Blogging in Enhancing Teaching and Learning of Science: A Qualitative Case Study

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ABSTRACT

This article examines the online experiences of a group of Science teachers from five Smart Schools who shared their teaching practices via blogs. The study was undertaken to explore the effectiveness of this technology in improving teaching practices and promoting a community of practice. Data were elicited via blog postings of what the teachers' perceived as best lessons and comments and feedback posted by their team members. These postings were supported with data from a focus group interview. The findings revealed that blogging had to a large extent led teachers to share principles of teaching and practice but only partially succeeded in promoting collaborative efforts among the teachers as evinced by the lukewarm postings and feedback. On the whole, the teachers exhibited concerns related to their awareness, readiness and competency in embracing the changes expected of them.

Keywords: Blogging, teaching and learning, teaching practices, professional development, Smart schools

INTRODUCTION

The advancement of technology can help build a community of practice which shares knowledge and experiences in a

collaborative way. Teachers need to take advantage of such innovations in their practices to make continuous progress to facilitate students' learning. However, there seems to be a lack of support to help teachers move in that direction. As pointed out by the National Research Council (2007), teachers need appropriate modern tools to take advantage of online programmes and it is inaccurate to assume

that teachers have the necessary computer skills and equipment to be able to embrace online technology entirely on their own. In line with this, a group of researchers from three universities, the National University of Malaysia (UKM), University of Nottingham (UK) and University of Sabah (Malaysia) undertook a project based on a partnership model for online professional development to support the professional development of a group of Science teachers from five Malaysian Smart Schools through online means and to promote the use of ICT in their teaching practices. The model used is known as CPDelT: Model 2020, which is loosely based on the successful UK-based *Improving the Quality of Education for All* (IQEA) project (Hopkins *et al.,* 1996). IQEA was initially set up by a team of researchers at the University of Cambridge Institute Of Education in the early 1990s. The overall aim of the university-based project was to "produce and evaluate a model of school development and a program of support that strengthens a school's ability to provide quality education for all its pupils building on existing good practice" (Ainscow *et al.*, 1994, p. 5). The eCPDelt (e-Continuous Professional Development for English language teaching) project is closely aligned with the Malaysian Ministry of Education's desire to maximise the utilisation of Information Communication Technology (ICT) in schools (Ministry of Education Malaysia, 1997) and also the goals of Vision 2020, which seek to equip the workforce with essential skills to access knowledge and information and to position

Malaysia as a competitive knowledge-based economy (more information about this project can be found in Thang *et al.*, 2010).

This article shares the findings from the blog discussions of a group of teachers teaching Science from five different Smart Schools. This involved the sharing of effective teaching practices among the teachers by reflecting and sharing their best lessons through their blogs and responding to comments posted by other team members in the discussion online. Data from these postings were supported with a focus group interview.

REVIEW OF RELATED STUDIES

This section reviews the related literature on the Science curriculum, the principles in teaching and learning Science, and the integration of ICT in teaching Science.

Science curriculum and relevant principles in teaching and learning Science

Before looking at studies on how blogs can be a tool in enhancing teaching and learning of Science, it is important to understand some important elements of the Science curriculum. Science education for secondary schools in Malaysia has been designed to provide students with knowledge and skills in Science to develop thinking skills, and strategies to enable them to solve problems and make decisions in everyday life (Ministry of Education Malaysia, 2002). It aims to produce Malaysian citizens who are scientifically and technologically literate, competent in scientific skills,

possess good moral values, are capable of coping with the changes arising from scientific and technological advances, and able to manage nature with wisdom and responsibility for the betterment of mankind (Sharifah Maimunah Syed Zin, 2003).

Employing different ways to present and teach Science and Mathematics is a continuing professional concern. Effandi Zakaria and Zanaton Iksan (2007) urge Malaysian teachers to move away from the traditional approaches in presenting their lessons and to embrace teaching strategies that are more students-centred, such as co-operative learning where students are actively involved in sharing ideas and working co-operatively to complete interactive tasks.

