EXAMINING RELATIONSHIPS BETWEEN PRESERVICE MATHEMATICS TEACHERS TIME SPENT ON THE INTERNET AND THEIR PERCEPTIONS OF A BLOGGING ACTIVITY IN A EUCLIDEAN GEOMETRY CLASS

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CITATION: Hossain, M. M., & Quinn, R. J. (2013). Examining relationships between preservice Mathematics teachers' time spent on the Internet and their perceptions of a blogging activity in a Euclidean Geometry class. *European Journal of Educational Sciences, 1* (1), 26-37.

ABSTRACT

This paper presents the results of a study that sought to determine if preservice mathematics teachers' perceptions toward a 12-week blogging activity, used as a supportive teaching and learning tool in a college Euclidean Geometry course, differed based on the amount of their self-reported weekly time spent on the Internet. Data was collected using a questionnaire comprised of demographic questions, 16 Likert-type scale items designed to measure participants' attitude toward the blogging activity, and another 18 Likert-type scale items designed to measure participants' perceived effectiveness of the blogging activity. The study found that participants who spend more time on the Internet perceived the blogging activities to be more effective than those who spend less time on the Internet. Overall, the participants found enjoyed the blogging activity and found it to be effective and helpful.

Keywords: *Blog, Euclidean Geometry, Mathematics Education, Perceptions, Preservice Teachers, Web 2.0 Technology*

INTRODUCTION

Technology has been a powerful tool in the United States' mathematics classrooms for several decades. Technology is one of the six principles included by the National Council of Teachers of Mathematics' [NCTM] in their Principles and Standards of School Mathematics (2000). In Principles and Standards, NCTM (2000) posits that "Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning" (p. 24). NCTM further advocates for the appropriate and integrated use of technology in every aspect of mathematics education from what is taught in mathematics; how mathematics is taught and learned; and how mathematics is assessed (Powers & Blubaugh, 2005).

Unfortunately, the use of information technology in mathematics education programs nationwide is not satisfactory (Gunter, 2001; Kurz & Middleton, 2006). Studies show that many teacher education programs in the U.S. have not integrated technology appropriately (Mistretta, 2005; Watts-Taffe, Gwinn, Johnson, & Horn, 2003). Properly preparing preservice teachers to use technology is one of the critical challenges teacher education programs face (Powers & Blubaugh, 2005). Studies show that many teacher education programs use the computer as a

teacher-centered tool rather than as a student-centered tool (Wang, 2002). Without adequate knowledge, these teachers have little opportunity to integrate technology into their actual classrooms (Brush, Glazewski, & Hew, 2008). The high cost of purchasing and updating mathematics teaching-learning software is a major deterrent to the use of traditional and Web-based online teaching and learning programs.

Fortunately, the rapid growth of social network services, Internet, mobile web usage, and Web 2.0-based applications provide an alternative to Web-based online courses and traditional teaching and learning software. One example of Web 2.0 applications, a blog, is fast, free, relatively easy to use, and requires only basic computing knowledge (Solomon & Schrum, 2007). Researchers expect that over the next few years blogs will be one of the fastest growing Web 2.0 applications (Kairer, 2009). Thus, a blog was considered to be an appropriate tool to evaluate the possible usage of other Web 2.0 technologies.

The continuing spread of Web 2.0-based free applications could provide an alternative means of supporting a large population of mathematics students, teachers, and classrooms who cannot afford to purchase licensed mathematics software or flexible online teaching-learning systems. Web 2.0 may be an especially effective avenue for fostering mathematics learning in today's technologically advanced students, who tend to use the Internet wirelessly.

Studies show that Americans spend approximately one third of their online time (36%) communicating and networking across social networks, blogs, personal email, and instant messaging (The Nielson Company, 2010). This suggests that there is a strong positive correlation between time spent on the Internet and time spent on social network sites. Therefore, it is possible that there might be a different perception between preservice mathematics teachers who spend more time on the Internet and social network activities than those who spend less time on these activities with regard to participating in a blogging activity in a college Euclidean Geometry course.

