A Look at Mobile Device Usage Among College Students
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National Survey of Student Engagement
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Introduction & Purpose

- Widespread adoption of mobile technologies has dramatically impacted the landscape for survey researchers (Buskirk & Andrus, 2012), and those focusing on college student populations are no exception.

- Hanley (2013) reported 92% of college students used smartphones to send and receive email messages.

- This study investigates smartphone usage among various college student demographics, and the impact this technology is having on one large survey project.

National Survey of Student Engagement

- NSSE aims to understand the curricular and co-curricular engagement of first-year and senior college students. 100+ survey items.
- Since 2000, ~ 4.5 million students from about 1,500 US and Canadian institutions participated.
- Formatted for “computer” though increasing numbers use smartphones to complete (2011: 4% / 2013: 13% / 2014~18%).

NSSE on Computer

Typical desktop view of survey

NSSE 2013 Mobile Device Usage

- iPhone: 10%
- Android: 3%
- Tablet: 3%
- Computer: 84%
**Research Questions**

1) Are there differences in respondent characteristics between smartphone and computer respondents? By smartphone type (Android OS/iPhone) as well?

2) Are there differences between smartphone and computer respondents in terms of a) completion rates, b) missing survey items and c) survey measures?

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**Sample & Variables**

**Sample**
- NSSE 2013 (568 US schools)
- About 2 million invitations sent followed by up to 4 reminder messages
- 30% average institution-level response rate; partial respondents included in numerator
- 334,808 first-year and senior respondents

**Variables**
- Device type
  - Computer (Mac/PC)
  - Smartphone
  - Android OS
  - iPhone
  - Tablet
- Demographic characteristics
- Engagement Indicators
  - Used to estimate differences in survey estimates

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**Respondent Results**

Are there differences in respondent characteristics between smartphone and computer respondents? By smartphone type (Android OS/iPhone) as well?
**Respondent Results: Sex**

<table>
<thead>
<tr>
<th></th>
<th>Computer (%)</th>
<th>Smartphone (%)</th>
<th>Smartphone (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>64</td>
<td>65</td>
<td>61</td>
</tr>
<tr>
<td>Male</td>
<td>36</td>
<td>35</td>
<td>39</td>
</tr>
</tbody>
</table>

Unless otherwise noted (~), all differences between computer and smartphone categories are statistically significant using column proportions z-test with Bonferroni adjustment.

**Respondent Results: First Generation College Student**

<table>
<thead>
<tr>
<th></th>
<th>Computer (%)</th>
<th>Smartphone (%)</th>
<th>Smartphone (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First generation</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Non-first generation</td>
<td>54</td>
<td>52</td>
</tr>
</tbody>
</table>

Unless otherwise noted (~), all differences between computer and smartphone categories are statistically significant using column proportions z-test with Bonferroni adjustment.

**Respondent Results: SAT/ACT Score**

<table>
<thead>
<tr>
<th></th>
<th>Computer (%)</th>
<th>Smartphone (%)</th>
<th>Smartphone (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 or lower</td>
<td>30</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>1,001 - 1,200</td>
<td>39</td>
<td>41</td>
<td>37</td>
</tr>
<tr>
<td>1,201 - 1,600</td>
<td>31</td>
<td>23</td>
<td>24</td>
</tr>
</tbody>
</table>

Unless otherwise noted (~), all differences between computer and smartphone categories are statistically significant using column proportions z-test with Bonferroni adjustment.

**Respondent Results: Age**

<table>
<thead>
<tr>
<th></th>
<th>Computer (%)</th>
<th>Smartphone (%)</th>
<th>Smartphone (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 or younger</td>
<td>33</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>20 - 23</td>
<td>38</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>24 - 29</td>
<td>10</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>30 or older</td>
<td>18</td>
<td>11</td>
<td>19</td>
</tr>
</tbody>
</table>

Unless otherwise noted (~), all differences between computer and smartphone categories are statistically significant using column proportions z-test with Bonferroni adjustment.
Respondent Results: Grades

<table>
<thead>
<tr>
<th></th>
<th>Computer (%)</th>
<th>Smartphone (%)</th>
<th>Smartphone Android (%)</th>
<th>Smartphone iPhone (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A or A-</td>
<td>52</td>
<td>46</td>
<td>44</td>
<td>47</td>
</tr>
<tr>
<td>B or B+</td>
<td>36</td>
<td>39</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>B- or lower</td>
<td>12</td>
<td>15</td>
<td>17</td>
<td>14</td>
</tr>
</tbody>
</table>

Unless otherwise noted (~), all differences between computer and smartphone categories are statistically significant using column proportions z-test with Bonferroni adjustment.

