

# **Comparing Cell Phone and Web for a Student Survey**

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# Outline

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# Background

- In many countries the proportion of the population with cell phones is higher than that with Internet access
- For this reason, recent attention has focused on surveys of cell phone users as well as Internet users
- However, there has been a lack of studies comparing cell phone surveys with Web surveys
- Thus, it is useful to compare these two modes of data collection in high-coverage populations

# Description of Dongguk University Time Use Survey

- Sponsor: Dongguk University, South Korea
- Collector: Survey Research Center, Dongguk University
- Purpose: To guide policy by investigating students' time use at home or school, and how this relates to their curriculum and classes
- Year Started: 2005
- Frequency: Conducted annually
- Target Population: Undergraduate students registered in the second semester
- Sampling Frame: A list of registered students

# Survey Questions

- Total number of questions: 48
- Categories
  - Student Information: Gender, grade, and age
  - School Life: Double major or minor, GPA, average hours for study per day, average hours of homework per day, secondary school certification program and graduate school
  - Personal Life: Type of residence, travel time to school, hours of sleep per night, average reading per month, expenditures, part-time jobs and club activities
  - Foreign Language: Attending private institutes for learning foreign languages, language studies abroad, foreign languages studied abroad and average study time for foreign languages.
  - Satisfaction: Satisfaction with school, major, offered courses, consultation and courses taught in English
  - Others: Smoking, height and weight

# Study Design

## ■ Sampling, Contacts and Follow-up

	Cell Phone Survey	Web Survey
<b>Modes</b>	<b>CATI</b>	<b>Web-based survey via email</b>
<b>Sampling method</b>	<b>SRS (stratified by colleges)</b>	
<b>Sample size</b>	<b>500</b>	<b>500</b>
<b>Dongguk University Website (Posting a notice)</b>		<b>Yes</b>
<b>Prenotice email (First contact) &amp; Prenotice text message (SMS) via cell phone (First contact)</b>		<b>Yes</b>

# Study Design(continued)

	Cell Phone Survey	Web Survey
<b>Cover letter (email) with questionnaire &amp; SMS</b>	<b>No</b>	<b>Yes</b>
<b>First follow-up email &amp; SMS (After the first week)</b>	<b>No</b>	<b>Yes</b>
<b>Second follow-up email &amp; SMS (After the second week)</b>	<b>No</b>	<b>Yes</b>
<b>Calls by interviewers</b>	<b>At least 6</b>	<b>No</b>
<b>Incentive</b>	<b>No</b>	<b>No</b>

# Survey Schedule

	<b>Cell Phone Survey</b>	<b>Web Survey</b>
<b>Survey Period</b>	<b>2010.11.09 ~ 11.26 (18 days)</b>	<b>2010.11.09 ~ 12.05 (27 days)</b>
<b>Prenotice email &amp; SMS</b>		<b>2010.11.09</b>
<b>Cover letter (email) with questionnaire &amp; SMS</b>	<b>NO</b>	<b>2010.11.10</b>
<b>First follow-up email with questionnaire &amp; SMS</b>	<b>NO</b>	<b>2010.11.18</b>
<b>Second follow-up email with questionnaire &amp; SMS</b>	<b>NO</b>	<b>2010.11.29</b>



# Survey Costs

- Survey Research Center at Dongguk University has its own CATI facility, while it does not have general infrastructure for Web surveys
- Thus, it is difficult to discuss the exact costs between the two modes
- But the Cell/Web ratio of the overall cost per interview was about 1.5

# Results

# Sampling and Contact Procedures

## ■ Response Rate (RR), Cooperation Rate (COOP) and Refusal Rate (REF)

	Cell Phone Survey	Web Survey
<b>Complete Interview (I)</b>	<b>403</b>	<b>108</b>
<b>Refusal and break off (R)</b>	<b>56</b>	<b>368</b>
<b>Noncontact (NC)</b>	<b>16</b>	<b>14</b>
<b>Partial Interview (P)</b>	<b>25</b>	<b>24</b>
<b>RR5</b>	<b>0.81</b>	<b>0.21</b>
<b>RR6</b>	<b>0.86</b>	<b>0.26</b>
<b>COOP3</b>	<b>0.83</b>	<b>0.22</b>
<b>COOP4</b>	<b>0.88</b>	<b>0.26</b>
<b>REF3</b>	<b>0.11</b>	<b>0.72</b>

