

# **Analysis of Student Participation in a Virtual Environment for Learning Tertiary-Level Mathematics**

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## **Abstract**

*This paper talks about analyzing the results of using a virtual classroom in the teaching of 1<sup>st</sup> year Mathematics. The teaching in this case study is supportive teaching that provides an opportunity for students to understand the foundational Mathematics from secondary schools in Trinidad & Tobago. The barriers from diverse culture, varying educational opportunity can created a class with varying levels of background mathematical knowledge. In teaching, knowledge has to be built upon the foundational knowledge. This paper looks at the second phase of this case study which is to analyse the data showing the student participation in using the virtual classroom.*

## **BACKGROUND**

This paper talks about analyzing the results of a case study - the use of a virtual environment in the teaching of 1<sup>st</sup> year Mathematics. In Trinidad & Tobago, where there is diverse culture and educational environments, the teaching of mathematics to students has to incorporate the varying levels of background mathematical knowledge. In 2006, a survey of mathematics in secondary schools in Trinidad & Tobago was conducted by Niherst. One of the result of this survey showed that 93 % of teachers teach Mathematics by showing how to do mathematics problems. This does not mean that the child understands what he or she is doing. This may be one of the reasons to explain why students leaving secondary school and entering into tertiary level was unable to pass a simple secondary level quiz on straight lines. In January 2008, 80 % of 65 tertiary level 1<sup>st</sup> year mathematics students from the University of Trinidad & Tobago failed the straight line quiz. This result motivated the instructor in researching possible low cost options to help these students. As a result a case study involving using a virtual classroom to help these students understand their foundational mathematics knowledge was started. This case study required no additional cost to the institution. The first stage of this case study was completed and the result suggested that the virtual classroom assisted the students (Mohan, 2008) since another quiz was given at the end of the and 80% of the same students passed. The second phase of this case study is to analyse the data addressing the student participation in using the virtual classroom.

## **RESEARCH METHODOLOGY**

The students of this era have been referred to as digital immigrants due to the highly technological society that they live in. This rapidly changing society has created technology students. The traditional blackboard approach to imparting knowledge needs to open its doors to technology. Research has been carried out into using Weblogs to enhance the learning for these technology students. An example of such an experiment is by Birney, 2006. In this experiment blogs was used as an additional support to 2<sup>nd</sup> year Networking and communications course. In this experiment, blogs was based on an adaptive Laurillard's conversational framework (Laurillard, 2002). The use of blogs in this experiment was allowing students to have a personal diary.

In an attempt into understanding these technology students, Warwick, 2006 conducted a pilot project. He concluded that diploma students often lack confidence and some basic mathematics skills and these experiences were not based on qualification gained. The traditional mathematics teaching mainly cultivates skills, neglecting conceptual understanding of the underlying domain (Kadijevic, 1999). The students' learning difficulties in acquiring the concepts of mathematics is abstract, students learn mathematics by memorizing. The virtual classroom case study attempted to incorporate this problem by encouraging the student to become the teacher in the virtual classroom. This approach could actually build the confidence of the student in his learning of mathematical concepts as well as build confidence in him.

In researching the choice of using blog to create a virtual classroom, the following issues was considered. Flatley, 2002, said blogs can promote collaboration. Beeson, 2005, added that blogs also encourage students to write and knowing a larger audience can be reading further develops critical thinking skills. In 2006, Davi et al concluded that the benefits of using blogs in teaching across disciplines can enhance liberal learning and providing course materials before class fostered a sense of active learning classroom. The use of blogs in teaching involves students making personal blog and using it as an online diary to express course content. The approach used in this virtual classroom was the use of one blog, yourmathscorner.blogspot.com by the whole class (Mohan, 2008).

### APPROACH

The test bed for the virtual classroom case study was 65 1<sup>st</sup> year students from the University of Trinidad & Tobago. The mathematics course used was Mathematics for Technicians II.

The virtual classroom was used in the following manner:

- Every student registers himself as an anonymous name.
- The instructor made postings to stimulate thinking on mathematical topics.
- The students responded by answering or commenting, asking questions or illustrating the topic by using a real life example.
- A student will read all the comments made by the students and then make his entry.

### SUMMARY OF RESULTS

This virtual classroom was used by the students over a 4 weeks period from November 21<sup>st</sup> 2008 to December 6<sup>th</sup> 2008. The number of students that was offered to use the virtual classroom was 65. As an incentive to use the virtual classroom, the virtual classroom was considered as a project in the course which means that 10% of the final mark was allocated to this project. In analyzing the student usage, it showed that 92 % of the students were actively adding comments. The graph below shows the average number of students' entries against each day that instructor made a posting. The average number of entries was calculated by dividing the total number of student entries by the total number of students i.e. 65. The graph, Fig. 1, suggests that on any given day, at least two entries were made into the virtual classroom. On some days as much as five entries were made.