Respondent Results: Race/Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Computer (%)</th>
<th>Smartphone (%)</th>
<th>Smartphone Android (%)</th>
<th>Smartphone iPhone (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>6~</td>
</tr>
<tr>
<td>Black/African American</td>
<td>10</td>
<td>10~</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Latino</td>
<td>9</td>
<td>12</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>White</td>
<td>72</td>
<td>71</td>
<td>64</td>
<td>73</td>
</tr>
</tbody>
</table>

Unless otherwise noted (~), all differences between computer and smartphone categories are statistically significant using column proportions z-test with Bonferroni adjustment.

Survey Results

Are there differences between smartphone and computer respondents in terms of a) completion rates b) missing survey items and c) survey measures?
Survey Measures: Method

- MANCOVA used to estimate differences in survey estimates between Computer and Smartphone respondents.
- Adjusted mean differences calculated for Engagement Indicators.
- Engagement Indicator scores range from 0 to 60.
- Covariates included: undergraduate enrollment, public/private status of institution, gender, first-generation college student, class level, age, STEM, and part-time status.
- All covariates were found to be statistically significant.

Survey Measures

<table>
<thead>
<tr>
<th></th>
<th>Computer</th>
<th>Smartphone</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Order Thinking</td>
<td>41.0</td>
<td>40.8</td>
<td>0.2</td>
</tr>
<tr>
<td>Reflective and Integrative Learning</td>
<td>38.3</td>
<td>38.0</td>
<td>0.3</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>28.2</td>
<td>29.1</td>
<td>-0.9</td>
</tr>
<tr>
<td>Student-Faculty Interactions</td>
<td>22.8</td>
<td>23.5</td>
<td>-0.7</td>
</tr>
<tr>
<td>Collaborative Learning</td>
<td>32.2</td>
<td>32.9</td>
<td>-0.7</td>
</tr>
</tbody>
</table>

Discussion/Implications

Research Question #1: Respondent characteristics

- Almost all respondent differences between smartphone and computer respondents were statistically significant, however meaningful differences (5% or greater) are far fewer in number.
- Smartphone users are more likely to:
  - Self-report having B+ or lower grades;
  - Be 30 years of age or older; and
  - Have lower SAT/ACT scores.
  - Results heavily influenced by iPhone users
- Even more meaningful differences appear by smartphone type. Compared to computer users, Android OS users are more likely to:
  - Be first-generation college students;
  - Have lower SAT/ACT scores;
  - Self-report having B+ or lower grades; and
  - Be underrepresented minority students.
Discussion/Implications

Research Question #2: Survey Results

- Completion Rates
  - Big rate gap between computer and smartphone devices that cannot be ignored. Why does Android OS show a higher rate than iPhone?
  - Additional evidence that tablet user experience is extremely similar to larger screen computer users.

- Missing Survey Items
  - Driven by survey break-off, not item non-response.
  - Very meaningful differences exist between computer and smartphone respondents for the last 2/3 of NSSE, ranging between 15% and 25%.
  - Differences exist earlier on in the survey, but not as striking.
  - Mobile optimization experiments necessary for NSSE, and probably others: important to short surveys but critical to long ones that can’t be shortened.

- Survey Responses
  - Good news: no meaningful differences, though unknown at the item level.
  - Results are consistent with several other studies (Peytchev & Hill 2010, Mavletova 2013, DeBruigne & Wijnant 2013).

Thank you!

Copy of this and past presentations can be found at:

http://nsse.iub.edu/html/pubs.cfm

Additional NSSE information can be found at:

nsse.iub.edu

Feel free to contact us with any questions regarding this study or NSSE.

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