**Complete Interview:** Interview without item nonresponse

**Refusal:** Refusal in cell phone or no answer in emails

**Noncontact:** Cell phone number not in service or not picking up the cell phone or dormant emails or email addresses with fatal errors

**Partial Interview:** Interview with at least one item nonresponse

# Completed Interviews and Margin of Error

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	Cell Phone Survey	Web Survey
<b>Number of Completed Interviews</b>	<b>428</b>	<b>132</b>
<b>Margin of Error (Fully or Somewhat Satisfied with Major)</b>	<b>± 4.0%</b>	<b>± 8.2%</b>
<b>Margin of Error (Part-Time Jobs)</b>	<b>± 4.7%</b>	<b>± 7.1%</b>

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# Population and Sample Distributions

## ■ Strata (colleges)

Stratum	Population	Cell Phone Survey (Diff)	Web Survey (Diff)
1	18.2	20.1(1.9)*	22.0(3.8)
2	16.8	15.7(1.1)*	18.2(1.4)
3	13.1	14.9(1.8)	14.4(1.3)*
4	10.5	11.7(1.2)	9.8(0.7)*
5	8.5	7.2(1.3)*	4.5(4.0)
6	6.5	5.8(0.7)*	3.8(2.7)
7	6.0	6.8(0.8)*	7.6(1.6)
8	4.5	3.7(0.8)*	3.0(1.5)
9	4.3	3.5(0.8)*	3.0(1.3)
10	4.3	4.9(0.6)*	5.3(1.0)
11	2.7	2.6(0.1)*	5.3(2.6)
12	1.9	1.2(0.7)	1.5(0.4)*
13	1.8	1.4(0.4)*	0.8(1.0)
14	0.9	0.5(0.4)*	0.8(0.1)*
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

*Note: 1. Diff - Absolute value of difference between population and samples*

*2. \* - The smaller difference*

# Population and Sample Distributions (continued)

## ■ Gender

	Population	Cell (Diff)	Web (Diff)
Male	55.1	51.6(3.5)	54.5(0.6)*
Female	44.9	48.4(3.5)	45.5(0.6)*
Total	100.0	100.0	100.0

\* - *The smaller difference*

## ■ Grade

	Population	Cell (Diff)	Web (Diff)
Freshman	22.5	20.7(1.8)*	26.4(3.9)
Sophomore	23.2	27.2(4.0)*	29.5(6.3)
Junior	26.1	25.0(1.1)*	21.7(4.4)
Senior	28.2	27.1(1.1)*	22.4(5.8)
Total	100.0	100.0	100.0

\* - *The smaller difference*

# Comparison of Responses between Cell Phone and Web Survey

## ■ Summary on Statistical Differences using 95% Confidence Intervals (CI)

	Number of Questions	Percent
Not Significant	21	58.3
(Partially) Significant	15	41.7
<b>Total</b>	<b>36</b>	<b>100.0</b>

*Note: 'Partially' means 'At least one response item'*

# Selected Examples

## ■ Average Reading per Month (not for academic study)

	Cell	Web	95% CI	
			LL	UL
<b>Almost do not read**</b>	<b>20.6</b>	<b>36.9</b>	<b>-25.394</b>	<b>-7.206</b>
1	26.0	28.3	-11.464	6.864
<b>2**</b>	<b>26.3</b>	<b>15.6</b>	<b>2.995</b>	<b>18.405</b>
3	10.1	8.2	-3.607	7.407
4	6.1	6.8	-5.880	4.480
<b>5**</b>	<b>4.9</b>	<b>1.3</b>	<b>0.812</b>	<b>6.388</b>
6 or more	6.0	2.9	-0.982	7.182
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		

