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 of 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
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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