Journal of
Mass Communication & Journalism

Wardyga, J Mass Commun Journalism 2012, 2:9
DOI: 10.4172/2165-7912.1000125

Review Article Open Access

A Relationship between Text Message Volume and Formal Writing Performance on the SAT

Brian J Wardyga*

Associate Professor of Communication Office: Brennan Library, USA

Abstract

The purpose of this study was to reveal whether there is a relationship between students' volume of text messaging and formal writing performance on the Scholastic Aptitude Test writing section. The study also examined gender as a contributing variable in this measure. The study focused solely on texting because texting has become the preferred method of telecommunication among teens and young adults. The design included a questionnaire that collected data to show whether any relationships exist that indicate a correlation between paired scores. The sample was taken from college freshmen who completed the SAT writing test before the fall 2011 semester. The results of the study showed a significant negative relationship between female students' average monthly text message volume and SAT writing scores.

Keywords: Text messaging; SMS; Writing scores; High school students; College freshmen; Higher education; Relationship; Correlation

Background

Text messaging has become one of the preferred methods of telecommunication for teens and young adults today. To promote the use of such technology, most cellular service providers such as AT&T Mobility, Verizon Wireless, T-Mobile, and Sprint offer unlimited texting plans as options to their services. In addition, there are the newer "smart phones" like the Blackberry, iPhone, and Droid, which make the process of sending a text message all the more easier for consumers. Current research on the subject reveals that text messaging is on the rise as a dominant form of communication among people today. The Nielson Company [1,2] reported that "the average U.S. mobile teen now sends or receives an average of 2,899 text-messages per month compared to 191 calls" and that "the average number of texts has gone up 566% in just two years, far surpassing the average number of calls, which has stayed nearly steady" (p. 8). It was further reported that "more than half of all U.S. teen mobile subscribers (66%) say they actually prefer text-messaging to calling" and "thirty-four percent say it's the reason they got their phone" [3].

Such claims were supported by the Pew Research Center, where a study by Lenhart et al. [4] showed that "between February 2008 and September 2009, daily use of text messaging by teens shot up from 38% in 2008 to 54% of all teens saying they text every day in 2009" (p. 30). Beyond the increase in frequency, teens are also reported to be sending large quantities of text messages each day [4].

About 14% of teens send between 100-200 texts a day, or between 3000 and 6000 text messages a month. Another 14% of teens send more than 200 text messages a day or more than 6000 texts a month. In light of these findings, it is not surprising that three-quarters of teens (75%) have an unlimited text messaging plan.

Lenhart et al. [4] identified three main reasons why teens are choosing texting over talking. First, sending text messages is a form of asynchronous communication and is more discrete than traditional voice phone calls. Second, text messaging can serve as a "buffer" when communicating with friends around parents—in addition to being a more comfortable form of communication when discussing intimate or personal subjects with possible romantic interests. Lastly, Lenhart et al. [4] described texting as "a simple way to keep up with friends when there is nothing special that needs to be communicated".

Just as talk time has become shorter, text messages themselves are a short method of communication. According to Buczynski [5] "text messaging, or more specifically, SMS (Short Message Service) texting enables text messages up to 160 characters long to be sent and received by mobile phones". At an average word length of five, an average "text" would only allow a total of 32 words per message.

This limitation in characters may be one of the reasons teens tend to abbreviate and often ignore the rules of spelling and grammar when texting. Another reason for abbreviations is the use of secret codes. With the many abbreviations used by teens when texting, it is no wonder that teenagers are sending and receiving thousands of text messages each month. As Vosloo [3] made clear, "texting does not always follow the standard rules of English grammar, nor usual word spellings. It is so pervasive that some regard it as an emergent language register in its own right" Like any new technology or rising trend, there will be people in the media and research fields seeking to both understand its potential, as well as determine whether any negative consequences could result from its use.

The majority of the current literature on text messaging has focused on sociological connections [2,6], emotional links [6-8], literacy [9-11] and the ways schools can use the technology to enhance a student's education [5,12,13] While studies have shown positive correlations between students who text and the intimacy levels of their communication [6] questions still remain in regards to texting and its relationship to formal writing ability in the classroom.