This paper is part of a semester-long study that examined the feasibility of using a Web 2.0 technology in the teaching and learning of secondary mathematics courses – by measuring preservice mathematics teachers' perceptions regarding a blogging activity that was a standard component of a Euclidean Geometry course offered in a university in the western United States. Specifically, this paper reports on research that seeks to determine if preservice mathematics teachers' perceptions toward a 12-week blogging activity differed based on their self-reported weekly time spent on the Internet for all purposes. Participants' attitudes toward and perceived effectiveness of the blogging activity were measured using instruments developed by the researchers. Data was analyzed using SPSS for windows.

PROCEDURE

The data presented in this paper were collected and analyzed quantitatively, in an attempt to answer the following research questions:

Do preservice teachers who report spending more time on the Internet differ significantly from those who report spending less time on the Internet with regard to their attitudes toward the blogging activity in a college Euclidean Geometry course?
Do preservice teachers who report spending more time on the Internet differ significantly from those who report spending less time on the Internet with regard to their perceived effectiveness of the blog for the learning of Euclidean Geometry?

The research was conducted in a semester long blogging activity that was implemented as a supportive teaching and learning tool in a college Euclidean Geometry course offered in a university in the Western United States. Due to the page limitation of this paper, a detailed methodology of the study cannot be presented here. Briefly, the blogging activity was conducted for 12 consecutive weeks as a standard component of the college Euclidean Geometry course. Prior to collecting data, permission was sought from the Institutional Review Board (IRB) of the university where the study was conducted. The blog can be visited at: http://edsc353fall2011.wordpress.com/.

There were 28 students in the class and all of them willingly participated in the blogging activity. The students were divided into six groups with five students in five of the groups and three in the remaining group. The six groups were randomly assigned to a pair of weeks, 1^{st} and 7^{th}, 2^{nd} and 8^{th}, 3^{rd} and 9^{th}, 4^{th} and 10^{th}, 5^{th} and 11^{th}, or 6^{th} and 12^{th}. Each week the researchers uploaded a new problem set. Each group member was responsible for submitting a complete solution to one of the eight problems posted during the weeks assigned to their group. The schedule was purposely set so that each group was assigned one week during the first half of the activity and another week in the second half. Each student created a pseudonym to maintain confidentiality throughout the activity.

Data was collected using a researcher-developed survey. The survey asked participants for demographic information and a self-reported estimate of the total amount of time they spend on the internet per week and included two researcher-created instruments to measure participants' attitude toward the blogging activity and their self-reported perception of the effectiveness of the blog as a teaching and learning tool, respectively. The first of these instruments consisted of 16 Likert-type scale items with a six-point scale, while the second instrument consisted of 18 Likert-type scale items with a six-point scale. Due to the nature of the Likert-type scale data the non-parametric Wilcoxon-Mann-Whitney U test, an alternative to the parametric t-test, was implemented. The validity and reliability of these instruments were measured through appropriate procedures and were found to be authentic and consistent. An electronic copy of the survey is available at:http://edsc353fall2011.files.wordpress.com/2012/10/survey_instrument.pdf

PARTICIPANTS AND DATA

As noted earlier, 28 students participated in this study. Twelve (42.86%) of the participants were male, and 16 (57.14%) were female. The participants ranged in age from 20 to 61 years old with a mean, median, and range of 26.43, 22.0, and 41 years respectively, and a standard deviation of 10.15 years. The participants' self-reported time spent on the Internet per week in hours for all purposes had a mean, median, and range of 22.43, 20.50, and 55 hours respectively, with a standard deviation of 10.823 hours. Thus, for analyzing the research questions, participants were

divided into two groups, those who spent less than 21 hours and those who spent 21 or more hours on the Internet per week, for all purposes.

The overall attitude toward the blogging activity score for each participant was determined by calculating the median score of the 16 Likert-type scale items designed to measure this construct. Each item had a possible range of 1 to 6; where, for positively worded items, 1 indicated Very Strongly Disagree (VSD) and 6 indicated Very Strongly Agree (VSA). There were 6 negatively worded Likert-type scale items on this instrument, items 9, 11, 13, 16, 19, and 23. The same options were given for the negatively worded Likert-type scale items; however, scores for these items were coded in reverse order with a possible range of 1 to 6; where 1 indicated Very Strongly Agree (VSA) and 6 indicated Very Strongly Disagree (VSD).