Likewise, Project 2061 (American Association for the Advancement of Science, 1990), Science for All Americans, shares similar sentiments about the need to place greater emphasis on "what students should learn", and how Science ought to be taught. Drawing from "a growing body of research knowledge about the nature of learning and on craft knowledge about teaching that has stood the test of time" (*see* http://www.project2061.org/publications/sfaa/online/chap13.htm), Project 2061 came up with a number of useful principles as guidelines for good Science teaching. Since these principles are universal in nature and relevant to the teaching and learning of Science in Malaysia, it was adopted as heuristics to explicate the practices of Science teaching and learning evident in this study. Fig.1 provides a schematic overview of the principles adapted from Project 2061 used in this study.
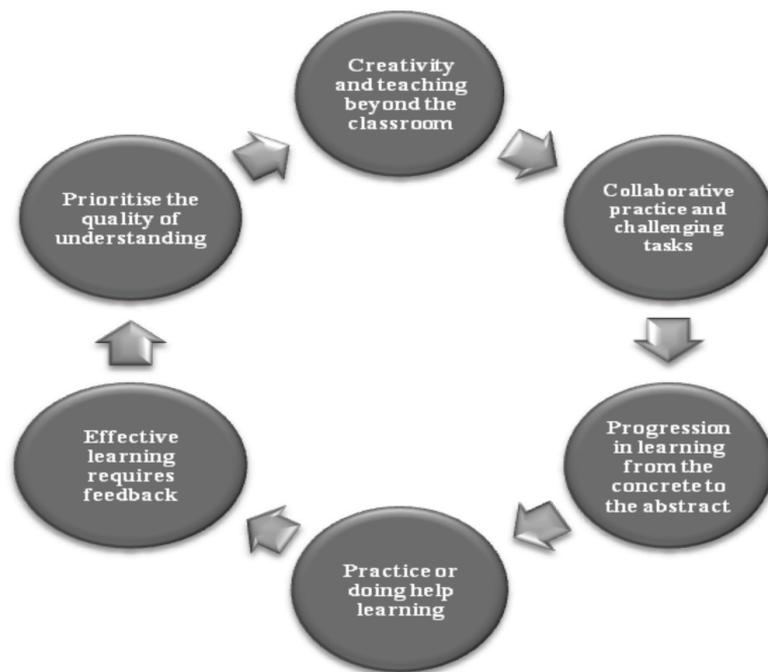

Fig.1: Principles of teaching and learning

1. Progression in Learning from the Concrete to the Abstract
    This principle stresses the importance of allowing learners to first learn with concrete examples before progressing to learn more abstract concepts. For example, young learners learn more readily about things that are tangible and directly accessible via their senses—visual, auditory, tactile and kinaesthetic compared to say learning to understand abstract concepts, manipulate symbols, reason logically and make generalisations.

2. Practice or Doing Helps Learning
    This principle emphasises that learners should be permitted and encouraged to think critically, analyse information, communicate scientific ideas, make logical arguments, work as part of a team and acquire other desirable skills in many contexts in order to learn.

3. Effective Learning Requires Feedback
    For effective learning to take place, learners should be provided with the opportunities to express ideas and obtain feedback from their peers. Besides the provision of feedback, learners should be given enough time to reflect on the feedback they receive, make adjustments and try again.

4. Prioritise the Quality of Understanding
    This principle highlights the importance of parsimony in setting out educational goals, that is, prioritising the most important concepts and skills to emphasise and concentrate on. In other words, teachers need to prioritise the quality of understanding rather than quantity of information presented.

5. Creativity and Teaching Beyond the Classroom
    This principle of learning stresses the importance of leveraging on learners' past learning experiences. This principle believes that learners actually construct their own meaning regardless of how explicitly teachers or books may attempt to explain things. It argues that concepts are best learned when they are encountered in a variety of contexts and expressed in a variety of ways as this enables more opportunities for the concepts to be embedded in the students' knowledge system.