One such inquiry into text messaging is to determine whether

***Corresponding author:** Brian J. Wardyga, Associate Professor of Communication Office: Brennan Library, USA, Tel: 617-243-2238; E-mail: bwardyga@lasell.edu

Received August 27, 2012; **Accepted** September 25, 2012; **Published** October 02, 2012

Citation: Wardyga BJ (2012) A Relationship between Text Message Volume and Formal Writing Performance on the SAT. J Mass Commun Journalism 2:125. doi:10.4172/2165-7912.1000125

the time high school students spend texting instead of talking over the phone has a positive or negative impact on their formal writing skills. A review of literature on the subject has uncovered little research regarding the impact of texting on formal writing skills and the research that has been done is somewhat contradictory. Dr. Beverly Plester, the head researcher on the Children's Text Messaging and Literacy projects at Coventry University, has conducted studies with her colleagues on children that show a positive correlation between text message volume and their competence with literacy and language [4].

A study by Rosen et al. [7] showed a positive relationship between texting and informal writing, but a negative correlation between texting volume and formal writing among young adults. Another scholar on the subject is executive director emeritus of the National Writing Project and lecturer at the University of California's Berkeley Graduate School of Education, Richard Sterling. Sterling concluded that a sufficient amount of writing, even through texting, is very beneficial and can develop student writing in a positive way [3].

The problem is that texting is replacing talking among teens [1] yet their primary form of communication in the classroom is oral communication and formal writing. [10] claimed that texting (which is more conversationally based) is appearing in standard written English and that "this concern, often cited in the media, is based on anecdotes and reported incidents of text language used in schoolwork" [11] added that "educators and the media have decried the use of these shortcuts, suggesting that they are causing youth … to lose the ability to write acceptable English prose". Lastly, Vosloo [3] stated that "for a number of years teachers and parents have blamed texting for two ills: the corruption of language and the degradation in spelling of youth writing".

At this time, only a small number of studies have been focused on the impact that high levels of text messaging may have on teenagers, and even fewer studies have been focused on their ramifications on formal writing in an education setting. Simply put, further research is needed to reveal the impact that high levels of text messaging may have on teenagers and young adults when it comes to formal writing performance.

First-year college students were chosen for this study because they are over 18 years old (for consent purposes) and because "they communicate with friends via MPTM (mobile phone text messages) on a daily basis, and have many opportunities for forming new relationships upon arriving to campus" [14]. The study sought to determine whether there was a relationship between the number of text messages that these students sent/received and their scores on the Scholastic Aptitude Test (SAT) writing test. The study also examined gender as a possible contributing factor in such correlations.

Research Questions

1. Is there a relationship between upper high school students' average monthly volume of text messaging and their formal writing performance on the SAT writing placement test?

2. Is there a relationship between upper high school male students' average monthly volume of text messaging and their formal writing performance on the SAT writing placement test?

3. Is there a relationship between upper high school female students' average monthly volume of text messaging and their formal writing performance on the SAT writing placement test?

Hypotheses

1. There will be no significant relationship between the average number of text messages the entire sample sent and received per month and their formal writing performance on the SAT writing section.

2. There will be no significant relationship between the average number of text messages male students sent and received per month and their formal writing performance on the SAT writing section.

3. There will be no significant relationship between the average number of text messages female students sent and received per month and their formal writing performance on the SAT writing section.

Theoretical Framework

The theoretical framework for this study was based on the theories of Moffett and Gibson who "contend that these choices are determined by one's sense of the relation of speaker, subject, and audience" [15]. In other words, the style and substance of one's writing is a matter of context that can and will vary from situation to situation. This theory supports the idea that students may write one way when sending text messages to friends and an entirely different way when writing formal papers for their college professors. The framework is reinforced by Lloyd Bitzer's "Rhetorical Situation" theory which "argues that speech always occurs as a response to a rhetorical situation, which he succinctly defines as containing an exigency (which demands a response), an audience, and a set of constraints" [15].

Method

Participants

The population for this study included a sample of freshmen students at a regional college in Massachusetts during the 2011-12 academic years. The total population of freshmen students at the time of the study was approximately 465 students. A demographic profile of the college's students showed that the majority of the student body was between the ages of 18 and 21 years-old and of predominantly white ethnicity. This lack of diversity at the college was one of the main reasons that age and ethnicity were not variables chosen to be examined in the study.

The student body at the time of the study was approximately 2/3 female and 1/3 male. In total, the college graduated 270 students last year, of which 68 were male and 202 were female. Finally, SAT test scores are not required for admission to this school; however the college does record the information since 91% of applicants submit their SAT results.

