - In reasonable lighting conditions
 - With feasible distances
- Not concentrating on technology, but on user experience



Thanks for listening

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