Similarly, participants' perceived effectiveness of using the blogging activity was measured by calculating the median response of the 18 Likert-type scale items included on this instrument. Each item had a possible range of 1 to 6; where 1 indicated Very Strongly Disagree (VSD) and 6 indicated Very Strongly Agree (VSA) with a higher number representing a more positive perceived effectiveness of the blog for the learning of Euclidean Geometry. An overview of participants' perception scores obtained from this instrument is presented in the Appendix.

In order to attain meaningful and complete scores, medians of the raw scores were used instead of means. While a mean score might allow for an easier interpretation (i.e., the mean was somewhere between *Strongly Agree* to *Agree*), the mean was inherently meaningless with this Likert-type scale. For a Likert-type scale, data cannot be treated as interval data as the distances between points on the scale are not equal (Cash, 2010). As Likert-type scale data are ordinal in nature, the researchers used median and mode scores to interpret the non-parametric ordinal data. An overall measure of the median attitude and median perceived effectiveness scores is shown in Table 1.

TABLE 1

Descriptive Statistics of Median Attitude and Median Perceived Effectiveness Scores

	Attitude Scores	Perceived Effectiveness Scores
Valid N	28	28
Mean	4.1786	4.1250
Median	4.0000	4.0000
Mode	4.00	4.00
Std. Deviation	.95466	.92921

Descriptive statistics of the attitude scores yielded a mean, median, and mode of 4.18, 4.0, and 4.0 respectively with a standard deviation of 0.95. This indicates that the typical response of participants corresponds to slightly more than agreement that they held a positive attitude toward the blogging activity in the College Euclidean Geometry course. Similarly, descriptive statistics of the perceived effectiveness scores yielded a mean, median, and mode of 4.13, 4.0, and 4.0 respectively with a standard deviation of 0.93, indicating that the typical response of participants

corresponds to slightly more than agreement that the blogging activity was an effective means of teaching and learning Euclidean Geometry.

RESULTS

The first research question was analyzed using a non-parametric Wilcoxon-Mann-Whitney U test on the participants' median attitude scores by their self-reported time spent on the Internet per week. The Wilcoxon-Mann-Whitney U test result indicated a non-significant difference (N = 28, U = 61.50, p >.05) that failed to reject the null hypothesis that the median attitudes of the participants, in using the blogging activity as a supportive teaching-learning tool in a College Euclidean Geometry course, did not differ in terms of their self-reported time spent on the Internet per week (Table 2).

TABLE 2

Wilcoxon-Mann-Whitney U Test Statistics on Participants' Median Attitude Scores on their Self-reported Time Spent on the Internet per week

	Median Attitudes
Mann-Whitney U	61.500
Z	-1.777
Asymp. Sig. (2-tailed)	.076
Exact Sig. [2*(1-tailed Sig.)]	.094[a]

a. Not corrected for ties.

This means that the study did not find any significant difference in the median attitude scores of the participants, in terms of their self-reported time spent on the Internet per week. Again, based on the ranks of the median attitude scores by time spent on the Internet (Table 3), it was determined that the participants who spend less than 21 hours on the Internet per week had a mean rank of 11.89 and the participants who spend equal or more than 21 hours on the Internet per week had a mean rank of 17.11 in their attitudes toward using the blogging activity as a supportive teaching-learning tool in a College Euclidean Geometry course. The mean ranks of attitudes were somewhat different; however, this difference was not significant.

TABLE 3

Ranks of the Median Attitude Scores by Self-reported Time Spent on the Internet per week

Group by Time Spent on the Internet	N	Mean Rank	Sum of Ranks
<21 hours per week	14	11.89	166.50
>=21 hours per week	14	17.11	239.50
Total	28		

Among the 16 attitude-measuring items there were ten positively worded Likert-type scale items: Q8, Q10, Q12, Q14, Q15, Q17, Q18, Q20, Q21, and Q22. For those items, participants' responses were inclined towards *Agree* (A) to *Strongly Agree* (SA) options (Figure 1).