Measures

The main instrument used in this study was the SAT Writing section of the SAT Reasoning Test. Beyond this instrument, a short voluntary questionnaire was administered to collect each student's gender and a set of text message data showing the volume of text messages sent and received during the two months prior to the time the student took the SAT. During the weeks following the initial distribution, the researcher collected all remaining questionnaires, along with the documentation of the students' reported text message totals. Students unable to complete the questionnaire on paper were provided with a link to complete it online. The students were asked to forward cell phone statements electronically or to bring a hard copy of their cell phone evidence to the researcher's office during the second week of the study.

To confirm validity of the reported text message totals, the first page of all reported months' cell phone bills were requested by the researcher for each of the months the students reported. Two alternative ways for students to validate their text message totals included: a) students forwarding text message responses from cellular service providers showing the total number of text messages sent and received in a given month to the researcher, and b) students forwarding email message responses from cellular service providers showing the total number of text messages sent and received in a given month to the researcher. Electronic validation was the most popular method, with over 83% of the sample providing text message totals in this way. Validity of SAT writing scores and gender was confirmed with administrative college officials at the Registrar's office. Regarding the SAT, multiple organizations and college systems, such as the University of California system, have conducted studies on the validity of this test. Studies from the University of California and the College Board have shown similar results—where the writing section has been found to be "the most predictive section of the SAT, slightly more predictive than either math or critical reading" [16].

Procedure

Before conducting any research, the author completed an application to the Liberty University Institutional Review Board (IRB), as well as a similar application to the Committee for the Protection of Human Subjects (CPHS) at the college of study. The study complied with all FERPA regulations. The questionnaire included an informed consent form, granting the author permission to obtain and/or verify the students' SAT writing scores from the college Registrar's office. This informed consent also assured students that their information would be kept confidential, secure, used only for the purpose of this study, and would be properly destroyed at the end of the study. Students were also given the option to discontinue the study at any time. The order of general procedures included:

1. Contacting all faculty members teaching freshmen writing courses in the spring semester to explain the study and to ask permission to visit their writing classes during the spring semester to distribute the questionnaire to freshmen students who have completed the SAT exam and the ENG: 101 writing I course.

2. Visiting each section of ENG 102: Writing II or ENG102H: Honors Writing II in the spring semester to distribute and collect all questionnaires.

3. Emailing the survey link to any students who were absent from class or unable to complete the paper copy for any reason.

4. Sending a follow-up email to participants requesting proof of the text message numbers reported on their questionnaires.

5. Validating all text message totals and SAT scores.

6. Collecting and entering all validated information into spreadsheets.

7. Analyzing all data using SPSS.

Participants were contacted when the investigator visited their freshman writing classes to distribute the short voluntary questionnaire. Students who were absent and/or unable to complete the questionnaire on paper were emailed all documents and provided with a link to take the questionnaire online. Each of the students were asked for their gender, college class, their best SAT Writing Score, and their total number of text messages during the two months before they took the SAT. Students had to retrieve cell phone bills or contact their cell phone provider for this information.

Before distributing the questionnaire, the investigator reviewed an informed consent document. Students in the classroom were given up to 10 minutes to review and sign the document. All informed consent documents were collected before distributing the questionnaire. Students who received the documents electronically were asked electronically sign and email the investigator the consent form before completing the questionnaire. Because the questionnaire was delivered to most students during a class session, students were only given 15 minutes to complete the questionnaire. Students that did not complete it during this timeframe were allowed to submit it to the investigator by the following week.

There were two options for students to submit late questionnaires to the investigator: 1) by hand delivering it in person to the researcher's office; or 2) by entering the information electronically and submitting their final answers via Survey Monkey. Finally, students signed the questionnaire to grant the investigator permission to verify the two academic scores from the Registrar's office.

Valid proof of text message data (electronic or via printed cell phone bill) listing the number of text messages sent and received per month was collected within a week of all participants having completed the questionnaire. This data was tallied and averaged to develop a mean that represented each student's average monthly text message use. Since participants only included freshmen college students who have taken the SAT writing test, all questionnaires by students who did not take the SAT writing test were removed from the sample. Other questionnaires omitted from the test included surveys where text message data was not validated.

The data was first organized into a spreadsheet with the following columns: 1. Student Name (coded as a "Participant Number" for privacy), 2. Gender, 3. Total Text Messages for Month One, 4. Total Text Messages for Month Two, 5. Mean Text Messages average before SAT, and 6. SAT Writing Score.

This raw data was then broken down into smaller spreadsheets of isolated data sets to be analyzed. Spreadsheet A included data for analysis of the entire sample that compared the students' SAT writing scores and mean total monthly text messages from the two months immediately preceding that test. It included columns for: 1. Participant Number, 2. SAT Writing Score, and 3. Mean Total Text Messages.

