

# Advantages and Disadvantages of Using a Blogging Activity in a College Euclidean Geometry Course

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**Abstract** – This study explored student perceptions of a 12-week blogging activity that was a standard component of a college Euclidean Geometry class offered in a university in the Western United States. This paper presents qualitative data regarding student perceptions of the advantages and disadvantages of using blogs as supportive tool in the Euclidean Geometry course. Data were collected by asking two open-ended items and analyzed using MAXQDA, a Qualitative Data Analysis program. The study uncovered ten themes related to advantages and six themes related to disadvantages of using the blogging activity as a supportive tool for teaching and learning in this class. Each of these themes was labeled by an in vivo code. The themes were not independent of one another, but instead showed interconnected aspects of an overall phenomenon.

**Index Terms**— Blog, Euclidean Geometry, Mathematics Education, Preservice Teachers, Online Discussion Board

## I. INTRODUCTION

Technology has been included as an important principle in the National Council of Teachers of Mathematics' (NCTM) Principles and Standards for School Mathematics (NCTM, 2000) in the United States. The technology principle states that technology is a tool that can enhance the teaching and learning of mathematics. According to *Principles and Standards*, with appropriate use of technology students can better understand the underlying meaning of mathematics and learn mathematics more easily. Technology can enrich students' range and the quality of their mathematical inquiry by providing a means of viewing mathematical ideas from multiple perspectives (NCTM, 2000).

The NCTM [1] *Principles and Standards* recommends that students use technology as an aid to help solve mathematical problems and enhance learning skills. They do not suggest, however, that technology should replace the role of the mathematics teacher. Instead, they envision that students in a mathematics classroom should have access to technology to facilitate their mathematics learning under the guidance of a skillful teacher who will decide when and how technology will be used. Further, they expect that teachers will play multiple roles in a technology-rich classroom to facilitate students' learning in appropriate ways (pp. 25-26).

Thus, information technology should play an increasingly important role in the teaching and learning of mathematics at all levels. Currently, most mathematics classrooms in the United States have advanced technological tools including high-speed Internet connected computers, projectors, smart-boards, graphing calculators, and various standalone mathematical software packages such as: Geometer's Sketchpad, Math Arena Advanced, and Data Explorer, as well as TI-84 Graphing Calculators and Explorer Calculators [2, 3]. Unfortunately, however, information technology has not reached its full potential in mathematics education programs across the U.S. [4, 5]. Many prospective mathematics teachers' feel the current role of technology in mathematics education is not satisfactory [6]. Most preservice mathematics teachers identified technology as important in education; however, many of them felt that after graduation they might not be well prepared to teach using technology [4, 7, 8].

Mathematics is a subject that requires considerable interaction between teacher and student when a student encounter difficulty; however, most mathematics learning software does not provide an opportunity for students to ask questions when they face difficulty [9]. Moreover, most mathematics software as well as traditional web-based programs are very costly and require frequent updates of purchased licenses. Some require a yearly license fee and a high-speed Internet and computer system to run; thus, they are beyond the accessibility of students and teachers in many rural school districts [10]. As a result, a large portion of students, teachers, and classrooms across the world cannot afford and use purchased mathematics software and web-based applications.

Fortunately, Web 2.0 technology, a new development of the Internet services available on the World Wide Web, allows Internet users to collaborate and share web information actively (O'Reilly, 2005). Thus, Web 2.0 has great potential to create new opportunities and challenges, especially for mathematics teachers, and educators seeking to develop new models that will be available and affordable to almost all students, teachers, and mathematics classrooms in the world. 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 young students, who tend to use the Internet through wireless means.

A Blog is a standard example of Web 2.0 technologies [11] and is one of the easiest applications of Web 2.0 technologies. Blogs offer unlimited possibilities for building collaborative teaching-learning environments in mathematics education. Creating a blog is one of the fastest growing Web 2.0 activities among mobile Internet users [12]. Blogs promote reflective practice as well as collaboration and social interaction among users [13]. Blogs can be used as a means of obtaining or outsourcing solutions of quizzes, fallacies, and various mathematical problems students need to know to be prepared for competitive tests.