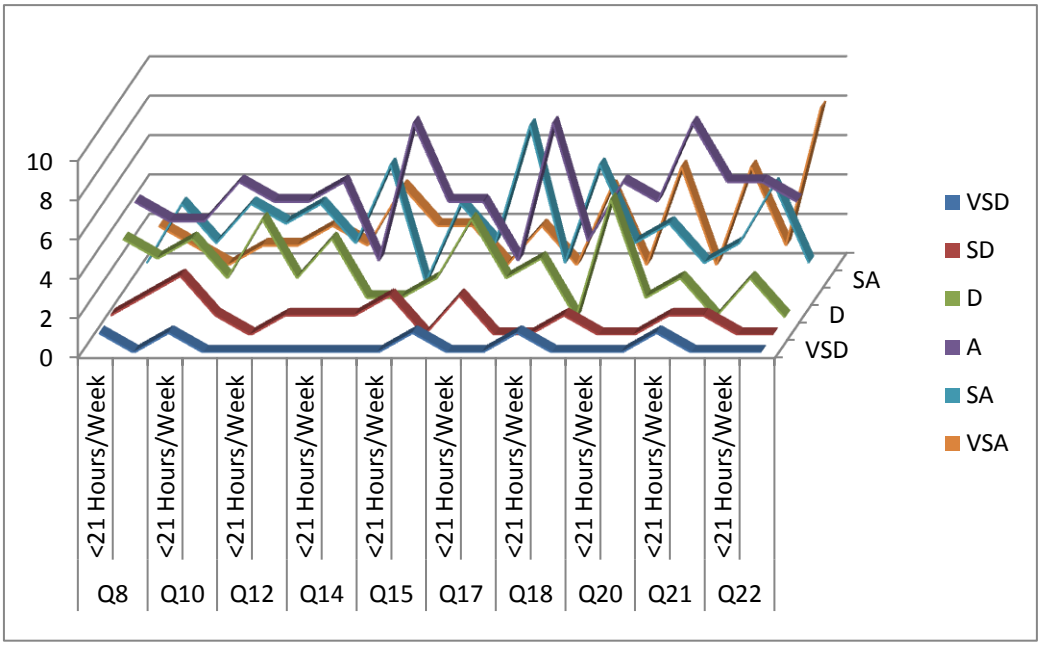

FIGURE 1: 3-D Line Graph of the Positively Worded Attitude Items

For the remaining six negatively worded items: Q9, Q11, Q13, Q16, Q19, and Q23 participants' responses were inclined towards *Agree* (A) to *Strongly Agree* (SA) options (Figure 2). As mentioned earlier, the negatively worded Likert-type scale items were coded in reverse order with a possible range of 1 to 6; where 1 indicated Very Strongly Agree (VSA) and 6 indicated Very Strongly Disagree (VSD).