Spreadsheet Two included data for analysis based on gender. It showed the entire male population and entire female population's text message means beside their SAT writing scores. This table included columns for: 1. Participant Number, 2. Gender, 3. SAT Writing Score, and 4. Mean Total Text Messages. This list was sorted by gender and divided into two groups—male and female.

The population's combined text message means was analyzed within their respective data sets and then any differences in these correlations were examined by gender between the male and female participants. The strengths of these procedures included:

- Gathering the primary data after the fact to eliminate the influence the study would have if the data were collected during the months the students took the test and were engaged in their texting.

• Isolating and analyzing the data in multiple ways to strengthen consistent relationships and suggestion(s) of the study.

Recording two consecutive months of text message data from the months before the students took the SAT test, for an accurate texting habit snapshot of the students during this time period.

Since there were two independent variables (one categorical and one continuous) and one continuous dependent variable, the ideal test for this study was a test that focused on multiple regression where data could be used for prediction between variables and the amount of variance they accounted for. Testing for multiple regression showed "how much variance in the DV is accounted for by linear combination of the IVs" and "how strongly related to the DV is the beta coefficient for each IV" [17].

A multiple linear regression analysis to assess this data with the intended power of 0.80, level of significance of 0.05, and a medium effect size of 0.25 (25 points on the SAT scores on a scale of 200 to 800 points, and a quarter of a point [0.25] on the students' final writing course grade on a scale from 0.7 to 4.0) required a minimum sample size of 55 students to participate in the study. This calculation was made using the software program G*Power 3.1.3.

Results

A total of 127 fully-completed questionnaires were obtained by the end of the collection period. There were 79 female respondents and 48 male respondents. Out of these 127 questionnaires, 91 were collected via the paper version distributed to students in the Writing II classrooms and 36 were submitted to the researcher electronically through SurveyMonkey.com. Over 80% of the participants emailed their cell phone bills or forwarded text messages from their cell phone service providers indicating their monthly text message totals. The rest of the students provided hard copies of their cell phone bills.

The mean SAT writing score of all participants was M=489.36. The range for this score was 200 to 800 points, indicating the mean score of these students to be almost perfectly in the middle range. Gender was entered as 0 for male and 1 for female, where M=0.6282 can be translated to 62.82% of the participants being female. Lastly, the average monthly text message volume for this group was just over 2,405 text messages per month.

The standard deviation for the SAT writing score was 64.91 points from the mean. The standard deviation for gender was the expected .49. The standard deviation for average monthly text message volume showed the highest level of variety at 2,405.08.

In the ANOVA results, the Sum of Squares column shows the total sum of squares to be TSS=$\Sigma(y-\hat{y})2$=324467.95, with the residual sum of squares to predict y to be SSE=$\Sigma(y-\hat{y})2$=321726.32. Applying the formula R2=TSS–SSE, divided by TSS, the result is .008. Using gender and monthly text message volume together to predict SAT writing scores provides an 8% reduction in the prediction error relative to using only y alone.

The resulting total degrees of freedom (df) was 77, with an F statistic of 0.320 and a level of significance of 0.727a. The F statistic was close enough to 1 that it failed to reject the null hypotheses. Since the alpha level of significance for this study was 0.05, the p-value of 0.727 was not statistically significant—failing to show a significant relationship between these variables.

The regression equation for predicting text message volume was E(Y)=.440X gender+494.16 where Beta (the probability of a Type II error) was just 0.003. The regression equation for predicting gender is Y=.003X texts+494.16 where Beta was -0.092. The 95% confidence interval for the slope was -30.18 to 31.06 for gender and -0.009 to .004 for average monthly text message volume. Again, with the level of significance for this study set to .05, the results of 0.98 and 0.43 ($p > 0.05$) failed to reject the null hypotheses, showing no significant relationship among these variables. The histogram for partial regression in the SAT writing score correlation and P-Plot showed a relatively standard distribution for this test. Three scatter plots were produced to show any relationships between: 1) texting volume and SAT writing scores for all students, 2) texting volume and SAT writing scores for male students, and 3) texting volume and SAT writing scores for female students.

Scatter plot of Texting Volume and SAT Writing Scores for All Students.

The dot cluster for the first test did not show a significant positive or negative relationship between variables. The Pearson correlation for all students was -0.09 with a level of significance of 0.21. This data failed to reject the null hypothesis (H01) which stated that there would be no significant relationship between the average number of text messages the entire collective sample sent and received per month and their formal writing performance on the SAT writing section.