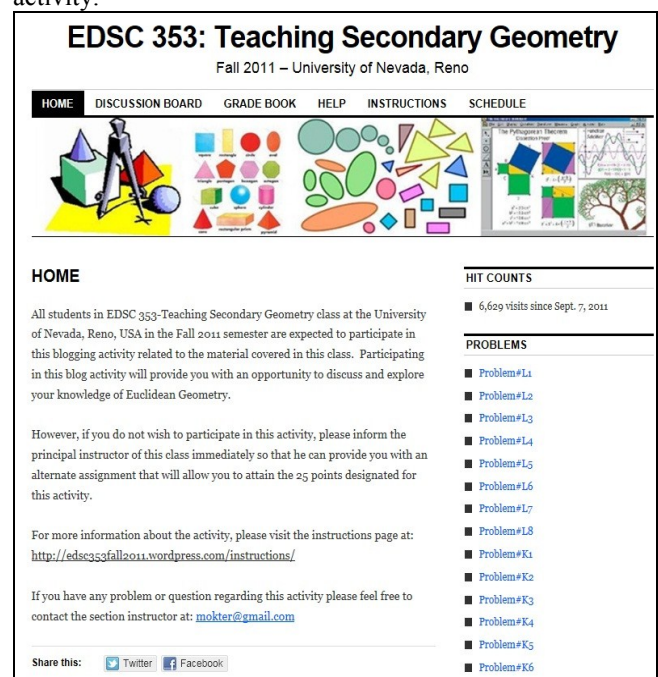
## II. METHODOLOGY

This study explored preservice mathematics teachers' perceptions of using a blogging activity as a supportive teaching-learning tool in a college Euclidean geometry course offered in a university in the western United States. The blog can be visited at: <http://edsc353fall2011.wordpress.com/>. The study was conducted over 12 consecutive weeks during a semester in which the blog was a standard component of a college Euclidean Geometry class.

This paper describes the qualitative data that were collected in response to two separate open-ended items:  
(i) What were the advantages of this blogging activity?  
(ii) What were the disadvantages of this blogging activity?  
These questions were asked to answer the research question: What do preservice secondary mathematics teachers perceive as the advantages and disadvantages of using a blog as a supportive tool in a Euclidean Geometry course? All of the respondents typed their response to each question, based on their practical experience in participating in the blogging activity over a period of 12 weeks. The qualitative data described and presented in this paper were collected through a survey developed by the researchers (Appendix-A) and from the students' postings to the online discussion board on the blog.

There were 29 students enrolled in the class and all of them agreed to participate in the blogging activity. One student, who attended only two class sessions and did not continue the course, did not participate in this study. Finally, all 28 remaining students continued in the blogging activity and participated in the study. It is noted that the students were given a choice to join or not to join in the blogging activity; with an alternate assignment provided by the instructor to those students who did not wish to participate in the blogging activity. However, nobody refused to attend in the blogging activity. All of the students enrolled in this course and a preservice teacher auditing the course as part of an independent study were asked to participate. Most of the students in this course were secondary mathematics education majors; however, a few were majoring in other areas.

Figure 1 shows a screenshot of the homepage of the blogging activity. The blogging activity was designed to run for twelve weeks and was a regular component of this course. The students were divided into six groups with five students in five of the groups and three in the remaining group. Each week the researcher uploaded a new problem set. The six groups were randomly assigned to a pair of weeks, 1<sup>st</sup> and 7<sup>th</sup>, 2<sup>nd</sup> and 8<sup>th</sup>, 3<sup>rd</sup> and 9<sup>th</sup>, 4<sup>th</sup> and 10<sup>th</sup>, 5<sup>th</sup> and 11<sup>th</sup>, or 6<sup>th</sup> and 12<sup>th</sup>. During the weeks to which they were assigned, group members were responsible for solving problems and leading the discussion board activity on the blog. 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.



**Figure 1. A Screenshot of the Homepage of the Blog used for this Study**

Each group member was responsible for submitting a complete solution, to one of the eight problems posted during the weeks assigned to their group. Additionally, during the assigned week, at least one group member was responsible for initiating a new discussion thread and the other group members were expected to contribute to the thread.