6. Collaborative Practice and Challenging Tasks
    This principle emphasizes on the importance of teachers providing their learners with challenging but attainable learning tasks in groups. It also stresses that learners are quick to pick up the expectations of success or failure that others have for them and argues that the positive and negative expectations shown by parents, peers and the news media affect students' expectations and their learning behaviour.

ICT and the Teaching of Science

The rapid proliferation of Information and Communication Technologies (ICT) in today's world has brought about massive changes in education and school systems. Teachers cannot ignore this tide of change. The Internet is one easily available online source for the teachers to use. It provides an enormous amount of useful and interesting information that teachers can use to complement their classroom teaching. Besides that, the Internet can be used as a social platform for teachers to share their practices.

The blog is one of the most easy-to-use tools for the purpose of social interaction. It has a simple interface and can hence be operated even by those with very basic computer skills. Research has found blog discussions to be effective in encouraging reflective learning (Liaw *et al.*, 2008; Chen *et al.*, 2005), and promoting the shift from surface to deep learning (Bartlett-Bragg, 2003). Ferdig and Trammel (*in* Williams & Jacobs, 2004) further reiterate that the immediacy and commentary-based systems of blogging lead to the reflection and analysis and contextualisation of learning via hyperlinks. They further contend that blogs are more successful in promoting conversational interactivity as opposed to other forms of online discussions. In fact, blogs can serve as a platform for the development of communities (Yang, 2009).

From a teaching and learning perspective, blog discussions have been proven to have the potential to significantly alter teachers' perceptions of themselves as education professionals and their perceptions of the power and validity of their ideas by allowing them to respond more creatively (Oravec, 2003) and to interact with the participants beyond the classroom context (Baim, 2004). A local research study by Malachi (2006) on trainee teachers' writing of blogs revealed that blogging helped them in their professional development and the analysis of the blogs showed positive reflections of their practices. However, there seems to be a dearth in the literature with regard to the potential and possible roles of blogs in the professional development of Science teachers in the Malaysian context. This study hopes to address this concern.

THEORETICAL FRAMEWORK

This study is premised on the theory that teachers' personal worlds (reflective and meaning focused), as well as the shared world (collaborative and knowledge focused), if associated with a purposeful and structured educational environment, could provide a worthwhile learning experience (Garrison *et al.*, 2000) for their professional development. The idea of building an online community through blogging is based on the constructivist theory of learning, which emphasizes on a social or a situated process of learning and personal construction of knowledge, including modelling, coaching, scaffolding, articulation, reflection, and exploration (Loving *et al.,* 2007). According to Oravec (2003), blogging can be usefully exploited to build a 'community diary' around a large project in which a group of learners can establish and maintain thoughts

and share their insights; this is in line with the ultimate goal of the project which is to develop a dynamic community of practice. According to Lave and Wenger (1991), a community of practice is posited as a social theory of learning. Based on this perspective, learning is conceived as the generation and transmission of tacit knowledge through the sharing of experiences that is mainly done through narratives and informal communications (Lave & Wenger, 1991; Wenger, 1998, 2000). Rovai (2000) further adds that a learning community is a group of autonomous, independent individuals who are drawn together by shared values, goals, and interests and committed to knowledge construction through intensive dialogues, interaction and collaboration.

The concept of community of learners originated from a democratic, student-centred, inquiry-based philosophical perspective grounded in the works of Dewey (1933), Vygotsky (1978) and Bruner (*as cited in* Mintrop, 2001). Vygotsky's work on knowledge construction through social interactions in situated and meaningful sociocultural contexts is especially relevant to building learning communities in which participants engage in critical thinking under the scaffolding provided through peer interactions and from the instructor (Bonk *et al.*, 1998; Vygotsky, 1978).

The project hopes that the utilisation of blog as a 'community diary' (Oravec, 2003) will enable the teachers to share common interest and exchange information, which will eventually lead to the building of social and organisational level knowledge. This is the long-term goal of this project. However, this study will limit itself to looking for evidence of sharing of common interest and exchange of information which has a potential in enhancing teaching and learning among the teachers. In investigating this, the principles of teaching and learning (as illustrated in Fig.1) were used as heuristics for data analysis.

