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Using Weblogs in Mathematics Courses
(Penggunaan Weblog Dalam Kursus Matematik)

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ABSTRACT

In the Malaysian Education system, Mathematics is a compulsory subject that is needed to be learned by all students at primary and secondary school levels, but what is largely still not researched is the Malaysian students' ability to write about Mathematics. A pilot study is conducted to explore Malaysian students' reaction towards using Weblog as a platform for writing about Mathematics. This paper presents how Weblogs has been applied in mathematics courses that could facilitate changes in teaching and learning. At the end of the semester, a paper survey was administered to 80 diploma students (from Tourism Management Program and Engineering Program) at Universiti Teknologi MARA (UiTM) undertaking Business Mathematics and Pre-calculus courses. Data collected was analyzed using descriptive analysis and the statistics used for this consisted of frequency analysis distribution. This paper also point out certain problems, which deserve attention before Weblogs can be widely accepted to facilitate such use in mathematics courses.

Keywords: Weblog, Writing to learn, Pre-calculus, Business Mathematics.

ABSTRAK

Dalam sistem pendidikan Malaysia, Matematik merupakan satu subjek yang perlu dipelajari oleh semua pelajar di peringkat sekolah rendah dan menengah. Tetapi amat sedikit kajian mengenai keupayaan menulis tentang Matematik dalam kalangan pelajar Malaysia. Satu kajian rintis dijalankan untuk meneroka reaksi pelajar terhadap tugasan menulis tentang Matematik dengan penggunaan platform Weblog. Kertas ini membentangkan bagaimana Weblog digunakan di dalam kursus Matematik di mana berlakunya satu perubahan dalam pengalaman pembelajaran. Di akhir semester, borang soal selidik telah diedarkan kepada 80 orang pelajar diploma (daripada Program Pengurusan Pelancongan dan Program Kejuruteraan) di Universiti Teknologi MARA (UiTM) yang mengambil kursus Matematik Perniagaan dan Pra-Kalkulus. Data yang terkumpul telah dianalisa dengan analisis deskriptif dan statistik yang digunakan adalah analisis taburan frekuensi. Kertas ini turut membincangkan isu-isu yang perlu diberi perhatian untuk memudahkan penggunaan Weblog dalam kursus Matematik.

Katakunci: Weblog, Belajar melalui menulis, Pra-Kalkulus, Matematik Perniagaan.

INTRODUCTION

Mathematics is part of our everday life, we cannot live without mathematics, therefore mathematics is made a compulsory subject in schools, and it must be taken by students of certain programs even at institutions of higher education. If we traced back on how Mathematics has been taught at schools those days till today it seems that it remains an unchanged phenomena. Normally the class time is spent to prepare students on how to solve problems that are going to be tested/asked in a test or exam (Morgan, Tsatsaroni, & 2002; Romberg, 1995). Students are first introduced theorems or formulas and followed by exposing them to some examples of problem solving techniques and then they were asked to practice these techniques until they mastered the skills. In short, mathematics learning is dealing with mastering formulas and procedures. During the exam, students are only assessed on their ability to solve problems and generate correct answers, but completely ignore their understanding of the mathematical concepts.

Perhaps, for most people they thought students should learn to write in English classes and to compute in mathematics classes, but there are some researchers (Gibson & Thomas, 2005; Ntenza, 2006; O'Connell *et al.*, 2005; Pugalee, 2004) who saw the potential of incorpating writing activities in mathematics education. Therefore, one of the strategies suggested was the use of the writing - to – learn mathematics which can be implemented any level of mathematics classes.

Johnson (1983) as cited in Miller (1991) wrote if one student is able to write explicitly about a mathematics concept, then there is a high possibility that he or she already understand it. This was supported by Vivaldi's (2003) research where he has tried implementing short writing tasks with his students as part of course assessment and he found that by this way he was able to develope students' mathematical understanding very well. On the other hand, according to McMillen (1986) as cited in Miller (1991) if a student is able to write out how he or she approached a mathematics problem, then it shows that the student has already achieve a higher thinking level.

Educators and educational researchers are recently showing interest to explore the use of the web technology such as the blog tool in higher education setting (Blazquez & Calvo, 2002). Perhaps, they saw the significant values of this tool for e-learning which is obvious is the possibility of doing interaction between students (Roznawski & Wiemeyer, 2008). Spicer (2009) pointed that in mathematics learning, it should involve communication element. For example, communication activities which require students to explain a solution to someone as part of homework assignments or encourage students to find and report real world uses of mathematics. However, as noted by Shield and Galbraith (1998) the findings related to the type of writing used in mathematics education research are very few.