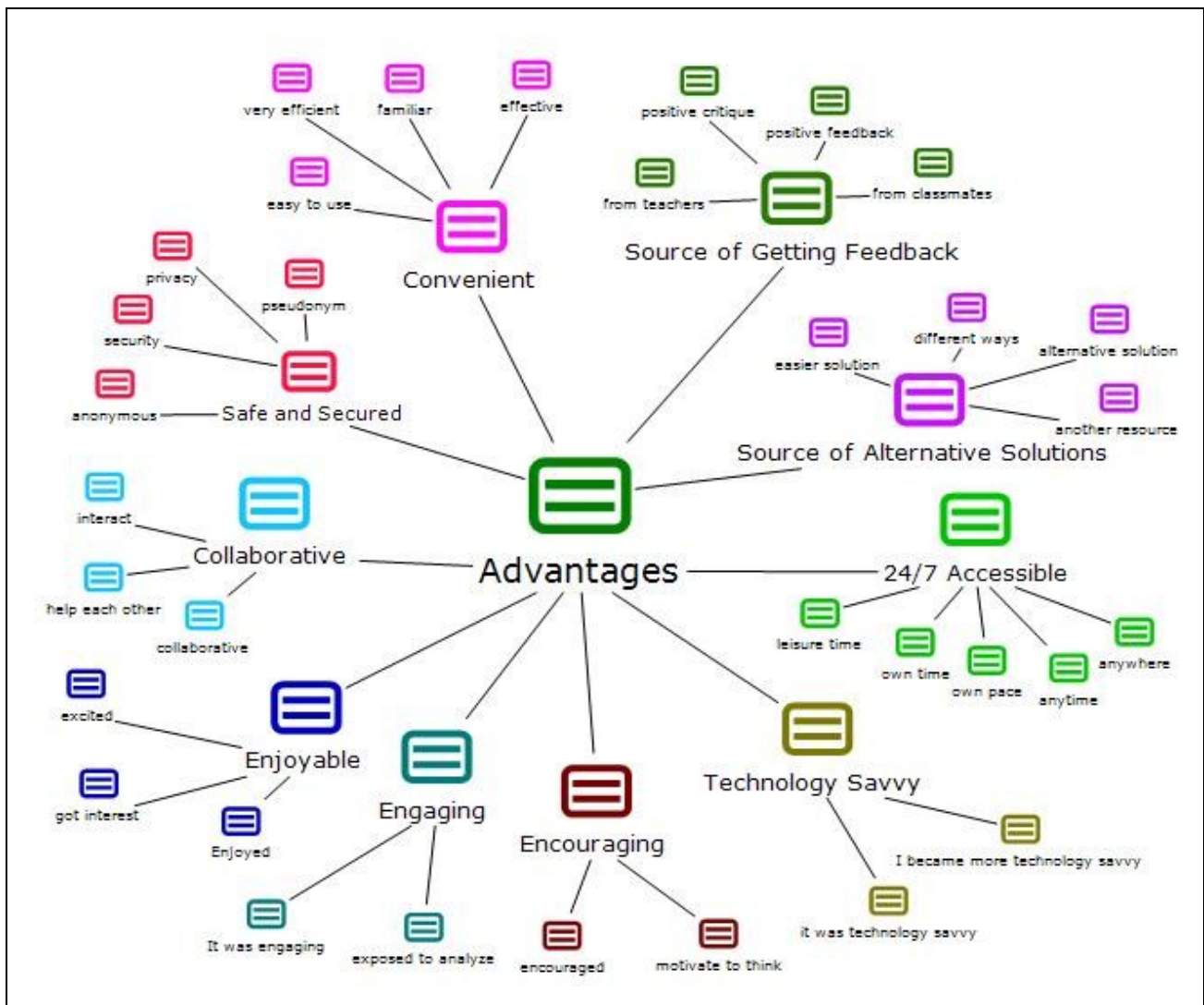
Additionally, throughout the semester each class member was required to post at least five substantive comments to solutions posted by other students; and to actively participate in the online discussion. Substantive comments included verifying a solution posted by someone else, fixing an incorrect or partially incorrect solution, or providing an alternative solution. In the online discussion board, a student could raise a discussion topic such as a contemporary issue related to the topics taught in the class or comment on threads that had been started by other class members. The address of the online discussion board: <http://edsc353fall2011.wordpress.com/discussion-board/>

During the 12-week activity, there were more than 6,500 visits to the blog; and there were 174 responses with 66 threads on the discussion board. Prior to collecting data, permission was sought from the Institutional Review Board (IRB) of the university where the study was conducted; and participants' consent was taken through an assent form, prescribed by the university. Additionally, an information script describing the purpose of the survey was read aloud to the students. The students were given a choice to participate or not participate in the study without any penalty or loss of rights to which they were entitled in the class. All individuals who agreed to participate were given the survey to complete in the absence of the researcher. Thus, the researcher did not have control of participants' feedback in this study. There were 29 students enrolled in the class; all 28 students who attended class regularly, participated in the study.