*Note: \*\* - The difference is significant*



## ■ Average Hours for Homework per Day

	Cell	Web	LL	UL
<b>Almost do not study**</b>	<b>11.4</b>	<b>3.2</b>	<b>3.658</b>	<b>12.742</b>
1	37.7	31.1	-2.075	15.275
2	26.0	28.5	-10.645	5.645
<b>3**</b>	<b>12.4</b>	<b>21.9</b>	<b>-17.484</b>	<b>-1.516</b>
4	6.6	5.1	-3.405	6.405
5 or more	5.9	10.2	-10.615	2.015
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		

Note: \*\* - The difference is significant

## ■ Average Hours for Foreign Languages

	Cell	Web	LL	UL
<b>Almost do not assign**</b>	<b>41.1</b>	<b>52.0</b>	<b>-21.096</b>	<b>-0.704</b>
1	35.9	27.5	-0.757	17.557
2	14.3	12.0	-4.235	8.835
3	5.5	6.8	-6.690	4.090
4	1.3	0.4	N/A	
5 or over	1.9	1.3	-1.645	2.845
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		

## ■ Satisfaction with School

	Cell	Web	LL	UL
<b>Completely satisfied**</b>	<b>12.3</b>	<b>5.1</b>	<b>2.521</b>	<b>11.879</b>
Somewhat satisfied	49.7	47.0	-7.286	12.686
Moderately satisfied	34.6	34.6	-9.783	9.783
<b>Somewhat dissatisfied**</b>	<b>2.4</b>	<b>13.3</b>	<b>-17.156</b>	<b>-4.644</b>
Completely dissatisfied	0.9	0.0		N/A
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		

## ■ Satisfaction with Major (or department or program)

	Cell	Web	LL	UL
<b>Completely satisfied**</b>	<b>30.1</b>	<b>18.6</b>	<b>3.659</b>	<b>19.341</b>
Somewhat satisfied	41.3	49.1	-17.646	2.046
Moderately satisfied	21.5	23.6	-10.386	6.186
Somewhat dissatisfied	5.5	5.9	-4.984	4.184
Completely dissatisfied	1.6	2.8	-4.758	2.358
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		

## ■ Major Courses One Wants to Take

	Cell	Web	LL	UL
Don not take any major courses	7.6	4.0	-0.378	7.578
Mostly offered**	48.2	29.6	9.791	27.409
Moderately offered**	35.2	48.5	-22.963	-3.637
Mostly not offered**	9.0	17.9	-15.799	-2.001
Total	100.0	100.0		

## ■ Survey Courses One Wants to Take

	Cell	Web	LL	UL
Don not take any survey courses**	22.1	8.8	6.643	19.957
Mostly offered	29.2	24.7	-3.860	12.860
Moderately offered	38.3	47.6	-19.299	0.699
Mostly not offered**	10.4	18.9	-16.363	-0.637
Total	100.0	100.0		

## ■ Opinion on Major Courses Taught in English

	Cell	Web	LL	UL
Extremely desirable	9.7	5.6	-0.624	8.824
<b>Somewhat desirable**</b>	<b>28.2</b>	<b>13.8</b>	<b>7.225</b>	<b>21.575</b>
Moderately desirable	26.8	31.4	-13.343	4.143
<b>Somewhat undesirable**</b>	<b>22.1</b>	<b>32.8</b>	<b>-20.179</b>	<b>-1.221</b>
Not at all desirable	13.2	16.4	-10.665	4.265
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		

## ■ Opinion on Survey Courses Taught in English

	Cell	Web	LL	UL
Extremely desirable	8.2	7.5	-4.644	6.044
<b>Somewhat desirable**</b>	<b>31.4</b>	<b>20.7</b>	<b>3.015</b>	<b>18.385</b>
Moderately desirable	30.3	32.3	-11.905	7.905
<b>Somewhat undesirable**</b>	<b>19.1</b>	<b>29.5</b>	<b>-19.659</b>	<b>-1.141</b>
Not at all desirable	11.0	10.0	-5.286	7.286
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		