Scatter plot of Texting Volume and SAT Writing Scores for Male Students.

The dot cluster in the second test did not show a significant positive or negative relationship between variables. The Pearson correlation for male students only was 0.10 with a level of significance of 0.30. This data failed to reject the null hypothesis (H02) which stated that there would be no significant relationship between the average number of text messages male students sent and received per month and their formal writing performance on the SAT writing section.

Scatter plot of Texting Volume and SAT Writing Scores for Female Students. The dot cluster in the third test showed a negative relationship between variables. The Pearson correlation for female students only was -.33 with a level of significance of .01. This data rejected the null hypothesis (H03), showing a significant negative relationship between the average numbers of text messages female students sent and received per month and their formal writing performance on the SAT writing section.

Discussion

This research applied to other similar studies by building upon Plester's assessment on texting and literacy by examining an older age group and cross-examining the age group of the study by Rosen and his colleagues. Unlike Dr. Beverly Plester's studies on younger children that showed a positive correlation between text message volume and their competence with literacy and language [10] this study on college students revealed mostly no positive correlation between text message volume and formal college writing scores.

The results of research question #3 in this study were more closely related to the study by Rosen [7] whose research showed a negative correlation between texting volume and formal writing among young adults. While two of the three tests showed no significant correlation, the results of research question #3 in the present study indicated that a relationship may exist between the number of text messages female students sent and received on average (before taking the SAT) and their formal writing performance on the SAT writing test.

For the analysis, the Pearson correlation for female students was -0.33 with a level of significance of 0.01. This data may suggest that as female students mature beyond high school, the relationship between their text message frequency and quality of formal writing performance decreases. At the very least, the study showed the negative correlation between the SAT writing test and the average monthly volume of text messages for female students to be significant.

Lenhart et al. [4] revealed that high school age females "are the most active texters, with 14-17 year-old girls typically sending and receiving 100 text messages a day, or more than 3000 texts a month". This was supported by Plester's studies on younger students, which found that females demonstrated a greater knowledge of textisms compared to males [10].

The implications of the current study receive further support by Faulkner and Culwin's study which showed that the volume of text messaging tends to decline with age [18]. Their study indicated that text messaging was more popular with females and that males had a tendency to send shorter text messages than females.

The study by Rosen and his colleagues found that females reported using more contextual and linguistic textisms in comparison to males. Their study indicated that "those participants with some college who reported sending more text messages demonstrated worse formal writing" [11] and that "the negative associations between texting and literacy … appear to moderate to some degree by gender and by level of education in young adults".

A study of 151,316 students (54 percent female) by Krista et al. [19] revealed that "females, on average, score higher on the SAT writing section (SAT-W) (F=557, M=550)", which may account for there being no significant correlation between text message frequency and SAT writing scores when examining males independently or males and females together. Drouin [20] noted that:

These different samples have the potential to produce contradictory results, as do the different methodologies used (e.g. literacy tasks and methods of analysis). Moreover, it is possible that the text messaging boom that has taken place in the United States in the last few years may have affected the relationships between texting and literacy.

It is also possible that that as text messaging becomes more popular, that "college students with greater reading and spelling abilities may be using text messaging more frequently, or that those with poorer literacy skills may be using text messaging less frequently" [21]. There are so many angles to approach on this subject matter that the research in this field has only just begun.

Limitations

The study had a number of limitations. First, it was targeted only toward freshman college students from one institution. The students at this college were not the most ethnically diverse and were predominantly between the ages of 18 and 24. Second, the study only averaged two months of text message volume during the two months before the time students took the SAT for their monthly mean texting average in this correlation. These limitations were set to encourage student participation by not overwhelming them with a larger amount of data to present to the researcher.

Further limitations included the fact that test results from the last time the students took the SAT exam could have been up to two to three years old, at a time where the students may not have had a cell phone. The study was limited in scope in that it only set out to seek a relationship between monthly text message volume and one validated writing instrument with the SAT writing score.

Other limitations included not examining the students' text message sent and received totals separately, because at the time of the study some providers did not separate these totals on their monthly statements. Also, the study did not examine the students' cell phone plans (e.g. the number of free talk minutes or any text message limits they may have been restricted to following each month). Lastly, the study did not examine the students' cell phone capabilities (e.g. whether they had a Blackberry, other smart phone, or a phone with a keyboard interface that could result in easier texting).