### III. RESULTS

The participants of the 12-week long blogging activities found a number of advantages and disadvantages of using blogs as a supportive tool in a Euclidean Geometry course. While coding this qualitative data, MAXQDA revealed ten themes related to advantages and six themes related to disadvantages of using the blogging activity as a supportive tool in a Euclidean Geometry course. Each of these themes was labeled by an in vivo code, an actual word or phrase used by one or more of the participants.

This was done in order to preserve the actual language used by the participating preservice mathematics teachers in describing particular advantages or disadvantages of using the blogging activity as a supportive tool in this class. These themes were not independent of one another, but instead show interconnected aspects of an overall phenomenon.



**Figure 2. Major Advantages of the Blogging Activity**

### ADVANTAGES OF THE BLOGGING ACTIVITY

Table 1 depicts the themes and subthemes related to the major advantages of the blogging activity in the Euclidean Geometry class, taken from the survey data. The table also delineates the subthemes that emerged. Figure 2 depicts the major advantages of the blogging activity drawn by the *MAXMaps* feature of MAXQDA. The following section describes the major advantages of using the blogging activity as a supportive tool in a Euclidean Geometry course.

**Table 1**  
**Themes and Subthemes Related to the Major Advantages of the Blogging Activity**

Themes	Subthemes (in vivo codes)
24/7 Accessible	Anytime accessible, anywhere accessible
Alternative Source	Alternative solution, another resource, easier solution
Collaborative	Collaborative, interact, correct each other's mistake
Convenient	Easy to use, effective, familiar,
Enjoyable	Enjoyed, excited, interest
Encouraging	Forced to think, showing to integrate technology
Engaging	It was engaging, exposed to analyze more
Getting Feedback	Feedback, positive critique
Safe and Secured	Anonymous, pseudonym, privacy, security
Technology Savvy	More technology savvy, it was technology savvy

*24/7 Accessible.* Anytime and anywhere accessibility was one of the most common advantages of the blog that most of the participants reported. They found the blog accessible through their computers, laptops, iPods, and iPhones on a 24/7 basis. One participant mentioned: "One of the advantages [of the blog] was the ability to check what you need to do anytime anywhere." Another participant elaborated on her similar experience: "I was able to work on it anytime throughout the week. It was different than other activities I have done in the past, which was cool. It is a more modern way to engage students." Another participant mentioned: "Having the ability to discuss questions and post comments at any time throughout course was very beneficial." Another participant noted: "You could post or reply as things occurred to you, at your own pace." That was supported by other participants' notes: "I can take as much time as I need"; "I could post comments / discussions at my leisure time"; and "I was able to do this on my own time."

*Alternative Source.* The participants found the blogging activity to be an alternative source of getting different or easier solutions to the problems they attempted to solve. One participant noted: "I think that the blogging activity helped students find different ways to solve problems." Another participant reported: "This [blogging activity] offered another resource to practice from."

Another participant mentioned: "If I didn't know how to complete a problem, I could look at how other students answered it on the blog." Another student noted: "It [blogging] was an interactive activity outside of class which allowed students to apply what they had learned and found errors or alternative solutions on others' work." Another participant described: "Another benefit was the different ways of solving problems which allowed me to find an easier solution. I also thought that the blog allowed me to get a better feel of the students in my class. Another benefit is if a tutor needed a reference to help a student in the class the tutor could refer to the blog to help."

*Collaborative.* The participants found the blogging activity to be a collaborative platform for effective communication with the instructor and other participants in the class. One participant commented: "It was a different way to incorporate collaboration of classmates. The feedback given from other students to my solutions was helpful to my future teaching techniques." Another participant elaborated: "We were exposed to a variety of problems relating to Geometry. We were presented with alternative methods in solving, as well as different reasoning procedures. We were forced to think through our solving process and analyze and critique others." Another participant noted: "The ability to interact with classmates and correct each other's mistakes or comment on solutions was an advantage."