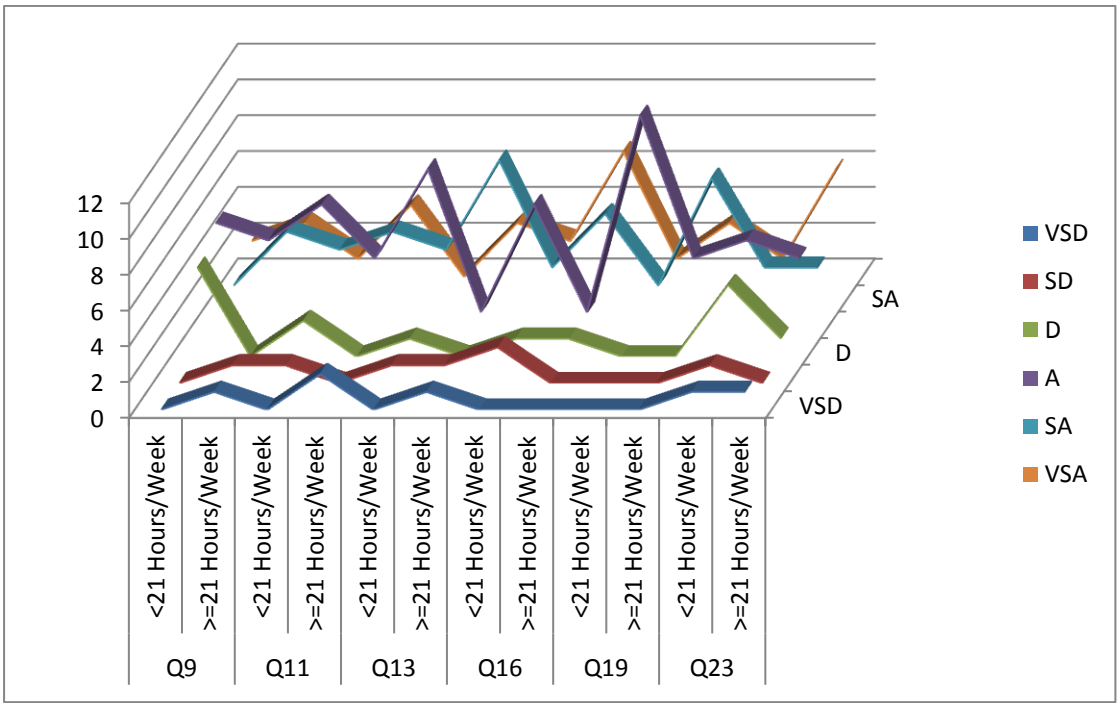

FIGURE 2: 3-D Line Graph of the Negatively Worded Attitude Items

Data for the second research question was analyzed using a non-parametric Wilcoxon-Mann-Whitney U test on the participants' median perceived effectiveness by their self-reported time spent on the Internet per week. The Wilcoxon-Mann-Whitney U test result (shown in Table 4) indicated a significant difference (N = 28, U = 53.00, p <.05) that rejected the null hypothesis that the median perceived effectiveness of the blog for the learning of Euclidean Geometry did not differ in terms of the participants' self-reported time spent on the Internet per week. This means that the study found a significant difference in the participants' median perceived effectiveness scores in terms of their self-reported time spent on the Internet per week.

TABLE 4

Wilcoxon-Mann-Whitney U Test Statistics for Median Perceived Effectiveness Scores on Time Spent on the Internet per Week

	Median Perceived Effectiveness
Mann-Whitney U	53.000
Z	-2.155
Asymp. Sig. (2-tailed)	.031
Exact Sig. [2*(1-tailed Sig.)]	.039[a]

a. Not corrected for ties.

Again, based on the ranks of the median perceived effectiveness scores by time spent on the Internet (Table 5), it was determined that the participants who spend less than 21 hours on the Internet per week had a mean rank of 11.29 and participants who spend 21 or more hours on the Internet per week had a mean rank of 17.71 with regard to their perceived effectiveness of the

blog for the learning of Euclidean Geometry. These mean ranks were deemed to be significantly different, indicating that participants who spend more time on the Internet perceived the blogging activity to be more effective as a supportive tool for the learning of Euclidean Geometry than participants who spend less time on the Internet.

TABLE 5

Ranks of the Median Perceived Effectiveness Scores by Self-reported Time Spent on the Internet per Week

Group by Time Spent on the Internet	N	Mean Rank	Sum of Ranks
<21 hours per week	14	11.29	158.00
>=21 hours per week	14	17.71	248.00
Total	28		

All 18 perception-measuring items were worded positively. Participants' responses to these items were inclined towards *Agree* (A) to *Strongly Agree* (SA) (Figure 3), indicating positive perceptions toward the effectiveness of blogging activity.