## ■ Taking a Course Taught in English

	Cell	Web	LL	UL
Yes	65.0	63.0	-6.985	10.985
No	35.0	37.0	-10.985	6.985
Total	100.0	100.0		

## ■ Satisfaction with Courses Taught in English

	Cell	Web	LL	UL
Fully satisfy	11.2	7.2	-2.535	10.535
Somewhat satisfy	39.5	37.8	-9.103	12.503
Moderately satisfy	31.5	27.9	-7.038	14.238
<b>Somewhat dissatisfy**</b>	<b>10.9</b>	<b>22.5</b>	<b>-20.264</b>	<b>-2.936</b>
Thoroughly dissatisfy	6.9	4.6	-3.044	7.644
Total	100.0	100.0		

## ■ Smoking

	Cell	Web	LL	UL
Yes**	20.4	11.7	1.479	15.921
No**	79.6	88.3	-15.921	-1.479
Total	100.0	100.0		

# Measurement Error

## ■ Secondary School Certification Program

	Cell		Web	
	Frequency	Percentage	Frequency	Percent
TRUE	424	99.1***	130	98.5
FALSE	4	0.9	2	1.5
Total	428	100.0	132	100.0

\*\*\* - *The higher proportion between the two modes*

## ■ Double Major or Minor

	Cell		Web	
	Frequency	Percent	Frequency	Percent
TRUE	408	95.3	127	97.7***
FALSE	20	4.7	3	2.3
Total	428	100.0	130	100.0

\*\*\* - *The higher proportion between the two modes*

■ GPA (to 2 decimal places)

	Cell		Web	
	Frequency	Percent	Frequency	Percent
<b>TRUE</b>	<b>75</b>	<b>18.2</b>	<b>64</b>	<b>54.2***</b>
<b>FALSE</b>	<b>337</b>	<b>81.8</b>	<b>54</b>	<b>45.8</b>
<b>Total</b>	<b>412</b>	<b>100.0</b>	<b>118</b>	<b>100.0</b>

■ GPA (to 1 decimal place)

	Cell		Web	
	Frequency	Percent	Frequency	Percent
<b>TRUE</b>	<b>187</b>	<b>45.4</b>	<b>91</b>	<b>77.1***</b>
<b>FALSE</b>	<b>225</b>	<b>54.6</b>	<b>27</b>	<b>22.9</b>
<b>Total</b>	<b>412</b>	<b>100.0</b>	<b>118</b>	<b>100.0</b>

■ GPA (without decimal)

	Cell		Web	
	Frequency	Percent	Frequency	Percent
<b>TRUE</b>	<b>346</b>	<b>84.0</b>	<b>117</b>	<b>99.2***</b>
<b>FALSE</b>	<b>66</b>	<b>16.0</b>	<b>1</b>	<b>0.8*</b>
<b>Total</b>	<b>412</b>	<b>100.0</b>	<b>118</b>	<b>100.0</b>



# Item Nonresponse

## ■ Open-Ended Questions

Response Item	<i>No. of Item Nonresponse</i>	
	Cell	Web
<b>GPA</b>	<b>11(2.6%)</b>	<b>11(8.3%)* **</b>
<i>Height</i>	<b>3(0.7%)</b>	<b>3(2.3%)* **</b>
<i>Weight</i>	<b>17(4.0%)</b>	<b>6(4.5%)* **</b>

*\*\*\* - The higher proportion between the two modes*

## ■ Closed-Ended Questions

There was no missing data in the Cell group, while there were 17 items missed in the Web group

# Conclusions

- The Cell phone survey has a distinct advantage over the Web survey with respect to response rates and coverage of domains
- The Cell phone survey has lower item nonresponse than Web survey. Particularly, for closed-ended questions, the Cell phone survey did not have any item nonresponse
- Significant differences between the two modes were found for about half the survey questions
- The Cell/Web ratio of the overall cost per interview was about 1.5
- Cell phone surveys may be useful to surveys in populations with universal or near-universal coverage, and where cell use may be more popular than internet use