*Convenient.* The participants found the blog to be an easy and effective tool for learning and practicing Euclidean Geometry. One participant noted: "It was very accessible; and the means of blogging was very efficient." Another participant narrated: "It [blogging] was an interactive activity outside of class which allowed students to apply what they had learned and found errors or alternative solutions on others' work. It was easy, accessible, and effective." Another participant elaborated: "Students were used to the [blogging] technology and were excited when they incorporated something they were familiar and skilled with to something they were learning. This technology has so much potential and efficiency, if it utilized correctly, it can be such a useful tool."

*Enjoyable.* The participants found the blogging activity to be an enjoyable learning tool. One participant commented: "I enjoyed the connection to modern media. I think it was helped to hold student-centered discussion." S/he also noted: "Students are used to this technology and are excited when they incorporate something they are familiar and skilled with to something they are learning. This technology has so much potential and efficiency, if it utilized correctly, it can be such a useful tool." Another participant noted: "I think it would work to the interest of most students."

*Encouraging.* The participants found the blogging activity to be a means of encouraging themselves to be active participants. One participant commented: "We were forced [ourselves] to think through our solving process and analyze and critique others."

Another participant reported: "Showing us all as future educators another way to integrate technology into the classroom." Another participant reported: "Getting a grade based on the future activity rather than just one problem enforced the advantage of learning from the activity."

*Engaging.* The participants found the blogging activity to be an engaging tool for learning Euclidean Geometry. One participant commented: "It provided more examples to problems, it was engaging, because it was online I liked that the activity was continuous all the way through the semester. It was not difficult to figure out." Another participant elaborated: "This blogging activity was great for preparing for quizzes. The questions were very similar to those we did in class and saw on the quizzes. It also allowed me to talk what topics related to education, but not necessarily Geometry." Another participant elaborated: "We were exposed to a variety of problems relating to Geometry. We were presented with alternative methods in solving, as well as different reasoning procedures." Another comment was concise but very notable: "It made me analyze the chapter problems more."

*Getting Feedback from Others.* Getting feedback from fellow classmates' comments and opinions on their work on the blog was impressive for the participants. One participant mentioned: "It's very useful to have feedback from fellow classmates along with feedback from the teachers." Another participant noted: "I think that the blogging activity ... also helped students come up with ways to positively critique other student's answer and thoughtfully reply to questions." Another participant elaborated on his or her similar experience: "The main advantage was doing a problem and getting feedback from classmates."

*Safe and Secured.* The impersonal nature of the blogging activity was considered to be a great advantage to many participants. Due to using pseudonyms instead of their actual names, the participants found the blog was as a safe and secured platform to express their opinion anonymously. One participant reported: "No one knew my pseudonym so if I got something wrong it wouldn't directly link back to me." Another participant stated it concisely: "Not shy about speaking out since pseudonyms." Another participant noted: "It [blog] allowed for privacy and security for students."

*Technology Savvy.* The blogging activity not only required a certain level of technology savvy from participants, it also, served to improve the level of technology savvy of many of them. One participant reported: "[With the blogging activity] I became more technology savvy." Another participant commented: "[The blogging activity was] convenient, easy, [and] more technology savvy."

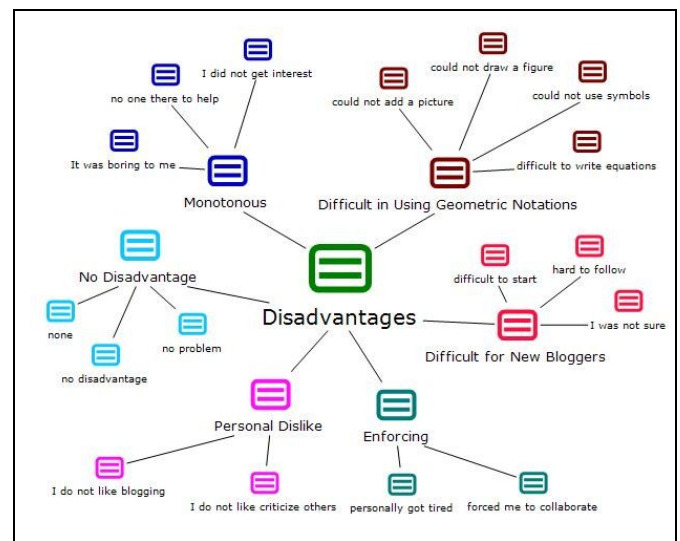
#### DISADVANTAGES/PROBLEMS

Most of the participants did not find any disadvantage of the blogging activity as a supportive tool in a Euclidean Geometry course. However, some participants found and reported some minor problems of using a blog as a supportive tool in a Euclidean Geometry course.