Blog has become one of the popular online publishing tools where the written entries will be displayed in the inverse chronological order. More often, it is viewed as a kind of online diary which contains personal ideas, links, photos, etc. The content published on blog can be very informative and subjective (Gewere, 2005 as cited in Shoffner, 2007).

Blogger website (www.blogger.com) has provided a free platform for the internet users or bloggers to publish their writings anytime and anywhere. With the availablity of this facility, many language educators first found that weblogs are helpful to be applied in language writing classrooms. For example, Mah and Er (2009) has conducted a study on the application of weblogs in the English as A Second Language (ESL) classroom in Malaysia higher education context. The application of blogs in education has been extended to various disiplines all over the world. Past researches have reported the feasibility of using weblog to support teaching and learning. For example, Shahrinaz (2009) has conducted a study on the use of weblogs in Management Information System subject among final year undergraduates in Malaysia; Suez-Llorca *et al*. (2010) explored the effects of using weblogs in sea sport subject among 5th year degree students at a university in Spain; and Farmer, Yue, and Brooks (2008) used blog in Cultural Studies Program at University of Melbourne.

Blog has become a choice for teaching and learning purposes because there are three advantages compared to conventional websites as acknowledged by Suarex-Llorca *et al.* (2010):

1. To publish on blogs is simple because the provided tools are user friendly, and it requires short learning time to master it as to compare to create websites using HTML edictors. In addition, for a created websites can only be published on web servers which are normally not free of cost.
2. Students (bloggers) need to focus on contents and the process of communication, not much on designing and creating blogs because there are preset templates available in the blog tools. This is enough for creating an attractive blog page.
3. Blogs also offer various added facilities for the use of bloggers. Some of the functions are comments, automatic detection of references, a file system, internal search engines and permanent personalised links to the written contents.

As mathematics educators we strongly support Reilly's (2007) argument that in mathematics instruction, it should move beyond the limits of standardized testing by incorporating writing activities into the mathematics curriculum. On the other hand, we also believe that in the learning process, students must be active, they should construct the knowledge themselves. They must be involved actively in the task that requires exploring, justifying, representing, discussing, using, describing, investigating, and predicting (Countryman, 1992). Absent from the literature, however, are studies on the use of weblog in mathematics courses in the Malaysia context. In our study we are focusing on incorporating writing about mathematics activities using blogs tool.

This study was designed to identify the perceptions held by students regarding the process of learning mathematics through the implementation of blogs as part of their higher education experience.

LITERATURE REVIEW

The Technology Acceptance Model (TAM) which was introduced by Davis in 1989 has been widely used for modelling user including student acceptance of technology system such as weblogs. TAM is used to explain the general determinants of technology acceptance which is capable of explaining user behaviour (Davis, 1989). The intention of this study is to investigate university students' acceptance of the weblogs as a learning tool in mathematics courses, therefore to develop an understanding of students' acceptance of weblogs among Malaysian students by adopting the TAM would be appropriate. As a pilot study, the researchers of this study have decided to focus on three variables of TAM, they are: ease of use, usefulness, and behavioral intention to use weblogs.

RESEARCH METHODOLOGY

Sample

The study was conducted at Universiti Teknologi MARA Pulau Pinang. The sample for this study consisted of 81 first semester diploma students, who were selected from two mathematics course groups: (1) Precalculus (MAT133) which is offerred for Electrical Engineering Program, and (2) Introduction to Business Mathematics (MAT108) which is offered for Tourism Management Program. These two groups of students were given an assignment of creating and writing in a personal mathematics learning blog.

Procedure

This study was carried out in semester July-November 2008. As part of the preparation for the study, each student should pick up the basics skills of blogging such as writing and interacting in a blog environment. Training is provided to these students to do the blogging task through a one-day workshop. The training was conducted by an ICT expert. During the workshop, students have been

introduced to the features, functions of the weblogs and the ethics of using ICT. At the same time, the students also created a personal learning blog using Blogspot.com platform. After the training, all the students should have own a personal learning blog and it was ready to do posting in their blog and comment on other classmates' blogs. To ensure students' full participation in this project, 10 marks of the total coursework marks (40 marks) were allocated for this assignment. Students were encouraged to reflect upon and discuss any topics related to the current mathematics course, summary of content that they have read, the history of mathematics, the application of mathematics in daily life and/or issues related to their mathematics learning experiences in their blog, etc. Or otherwise, based on their creativity, they can also upload relevant images and movie clips to their blogs. Because the medium of instruction of UiTM is English, therefore only English language is allowed in their blogs posting. Students were asked to update their own blog as frequently as possible, like at least one post per week and maintain a blog throughout the semester. Students were also being asked to invite their friends and family members to comment in the blog, and they were also encouraged to write comments on other people's blogs. At the end of the semester, the content of the weblogs posting will be evaluated by the course instructor.

