Usability of Different Types of Commercial Selfie Sticks

Ahmed Sabbir Arif
University of California, Merced
Merced, CA, USA
asarif@ucmerced.edu

Sunjun Kim
School of Computing, KAIST
Daejeon, Republic of Korea
kuaa.net@gmail.com

Geehyuk Lee
School of Computing, KAIST
Daejeon, Republic of Korea
geehyuk@gmail.com
Selfie Sticks

• Becoming increasingly popular
  • 95% of U.S. 18-34 year-olds have taken a selfie
  • 27% have used a selfie stick

• Often physically demanding
  • Carrying around a camera attached monopod
  • Adjusting the angle
  • Balancing the rod with one hand for an intended view

• Human factors must be considered
  • No research on usability of commercial selfie sticks
Physiological Challenges

A second-class lever

A third-class lever

A portrait orientation grip (i.e., when the smartphone is in a portrait position)
Commercial Selfie Sticks

• Informal survey of Alibaba, Amazon, eBay
  • Collected all items listed as “selfie stick”
  • Divided then into “inexpensive”, “affordable”, “expensive” price ranges
    • Based on the cheapest and the priciest items on the list
  • Picked the 10 most sold items from each price range

• 3 main types of selfie sticks

<table>
<thead>
<tr>
<th>Category</th>
<th>Shutter Control</th>
<th>Advance Camera Control</th>
<th>Material</th>
<th>Handle/Grip Width cm</th>
<th>Phone Holder Diameter cm</th>
<th>Mirror Folded cm</th>
<th>Length Extended cm</th>
<th>Joints</th>
<th>Weight g</th>
<th>Max. Load g</th>
<th>Available Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Timer</td>
<td>Camera Timer</td>
<td>No</td>
<td>Stainless steel or aluminum alloy</td>
<td>2-5</td>
<td>2.3</td>
<td>No</td>
<td>13-23</td>
<td>50-110</td>
<td>45-181</td>
<td>500-1000</td>
<td>GoPro accessories and custom camera apps</td>
</tr>
<tr>
<td>Type B: Wired</td>
<td>3.5mm headphone audio/auxiliary jack</td>
<td>Rarely</td>
<td>Foam plastic or rubber-based</td>
<td>2.4</td>
<td>Rarely</td>
<td>13-25</td>
<td>50-110</td>
<td>5-7</td>
<td>45-136</td>
<td>500-1000</td>
<td>None</td>
</tr>
<tr>
<td>Type C: Bluetooth</td>
<td>Bluetooth 3.0 or above</td>
<td>Mostly</td>
<td>Plastic or rubber-based anti-slip grip</td>
<td>2.4</td>
<td>Rarely</td>
<td>18-50</td>
<td>76-125</td>
<td>130-300</td>
<td>500-1000</td>
<td>Tripod and remote control</td>
<td></td>
</tr>
</tbody>
</table>
Commercial Selfie Sticks: Results
A Survey

• Voluntary participants recruited from social media (twitter, facebook)
• A semi-structured questionnaire
  • Demographic
  • Selfie stick usage (type, frequency of use, etc.)
  • Subjective opinion (pros, cons, considerations, etc.)
  • Ergonomics (fatigue-related questions)
Result: Participants demographics

96% South Korean

105 out of 113 have used a selfie stick

Female: 37 % | Male: 63 %

Avg. 24.9 years old (SD=4.4)
Result: type of selfie stick usage

Type A: 64%
Type B: 62%
Type C: 43%
Shot 16%
Zoom 11%
Bluetooth 9%

Result: importance

Q: How important is your selfie stick to you as a gadget? (1: less important / 5: most important)

People thinks selfie stick is not an important gadget.

Female tends to think a selfie stick more important than male (marginal, p=.09)

Those who buy cheaper sticks (A type) thinks a selfie stick less important

* : p < 0.05
** : p < 0.01
*** : p < 0.001
Q: How long have (or had) you used your selfie stick(s)?

- < 6m: 44%
- 0.5 - 1y: 32%
- 1 - 2y: 23%
- > 2y: 1%

Q: When you carry your selfie stick, how often do you carry your selfie stick in hand?

- When planning on taking subsequent pictures: 65%
- I put it away (i.e., in a bag) right after taking a picture: 31%
- Never: 3%
- etc: 1%

Result: usage pattern
Result: upgrade willingness

Q: Would you like to upgrade to a better selfie stick?