Table 2 depicts the themes related to the disadvantages/problems of the blogging activity in the Euclidean Geometry class, taken from the survey data. The table also delineates the subthemes that emerged within these themes.

**Table 2**  
**Themes and Subthemes Related to the Major Disadvantages/Problems of the Activity**

Themes	Subthemes (in vivo codes)
No Disadvantage	None, no disadvantage, no problem
Difficult for New Bloggers	Difficult to start, hard to follow, I was not sure
Difficult in Geometric Notations	Could not add a picture, could not draw a figure, could not use symbols, difficult to write equations
Enforcing	Forced me to collaborate, personally got tired
Monotonous	Boring, I did not get interest, no one there to help
Personal Dislike	I did not like blogging, I do not like criticize others



**Figure 3. Major Disadvantages/Problems Found in the Blogging Activity**

Figure 3 depicts the major disadvantages found in the blogging activity drawn by the *MAXMaps* feature of *MAXQDA*. The following section describes the major disadvantages/problems of using the blogging activity as a supportive tool in a Euclidean Geometry course. The presentation includes representative excerpts from the responses.

*No Disadvantage.* In response to the question: what were the disadvantages of this blogging activity? One participant commented: "None, really." Another participant noted: "There were really no practical disadvantages that I can see." Another participant noted: "The blogging activity was time consuming but not difficult."

Surprisingly, limiting the number of solutions and comments was also considered as a limitation to a participant. She noted: "The only disadvantage is that students were not getting practice with all different types of problems. We were only shown two different week's problems." Thus, it seemed that the participants would like to participate and spend more time on the blogging activity.

*Difficult for New Bloggers.* Some participants who did not have previous experience in blogging had difficulty starting up with the blog and writing comments. One participant noted: "Substantive comments were hard for me to do. I was never sure how to do them and I didn't know what to write." Another participant noted: "The discussion was hard to follow, would have been easier if the threads were separated."

*Difficult in Using Mathematics Notations.* Inserting mathematical symbols and equations was a limitation mentioned with regard to the free blog used in this study. That was noticed and considered to be a disadvantage by some participants. One participant noted: "The blog didn't allow me to draw a diagram of the word problems in my solution. It made it difficult to articulate my ideas clearly." Another participant noted: "Typing math equations on the blog was difficult."

*Enforcing.* Working with other students in their groups and doing so in a timely manner were mentioned as one kind of enforcement or pressure to a few participants. One participant noted: "[The blogging activity] forced me to collaborate with other students in the class and solve problems together." Another participant elaborated: "There were several students who were almost too critical of our answers. Some participants didn't give everyone an opportunity to leave comments. I personally got tired of reading some participants' comments on every set of problems. This made me not want to even go to the blog page."

*Monotonous.* A few participants did not like the insulated nature of the blogging activity as they considered it to be a monotonous activity. One participant noted: "There was no one there to help me if I had a problem." Another participant noted: "No interaction if you cannot figure it out, you can't ask teacher." Another participant noted: "I could not talk to people face to face and interact on paper." Another participant noted: "I would rather give face to face explanations so I can see the other persons understanding or not."

*Personal Dislike.* Some participants did not like the impersonal nature of the blogging activity. One participant noted: "I personally did not like this kind of learning tool." Another participant noted: "I did not like commenting on other students work. I don't like the impersonal nature of the blog discussions." Another participant noted: "I did not like commenting on other students answer, because it comes across as rude. If you give an alternative answer it can be difficult to do it in a way that adds to the problem."

#### IV. DISCUSSION AND IMPLICATIONS

This study has revealed some important and notable results regarding the use of blogs in the teaching and learning of Geometry and other mathematical subjects. As most of the participants of this study were inservice or preservice mathematics teachers, their perceptions were related to both teaching and learning. The study revealed that participants perceived numerous advantages of using a blog as a supportive teaching-learning tool in a Euclidean Geometry class and mentioned only minor disadvantages. Additionally, it is likely that some of these disadvantages can be overcome as software engineers continue to improve the quality of free or low cost blogging websites.