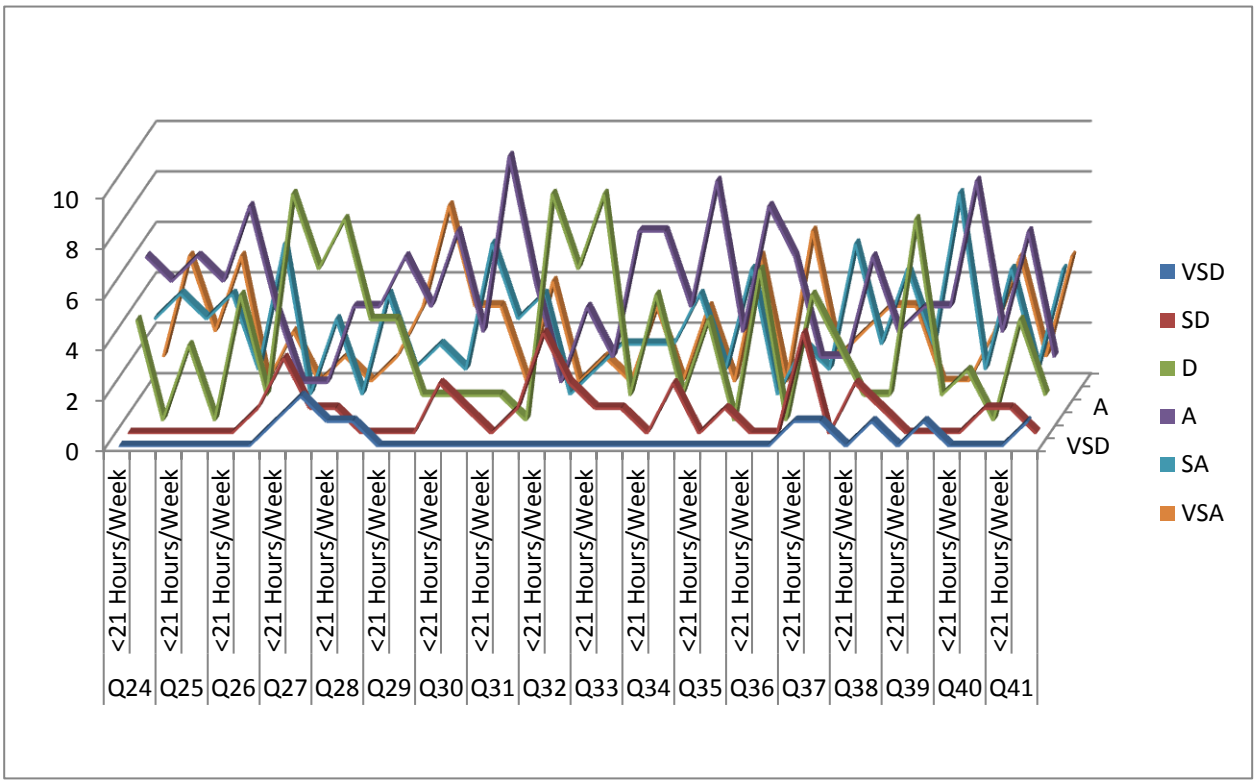

FIGURE 3: 3-D Line Graph of the Effectiveness Items

DISCUSSION

Descriptive statistics of the median scores of attitude toward the blogging activity showed a mean, median, and mode of 4.18, 4.0, and 4.0, respectively, with a standard deviation of 0.95. Similarly, descriptive statistics of the median scores of perceived effectiveness yielded a mean, median, and mode of 4.13, 4.0, and 4.0 respectively with a standard deviation of 0.93. These numbers suggest that the typical response of participants corresponds to slightly more than agreement that participants enjoyed participating in the blogging activity and found it to be an effective means of teaching and learning Euclidean Geometry.

Analysis of the first research question, that examined participants' median attitude scores toward the blogging activity relative to their self-reported time spent on the Internet per week, indicated no significant difference in the median attitude scores of the participants toward the blogging activity across participants who spend more or less time on the internet. However, analysis of the second research question, that examined participants' median perceived effectiveness scores of the blogging activity relative to their self-reported time spent on the Internet per week, found a significant difference ($N = 28$, $U = 53.00$, $p < .05$). This significant result indicates that participants who spend more time on the Internet perceived the blogging activity to be more effective than participants who spend less time on the Internet.

One possible explanation of this result is that participants who spend more time on the Internet are more familiar with blogs and/or other social network sites than those who spend less time on the Internet. Thus, the participants who spent more time on the Internet were more likely to perceive the use of a blogging activity for the learning of Euclidean Geometry to be more effective than those who spend less time on the Internet.

Thus, it is possible that participants who spend more time on social network sites might perceive the blog to be more effective than those who spend less time on the Internet and thus less time on social network sites. This prediction is consistent with the finding of a recent study on students' perceptions of collaboration, self-regulated learning, and information seeking in the context of Internet-based learning and traditional learning, conducted by Lee and Tsai (2011) who found "students who spent a moderate amount of time online for learning actually perceived higher capability and more experience of collaboration than the group who spent less time" (p. 909). In another contemporary study Chu and Tsai (2009) found that "more time spent on Internet practice may increase adult learners' Internet self-efficacy, which may strengthen their preferences for Internet-based learning environments" (p. 1).

IMPLICATIONS OF THE STUDY

The results of this study have possible implications not only to researchers in the field of mathematics education, but also for mathematics students, teachers, educators, curriculum developers, instructional designers, and policy makers regarding the use of a blog and other Web 2.0 applications as a supportive or comprehensive tool for teaching, learning, and planning purposes. The findings of this study suggest that blogs and other Web 2.0 technologies could provide an important avenue for fostering the teaching and learning of mathematics in today's technologically advanced society.