- **Yes**: 34%
- **Maybe**: 20%
- **No**: 46%

There are more demands for upgrading a selfie stick as they think their selfie sticks more important.
Result: usage frequency

Q: How frequently do you use your selfie stick?

- 72% use it every day
- 10% use it once a week
- 10% use it several a month
- 3% use it once a month
- 3% use it rarely
- 2% never use it
- 3% use it etc

*Usage frequency vs. importance*

Perceived importance of the devices increase with usage frequency

\[ y = 1.6927e^{0.1652x} \]

\[ R^2 = 0.9465 \]
Q: What do you like the most about your selfie stick?

1. Ability to take pictures and videos with wider backgrounds and landscapes (68.6%),
2. Ability to take self-portraits without the assistance of the others (27.6%),
3. Ability to take group pictures with ease (26.7 %)
4. Ability to enhance the composition and aesthetics (21%).
Subjective question: disliked

Q: What do you hate the most about your selfie stick?

1. **The devices are heavy and bulky (55.2%),**
2. The preparation involved with using a selfie stick, such as mounting the phone and expanding the rod (12.4%)
3. The devices are not durable (9.5%)
   - The rod is often conspicuous to others (9.5%)
   - The fear of accidentally dropping the smartphone or camera (9.5%).
Subjective question: desired improvement

Q: If you could change one thing about your selfie stick, what would it be?

1. **Volume and weight**, i.e., would make them smaller, thinner, and lighter (36 %)
2. **Holder design**, i.e., more durable and firm holder (12.4 %)
3. **Connection** method, i.e., A→B, B→C, C→B (12.4 %)
4. More **Durable** stick (9.5 %)
5. Longer rod length (5.7 %)
6. Better (shake-resistant) button (5.7 %)

Q: What is the ‘one’ thing you would consider in your next selfie stick purchase?

1. **Price** (27.6 %)
2. **Portability** (21.9 %)
3. **Durability** (21 %)
4. **Solid holder** (18.1 %)
5. **Functionality** (14.3 %)
6. **Convenience**, i.e., easy to press a shutter button (11.4 %)
Q: Do you feel any discomfort using the selfie stick?

<table>
<thead>
<tr>
<th>Yes, 72.9%</th>
<th>No, 12.1%</th>
<th>Uncertain, 15.0%</th>
</tr>
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</table>

Fatigue score ($FS$)

$$FS = \sum (\text{Discomfort Body parts})$$

Effect of ...
- Frequency on Fatigue: n.s. ($p=.52$)
- Gender on Fatigue: marginal ($p=.052$)

Average Fatigue Score (error bar= S.E.)

Male

Female
Summary

• Most used selfie sticks occasionally
• A weak relationship between usage frequency and importance
• Users that found selfie sticks important
  • On average female found more important than male \(\text{not significant, } p = .09\)
  • Are likely to upgrade to better/smarter selfie sticks
• Users that found selfie sticks unimportant
  • Settled for cheaper selfie sticks
  • Not interested in upgrades
• Caused short-term fatigue in all major arm and shoulder muscles
  • The extent suggests, could turn into chronic over the time and with extensive use
  • On average female reported 29% higher fatigue than male \(\text{not significant, } p = .052\)
Recommendations for reducing fatigue

- Use a shorter arm if possible
- Add counterweight to the handle, e.g. sword’s pommel
  - May increase fatigue due to the third-class lever
- Use lightweight materials for the long rod, e.g., carbon fiber composite
- Use wide handle made/covered with anti-skid materials
- Automate repetitive features, e.g., angle adjustment
  - Requires additional hardware & sensors, increasing the price
  - Since affordability is one of the most desired factors (25%), it is important to maintain a balance between the functionality and the cost
Limitations & Future Work

• Fatigues were self-reported
• 96% participants were from the Republic of Korea
  • A future study will broaden participant pool
• Insufficient data to study effects of frequency & gender on fatigue
  • A future study will increase sample size
• Insufficient data to study long-term effects
  • 95% provided contact info for a future study to find out
    • If they continued using their selfie sticks
    • Upgraded/downgraded to different selfie sticks
    • Long-term effects of the selfie sticks
• Standardization of selfie stick (minimal requirements)
Raw data is now available!

• Find the anonymized result data at:

  http://kuaa.net/publications/2017-SelfieStick-SurveyResult_release.csv
  (or simply visit http://kuaa.net)

• We appreciate your additional analysis on the data.

• Thank you for listening!