First and foremost, the participants in this study described a number of advantages of using the blogging activity in the college Euclidean Geometry class. One such advantage was the collaborative nature of this type of activity. Not surprisingly, collaboration is considered to be an important aspect of learning mathematics, as stated in the NCTM [14] Principles and Standards, "Technology also provides a focus as students discuss with one another and with their teacher" (p. 25). Through collaboration, preservice mathematics teachers gain "a better appreciation of mathematics content and pedagogical strategies that lie beyond the grades they will likely teach" [15], (p. 1). Thus, as this study suggests, blogs could be a vehicle to improve the teaching and learning of mathematics because in such an activity students get more opportunities to communicate and collaborate with the teacher and their peers. This might also apply to mathematics teachers engaged in professional development activities, an idea supported by the findings of Tinzmann, Jones, Fennimore, Bakker, Fine, and Pierce [16]: Collaborative teachers encourage students' use of their own knowledge, ensure that students share their knowledge and their learning strategies, treat each other respectfully, and focus on high levels of understanding. They help students listen to diverse opinions, support knowledge claims with evidence, engage in critical and creative thinking, and participate in open and meaningful dialogue. (p. 1)

Second, the blog was found to be a source of alternative solutions and positive feedback from other students in the class, characteristics which have been identified as effective components in the teaching and learning of mathematics. The importance of encouraging alternative solutions is emphasized by the NCTM [14] Principles and Standards, "Different strategies are necessary as students experience a wider variety of problems. Students must become aware of these strategies as the need for them arises, and as they are modeled during classroom activities, the teacher should encourage students to take note of them" (p. 54). The importance of encouraging alternative solutions is, also, witnessed by Stipek, Givvin, Salmon, & MacGyvers [17] who state that, "teachers should emphasize process and encourage students to seek alternative solutions rather than to find a single correct solution" (p. 216) and by Cohen and Ball [18] who contend that "Teachers should encourage students to offer alternative solutions to problems and invite them to collaborate in figuring out what makes sense and why" (p. 3).

Third, regarding the importance of feedback as identified by participants of this study, Lou and MacGregor [19] found that, in a collaborative learning environment, “receiving positive feedback from other groups was rewarding and encouraging” (p. 435). Lou and MacGregor [19] also found that:

Providing feedback to each other across groups helps students to develop critical thinking skills, self-regulating skills, as well as the skills in evaluating the work of others – a professional skill important for educators. Through evaluating each other’s work, the students become more aware of possible areas of weaknesses in their projects. It enhances the transfer between conceptual understanding and applying newly learned concepts in their own projects and in evaluating other projects.” (p. 437)

Fourth, the 24/7 accessibility of the blog might provide students with easy and convenient communication with the teacher and their classmates while they are at home, on the school bus, in the family car, or at a shopping mall. Likely, the convenient, enjoyable, encouraging, engaging features of the blog might be a way to motivate students to spend more time learning mathematics. Notably, these features of blogs and/or other Web 2.0 technologies might change the lackluster attitudes toward learning mathematics held by many students who are more willing to spend their time on social networking sites than on practicing mathematics.

Fifth, the researcher, as an instructor of the course, and the participants in the study discovered some minor difficulties in using the blog in the Euclidean Geometry class such as being unable to use mathematical symbols, equations, and construction tools on the blog. The free

version of the WordPress.com blog used in this study did not allow the instructor to install and use any third party plugins for these purposes. Software developers should consider making the use of mathematical symbols easier on their free blog websites. Doing so will make their products more convenient to use and would most likely lead to an increase in the number of mathematics teachers and/or students who would opt to purchase this product. Another potential solution for software developers would be to create low cost plug-ins that allow for easy use of mathematical and scientific symbols and equations that could be used in tandem with their free blogs. Policy makers could encourage software developers in this regard by investing in software development programs with the promise of purchasing successful and innovative software programs after they have been developed.

## V. CONCLUSION

This exploratory study provides strong qualitative evidence that college students enrolled in a Euclidean Geometry class perceive far more advantages than disadvantages of a blogging activity as a tool for teaching and learning. Given the proliferation of inexpensive Internet applications that support Web 2.0 applications such as blogs, the encouraging results of this study should be considered a strong impetus for educators at all levels to develop and incorporate blogging activities such as the one implemented in this study. Further research in this area combined with continued improvements in technology may allow Web 2.0 to have a significant and positive impact on the teaching of mathematics.

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