First, the study found that although participants generally reported positive attitudes toward the blog regardless of the amount of time they spend on the Internet, those who spend more time on the Internet perceived the blogging activities to be more effective than those who spend less time on the Internet. Based on these results, professors and teachers who want to use this type of activity in their classroom need to be aware of some issues before starting. Of course, it is critical to determine whether or not all of the students in the course actually have access to the Internet, since this lack of access may be the reason why some students spend little or no time online. Clearly these students would be disadvantaged by such an activity unless the teacher or professor made Internet access more accessible to them. Additionally, if students spend less than 21 hours per week online, they may need support regarding their Internet skills. Providing special training for these students may help them to see these activities as being even more effective just as those who spend more than 21 hours on the Internet already do.

Second, and most notably, since undergraduate college students and preservice mathematics teachers perceived the blog to be an effective tool for teaching and learning, there is a good chance that high school and middle school students, and/or in-service mathematics teachers might, also, find it to be effective. Thus, middle or high school teachers should consider implementing activities similar to those used in this study in their own classrooms and teacher educators should provide instruction to preservice teachers regarding the implementation of blogging activities and encourage these preservice teachers to use them in the future classrooms. Additionally, curriculum developers and policy makers should use their influence to encourage the inclusion of blogs and or/other Web 2.0 technologies in the middle school, high school, and teacher education curricula in mathematics.

CONCLUSIONS

This study has revealed some notable findings regarding the use of blogs in the teaching and learning of Euclidean Geometry. Quantitative measures of participants' perceived effectiveness of using a blog indicated that participants enjoyed participating in the blog and found it to be an effective tool for the teaching and learning of Euclidean Geometry. The study revealed that participants who spend more time on the Internet found the use of a blog more effective as a supportive teaching-learning tool in a Euclidean Geometry course than those who spend less time on the Internet. This suggests that mathematics teachers who want to use such a blogging activity in their courses should be aware of the need to provide additional support and possibly even increased accessibility to the Internet to some of their students.

Although most of the participants in this study were preservice mathematics teachers, their perceptions of the blogging activity may be representative of a variety of other populations. Preservice teachers in other disciplines, inservice teachers, middle school students, and high school are but a few of the populations that could potentially benefit from blogging activities similar to the one studied in this paper. Given the proliferation of Internet connectivity and the propensity of people, especially youth, to avail themselves of these resources, it is incumbent on educators at all levels to look for means of harnessing this energy for the improvement of teaching and learning at all levels.

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APPENDIX: AN OVERVIEW OF PARTICIPANTS' PERCEPTION SCORES OBTAINED FROM THE SURVEY

TABLE -A1: AN OVERVIEW OF PARTICIPANTS' ATTITUDE SCORES TOWARD THE BLOGGING ACTIVITY

Participants		Items in the Survey Instrument Pertaining to the Measurement of Attitude																Median
No.	Time	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	>=21	5	6	6	6	5	6	6	5	6	5	5	6	6	6	6	6	6
2	>=21	3	5	4	6	5	6	6	6	5	6	6	5	6	6	6	6	6
3	<21	4	3	5	6	5	4	4	4	5	3	4	4	4	4	4	6	4
4	<21	5	4	4	4	4	4	5	4	2	4	4	4	4	4	4	4	4
5	<21	4	3	2	3	3	4	3	2	2	2	4	4	3	4	4	4	3
6	<21	4	4	3	4	3	4	4	4	4	3	4	4	4	4	4	4	4
7	<21	6	6	4	5	5	5	6	6	6	5	5	4	5	5	5	5	5
8	>=21	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	5
9	>=21	5	4	4	4	4	5	3	3	4	3	5	5	5	4	5	4	4
10	<21	1	6	1	5	6	5	5	6	6	4	1	6	4	1	6	1	5
11	<21	4	4	3	4	4	4	3	4	5	4	4	4	3	4	5	3	4
12	<21	3	3	2	3	3	5	3	4	4	3	4	4	3	3	3	3	3
13	>=21	3	4	3	5	3	5	5	4	5	5	5	4	4	5	4	3	4
14	<21	6	4	3	4	5	3	4	4	3	5	3	4	5	4	5	3	4
15	>=21	2	2	2	1	3	2	5	1	3	3	4	6	3	4	4	5	3
16	<21	3	3	2	2	3	2	3	3	4	3	3	4	3	3	3	2	3
17	>=21	4	4	4	4	5	5	5	4	6	5	4	4	5	4	6	5	4.5
8	>=21	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
19	<21	3	5	3	4	4	4	4	4	4	4	4	5	3	4	5	3	4
20	>=21	5	6	5	5	6	5	5	5	6	5	6	4	4	6	6	6	5
21	>=21	4	4	4	4	4	5	5	5	6	5	5	5	4	4	4	4	4
22	>=21	4	4	4	6	4	5	6	4	5	5	6	4	5	5	6	6	5
23	<21	3	4	4	5	3	4	2	2	4	2	3	4	3	2	5	5	3.5
24	<21	4	3	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4
25	<21	2	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4
26	>=21	3	5	3	5	4	4	4	3	6	5	5	5	4	4	4	4	4
27	>=21	2	1	5	1	2	1	2	4	6	4	2	5	6	2	6	1	2
28	>=21	4	5	4	4	4	5	4	4	5	4	4	5	4	4	4	4	4