Survey Intrument and Data Analysis

This research deployed a survey method to investigate students' perception towards using weblogs tool in mathematics courses. A 12-item questionnaire was designed based on TAM for the purpose of this study which required response 'Yes' or 'No' answer. A multiple choice item related to ''How often do you update your blog?" was included in the questionnaire. Besides, questions pertaining to the students' demographic information such as gender, study program, prior knowledge of blog were also included. In addition, one open-ended question was included in the questionnaire to find out what problems faced by the students to complete the project on blog? The questionnaires were distributed at the end of the semester. The SPSS 15.0 programme was used to carried out a prior descriptive analysis, with the statistics used for the said purpose consisting of frequency analysis distribution.

FINDINGS AND DISCUSSION

Statistical Calculation of Frequency and Distribution of Use of the Blogs

Data was collected through statistical calculation of frequency and distribution of use of the blogs. It was found that on the whole:

- 78 students had accessed their blogs since created.
- 50 students made more than 1 posting.
- The highest postings by a student in one blog was 38, the average number was 6, standard deviation was 5.6.
- 26 students made 6 or more postings.
- The average number of comments was 4, with the highest number of comments for a student was 20 comments, and the lowest was 0.

From this study, we found that only 3 students did not access to their blog since created (1 from engineering program and 2 from tourism management program). As shown in the Table 1, it reveals that 52% of the students from engineering program and 69% students from tourism managament program made more than 1 posting in their blogs. It seems that there is one engineering student hit the highest number of posting in one blog. It was interesting to find that 19 (40%) students from tourism management program made 6 or more postings on a blog, while there are 7 (21%) students from engineering program who also achieved this target.

Table 1 also reveals that on average there were 5 comments per blog found in tourism management students' blogs compared to 2 comments per blog in engineering students' blog. From this study, we found that engineering students were more interested to make postings on their own blog than writing comments on their peers' blogs. This was supported by the highest numbers of comments per blog in a tourism management student that hits 20 comments, while for engineering student blog the highest hits was 8 comments only.

Table 1: A comparison of statistical calculation of frequency and distribution of use of the blogs between engineering students and tourism management students

	Engineering Program	Tourism Management Program
Number of students had accessed their blog since created	32	46
Number of students made more than 1 posting	17	33
The highest postings by a student in one blog	38	16
Number of students made 6 or more postings	7	19
The average number of comments per blog	2	5
The highest number of comments per blog	8	20
The lowest number of comments per blog	0	0

Feedbacks from the Survey

From the total number of questionnaires distributed, 71 were completed and returned, showing a 88.7% response rate. The general demographics of the participants for gender showed that 31 participants were female (43.7%) and 40 participants were male (56.3%). The mean age of the participants was 18 years old. 100% of the participants are studying in semester 1 and they are doing diploma courses at UiTM Penang. Majority of these students (67.6%) are from Diploma in Tourism Management Program and (32.4%) are from Diploma in Electrical Engineering Program. Generally, it was found out that 60.56% of the participants do not have the knowledge of using blog before they enrolled their study in UiTM. The distribution is shown in Figure 1.

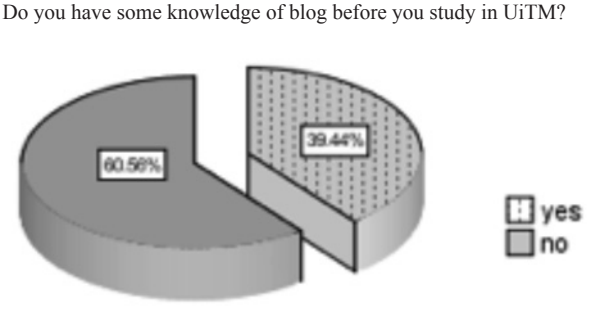

Figure 1: The distribution of the students with and without having the knowledge of using blog before they enrolled as a UiTM students.

Table 2 depicts the findings on students' perception towards the use of blog according to the students' program. Twelve items as listed in Table 2 have been evaluated. Not many students (only 28.2%) indicated that they are not in favor of creating a personal learning blog. This means that the students are not reluctant to create learning blog for academic purposes. This is supported by the finding on the item 2 on the perception of the students as to whether blog should be made compulsory as a coursework for mathematics courses, both programs' students provided a positive response (80% of the students said 'yes'). On the other hand, on average there were 65% of the students responded that they have the difficulties to update their blog. It was interesting to find out that not more than 45% of the students are willing to spend money for the purpose of updating their blogs although this assignment will contribute some marks for their ongoing assessment, but not many marks. This was supported by the finding of item 10, as shown in Table 2 that more than 65% of the students will only look for free access to update their blog. There is a small portion of students (20%) who reported that they are not willing to spend their time to write a blog. However, the students generally confirmed that blog was easy to use. 74% of the students agreed that it can be easy for him/her to use and do what he/she wants to write in their blog. Over 90% of the students agreed that owning a personal learning blog is fun. But it was interesting to find out that only 63% of the students loved to to write comments on other people's blog. 88% of the students seems to enjoy reading other people's blog. We can conclude that the students were more interested in updating their own blog as well as reading others' blog than to write comments on other's blog. Maybe the reason behind it was our students did not have the higher order thinking skill proficiency where they need to think critically and to make evaluative judgement. These skills were not given enough focus in mathematics classroom, especially in Malaysia.