Recommendations

This research is one of a small handful of studies just beginning to examine this new and rapidly growing technology and its impact on the educational performance of students. The results showed a strong normal distribution in the SAT writing score test and a significant negative correlation between female students' SAT writing score and their number of average monthly text messages.

Because of the relatively small sample size of this study and the significant negative correlation found between female students' SAT writing score and number of average monthly text messages, future correlation studies using the SAT writing score and gender are recommended. Some closely-related future studies on this subject could include comparing students' average monthly text message volume to other validated writing tests, such as the ACT (American College Test) COMPASS (Computerized Adaptive Placement Assessment & Support System) exam.

Since this study only sought to find a relationship between its variables, continued studies could be conducted to determine if one variable actually leads to the other and why. The concept of this study as a whole may encourage future research on the correlation between the volume of various other types of technology usage and the quality of formal writing by both college students and younger children as well.

Summary

This study was significant to the subject in that it addressed the question that so many teachers, parents, and students have about the potential relationship(s) between SMS technology and students' formal writing skills in the classroom: Is there a relationship between students' average monthly volume of text messaging and their formal writing performance?

The results of the study may lead educators and students toward a greater understanding of how text messaging volume and a teenager's writing development are related. This perspective could provide administrative insight as to how text messaging should be managed and used by and within an educational institution. At the very least, this synthesis of information and the findings of the research may help direct future studies on this subject.

Future correlational studies comparing formal writing scores and gender are recommended, as are continued studies that attempt to determine if one variable leads to the other and why. Lastly, future studies could be conducted in this area to seek a correlation between the volume of other types of technology use and educational performance measures by both college students and younger children alike.

References

1. Lindley D (2008) Telecommunications: Teens who text. Communications of the ACM 51: 19.
2. The Nielsen Company (2009) How teens use media: A Nielsen report on the myths and realities of teen media trends.
3. Vosloo S (2009) The effects of texting on literacy: Modern Scourge or Opportunity?
4. Lenhart A, Ling R, Campbell S, Purcell K (2010) Teens and mobile phones: Text messaging explodes as teens embrace it as the centerpiece of their communication strategies with friends.
5. Buczynski JA (2008) Libraries begin to engage their menacing mobile phone hordes without shhhhh! 13: 261-269.
6. Igarashi T, Motoyoshi T, Takai J, Yoshida T (2008) No mobile, no life: Self-perception and text-message dependency among Japanese high school students. Comput Human Behav 24: 2311-2324.
7. Rosen L, Chang J, Erwin L, Carrier LM, Cheever NA (2010) The relationship between "textisms" and formal and informal writing among young adults. Commun Res 37: 420-440.
8. Lin IM, Peper E (2009) Psychophysiological patterns during cell phone text messaging: A preliminary study. Applied Psychophysiology Biofeedback 34: 53-57.
9. Mattern KD, Patterson BF, Shaw EJ, Kobrin JL, Barbuti SM (2008) Differential validity and prediction of the SAT.
10. Plester B, Wood C, Joshi P (2009) Exploring the relationship between children's knowledge of text message abbreviations and school literacy outcomes. British J Dev Psychol 27: 145-161.
11. Taylor AS, Harper R (2003) The gift of the gab: A design oriented sociology of young people's use of mobiles. J Collab Comput 12: 267-296.
12. Harley D, Winn S, Pemberton S, Wilcox P (2007) Using texting to support students' transition to university. Inno Edu Teach Int 44: 229-241.
13. Hill JB, Hill CM, Sherman D (2007) Text messaging in an academic library: Integrating SMS into digital reference. Refer Libra 47: 17-29.
14. Plester B, Wood C, Bell V (2008) Txt msg n school literacy: Does texting and knowledge of text abbreviations adversely affect children's literacy attainment? Literacy 42: 137-144.
15. Naismith L (2007 Using text messaging to support administrative communication in higher education. Active Learning in Higher Education 8: 155-171.
16. Marenco A (2011). When to use a particular statistical test.
17. Igarashi T, Takai J, Yoshida T (2005) Gender differences in social network development via mobile phone text messages: A longitudinal study. J Soc Person Relation 22: 691-713.
18. Flower L, Hayes JR (1981) A cognitive process theory of writing, Coll Compos Commun 32: 365-387.
19. College Board (2010) SAT validity studies.
20. Marenco A (2011) When to use a particular statistical test.
21. Faulkner X, Culwin F (2005) When fingers do the talking: A study of text messaging. Interact Comput 17: 167-185.