TABLE - A2: AN OVERVIEW OF PERCEIVED EFFECTIVENESS SCORES OF THE BLOGGING ACTIVITY

Participants		Items in the Survey Instrument Pertaining to the Measurement of Perceived Effectiveness																		Median
No.	Time	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
1	>=21	5	6	4	3	3	4	5	5	3	4	5	5	4	4	5	4	5	3	4
2	>=21	6	6	4	3	4	6	5	5	3	4	4	5	6	3	4	4	6	4	4
3	<21	4	5	5	3	4	6	6	4	3	5	5	5	4	6	6	5	4	3	5
4	<21	4	4	4	3	4	4	5	5	3	3	4	4	4	4	4	4	4	4	4
5	<21	4	3	4	1	2	3	4	4	2	2	3	3	3	1	2	3	4	4	3
6	<21	4	4	4	2	4	4	4	4	2	3	4	4	4	3	4	4	4	4	4
7	<21	5	6	4	3	4	6	6	5	2	5	5	4	4	5	6	5	6	4	5
8	>=21	6	6	6	5	5	6	6	6	6	6	6	6	6	6	6	5	6	5	6
9	>=21	5	5	4	3	3	4	4	5	3	4	2	5	4	3	4	5	5	5	4
10	<21	3	6	3	3	3	6	4	4	4	4	4	4	3	4	6	3	6	3	4
11	<21	5	5	3	3	3	4	4	4	3	4	4	4	4	2	4	4	4	4	4
12	<21	3	4	4	3	3	3	2	3	3	3	3	3	3	3	4	3	3	4	3
13	>=21	6	6	5	4	5	6	6	4	4	6	6	5	6	5	5	5	6	5	5
14	<21	5	5	4	2	3	5	6	4	2	3	4	4	3	2	5	3	5	2	4
15	>=21	4	4	5	1	4	5	5	4	3	2	4	4	4	1	2	4	4	5	4
16	<21	3	3	3	3	1	3	3	4	3	3	3	3	3	3	3	3	3	3	3
17	>=21	5	5	5	3	4	6	4	4	3	4	4	6	5	5	5	5	5	6	5
18	>=21	6	6	6	6	6	6	6	6	4	5	6	6	5	5	5	5	5	6	6
19	<21	4	4	4	2	3	4	4	5	3	3	4	3	3	2	2	3	4	4	3.5
20	>=21	6	5	5	5	5	6	5	6	5	5	5	6	6	6	6	5	6	5	5
21	>=21	5	5	5	5	5	5	5	5	3	4	5	6	6	5	5	5	5	6	5
22	>=21	4	4	5	3	4	6	5	6	4	6	5	5	6	5	6	5	6	6	5
23	<21	6	3	3	4	3	4	2	4	3	3	3	4	4	2	5	3	4	5	3.5
24	<21	4	4	4	3	3	3	4	4	3	3	4	4	4	3	4	4	4	6	4
25	<21	3	4	3	3	3	4	4	4	3	3	3	4	4	3	4	3	4	3	3
26	>=21	4	4	3	1	3	4	3	4	4	3	3	4	4	3	3	3	4	6	3.5
27	>=21	4	4	2	2	1	3	2	2	2	4	2	2	4	5	1	1	2	1	2
28	>=21	4	4	4	3	3	4	4	4	2	4	4	4	4	4	4	4	4	4	4