Table 2: Students' response on the survey items on using weblog as learning tool

	Item	Tourism Management Students (n=48)	Electrical Engineering Students (n=23)	Total (n=71)
		Yes (%)	Yes (%)	Yes (%)
1	I am not in favor of creating a personal learning blog	27.1%	30.4%	28.2%
2	Creating a personal learning Blog should be made compulsory to all students as a coursework for this mathematic course.	79.2%	82.6%	80.3%
3	I have some difficulties to update my blog.	66.7%	60.9%	64.8%
4	I am willing to spend some money if I want to update my blog.	45.8%	39.1%	43.7%
5	I am not willing to spare the time to write a blog.	18.8%	21.7%	19.7%
6	Blog is easy.	75.0%	73.9%	74.6%
7	Owning a personal learning blog is fun.	91.7%	91.3%	91.5%
8	I love to write comments on other people blog.	62.5%	65.2%	63.4%
9	I enjoy reading other people's blog.	89.6%	87.0%	88.7%
10	I will look for free access to update my blog only.	66.7%	69.6%	67.6%
11	I find blog is useful for me to reflect my knowledge and feelings.	89.6%	91.3%	90.1%
12	I will continue updating my personal learning blog throughout my study in UiTM.	83.3%	87.0%	84.5%

Generally, 90% of the students agreed that the use of blog is useful for them to reflect on their knowledge and feelings. Approximately 85% of the students responded that they will continue updating their personal learning blog throughout their study in UiTM. After 3 years since the blogs project was conducted, the researchers revisited every one of the students' blogs again on the date of July 18, 2011, to see whether how many students had continue updating their blogs. It was surprisingly found that there were 7 students still updating their blogs. There are a total of 125 postings added to these blogs.

Figure 2 shows that majoritiy of the students indicated that they were interested to update their blog whenever they have free time. This is followed by updating weekly. None of students updated their blog daily.

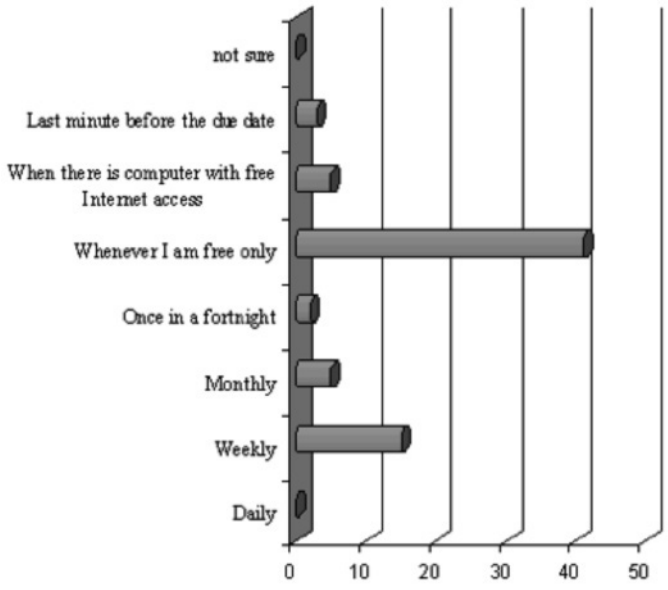

Figure 2: The distribution of the students' frequency to update their learning blogs

CONCLUSION

Till today, we found that integrating ICT into mathematics classroom is still a complex processes, past researches have drawn out some issues bounded like access, funding, support and time for both students and educators (Young & Bush, 2004; Shoffner, 2007). But in this study, we have shown that using writing to learn via weblogs can be viewed as a valuable assessment tool in higher educational setting, particularly for subjects related to mathematics. Based on the results of this study, some of the challenges and realities in applying the weblogs in mathematics courses has been identified. Even though weblogs service is free and user-friendly, to make it effective application in mathematics courses, it is highly dependent on the creativity of the instructor to design and implement it and also how the students are motivated to take part in it. From this study, we have obtained very supportive and encouraging results. With a well organised instructional design for any mathematics courses offer at university level, we are sure that the use of blogs is definitely a good experience that can be brought into mathematics learning for the students and the educators.

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