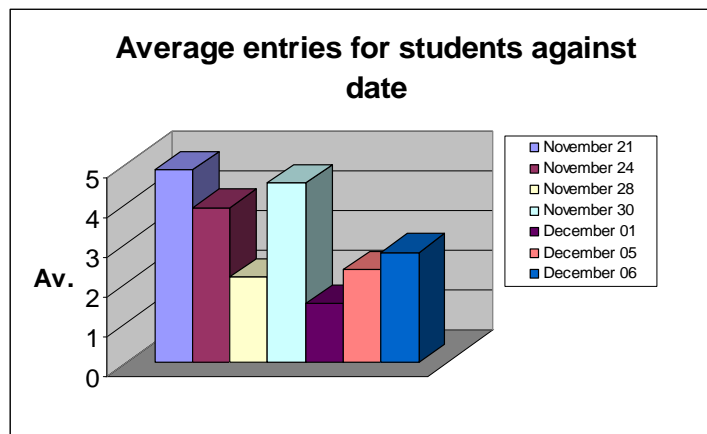


Figure 1: Graph showing the average number of entries

The number of entries that a student can make on a given day was not restricted. The students were not allowed to register under their given name instead they had to register using an anonymous name. Some students were so comfortable using the virtual classroom that they registered themselves as two different users. Ten of the 65 students did that and used both of their registered names. During the physical classroom time, a lot of suspense was in figuring out whom certain registered users were. A user, captain vegetable, answered a lot of questions or errors made by other users. Guessing who the user “captain vegetable” was generated a lot of communication and excitement.

Five of the 65 students did not participate in the virtual classroom. In spite of this, in the short period of 1 month, 2028 comments were made by the student. Some students were very motivated to use the virtual classroom as shown in the graph below, Fig. 2.

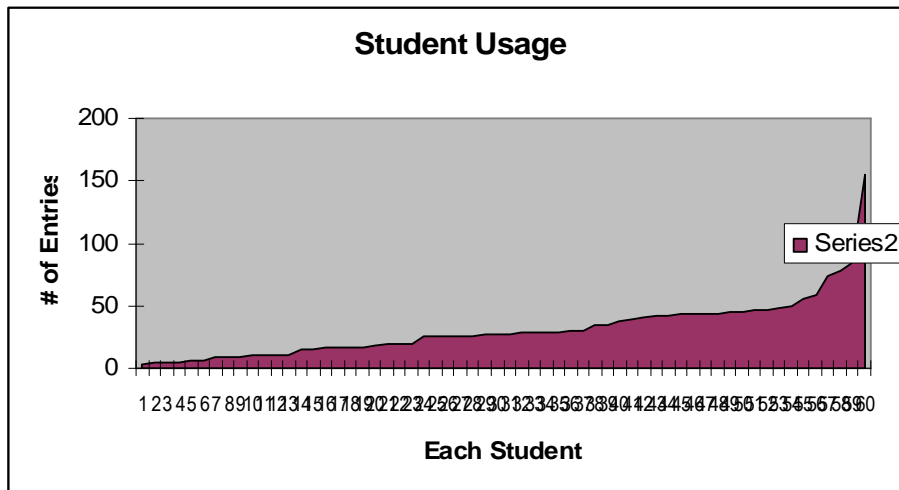


Figure 2: Graph showing the number of entries for all students

The three lowest number of entries were 3, 4 and 5 while the 3 highest number of entries were 78, 84 and 155. The student who used the virtual classroom 155 times in 4 weeks was not the student who answered most of the question, captain vegetable. In fact he asked a lot of questions, his blog name was cokebaby.

It should be noted that the instructor also did not limit herself to one post a day. On one day as much as 5 different postings will go up. Also some postings triggered a lot more comments by students than others. The instructor was basically probing the students in order to get them to think and comment.

### CONCLUSION

This case study experienced a number of set backs such as:

- no availability of computers for student to use
- slow or no internet access
- blogger problems
- no computer at home
- no internet access at home
- web sense at the institution denying access to yourMathsCorner

Despite these setbacks the student has shown a significant usage of the virtual classroom. The case study suggests that the use of virtual classroom can make a difference in the teaching to students. But the use of a virtual classroom involves a lot of additional time to the instructor, both administrative and making postings. Future work will involve analyzing:

- The time of the day that the students made posted
- The type of posting answer, question or illustrative explanation
- Possible relationship to student usage and final grade

In conclusion, the convenience of studying at any time and not restricted to a physical classroom period has great potential for teaching.

## REFERENCES

- Beeson P. Bringing blogs into the classroom, *Journal of Online Learning and Teaching*, Quill 93(6), 2005, pp. 27-29.
- Birney R., Barry M. & O'Eigeartaigh M. The use of Weblogs as a tool to support collaborative learning and reflective practice in third-level institutions. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications*, 2006, pp. 1047-1052.
- Davi A., Frydenberg M. & Gulati G. J. Blogging across the disciplines: Integrating Technology to enhance Liberal Learning, *Journal of Online Learning and Teaching*, 2006.
- Flatley M. Blogging for enhanced teaching and Learning, *Business Communication Quarterly* 68 (1), 2005, pp. 79-10007 – 80.mathematics, Vol. 2 91
- Kadijevic D. Conceptual task in mathematics education. *The teaching of Mathematics*, 2(1), 1999, pp. 59-64.
- Laurillard, D Rethinking university teaching: A framework for the effective use of educational technologies (2<sup>nd</sup> Ed.), 2002 London: Routledge Falmer.
- Mohan F. Using a blog to bridge the mathematical knowledge at the tertiary level. *Proceedings of the American Conference on Applied Mathematics*, 2008, pp. 337-342.
- Mohan F. yourMathsCorner: A blog-based approach to learning prerequisite mathematical knowledge at the tertiary level, *INTERNATIONAL JOURNAL OF MATHEMATICS AND COMPUTERS IN SIMULATION*, 2008, Issue 1 Vol. 2, pp. 95-101.
- Niherest, Survey of Mathematics in Secondary Schools, Trinidad & Tobago, 2006, [www.niherest.gov.tt/st-statustics/surveys-publications.htm](http://www.niherest.gov.tt/st-statustics/surveys-publications.htm).
- Warwick J. Mathematical Self-Efficacy: A Pilot Study Exploring Differences Between Student Groups, *International Journal for Mathematics Teaching and Learning*, 2006.