RESEARCH QUESTIONS

Thus, the current study was conducted to investigate the following research questions:

1. To what extent did the blog activities lead to the sharing of principles of teaching and learning among the teachers?

2. What were the challenges faced in using blogs for teacher professional development?

METHODOLOGY

There were several stages in this research project. It commenced with a 'Show and Tell' session on 16 September 2008 at two different schools; one in Kuala Lumpur and one in Putrajaya. Twenty teachers of three different disciplines, namely, English, Science and Mathematics, were involved. There were six English teachers, nine Science teachers and five Mathematics teachers from five different schools in Kuala Lumpur, Putrajaya and Petaling Jaya. These sessions were aimed to introduce members of the project team to all teacher volunteers in a friendly and informal way. The teachers were briefed on the aims

and the objectives of the research project and also informed about the forthcoming training workshops and online journal activities. The teachers were introduced and encouraged to experiment with blogs as many said they had never tried blogging or other related online activities before.

In November 2008, the teachers were invited to a workshop where they were taught how to commence a blog, post entries into their post and respond to others' blogs. The teachers were given two tasks during this workshop. Task one required the teachers to reflect on a lesson conducted by them, which was considered good, whereas task two was reflecting on a lesson they considered as bad (*see* Appendix A). These teachers had to share both lessons with other teachers via a blogging activity. Technical assistance was provided via email and telephone conversations throughout this activity by the mentors from the research team that had been assigned to them. The description that follows focuses only on Science teachers as they were the group under investigation in this study.

Nonetheless, the participation from the Science teachers was rather dismal despite numerous reminders via email and text messages. Only six teachers posted their blogs by the end of February 2009, and no comment was posted by the teachers on the blogs. In view of that, a focus group interview was conducted to look into the cause of the lack of participation (see Appendix B for the questions asked during the interview). The interviews with four teachers were audio-taped and transcribed to be analysed.

After the focus group discussions, there was a marked increase in online blog activities compared to only four postings previously and the comments sent in by members were indeed encouraging. The moderators played their part by giving their comments and feedback on the blogs entries posted by the teachers. These blog entries were then thematically analysed according to the principles of teaching and learning Science, as reflected in Fig.1. Similarly, data from the interview were thematically analysed.

TABLE 1
Teachers' Profile

School	Teacher	Gender	Forms taught	Subjects taught	Teaching Experience
A	T1	Female	4, 5	Chemistry	28 years
	T2	Female	4, 5	Physics	11 years
B	T3	Female	2, 5	Science	6 months
C	T4	Female	6	Biology	10 years
	T5	Female	4	Biology	5 years
D	T6	Female	1, 2	Science, Mathematics	2 years
	T7	Female	1, 4	Biology, Science	4 months
E	T8	Female	3, 4, 5	Chemistry	14 years
	T9	Female	1, 4, 5	Science	6 years

PARTICIPANTS

Nine Science teachers, who were involved in the research project, took part as subjects in the current study. Table 1 provides the participants'/teachers' profile.

DATA ANALYSIS

Postings of the teachers' blog were sorted into five categories and analysed together with the supplementary data from the focus group interview. The six categories were adapted from the Project 2061 (American Association for the Advancement of Science, 1990) framework for quality teaching and learning practices on teachers' blogs. As Project 2061 framework was designed for American teachers, it was therefore modified to suit the Malaysian context as the principles are related to the teaching and learning of Science. The categories used are listed below:

1. Progression in learning from the concrete to the abstract

2. Practice of doing helps learning

3. Effective learning requires feedback

4. Collaborative practice

5. Creativity and teaching beyond the classroom

The collected data were organised into these categories and analysed accordingly. The purpose of this analysis was to find out the extent to which the sharing among the teachers could be fit into the above categories, as illustrated in Fig.1.

RESULTS FROM THE BLOG ENTRIES

Progression in Learning from the Concrete to the Abstract

Excerpt 1 shows the teachers sharing instances where they engaged their students in meaningful activities that would introduce them to concepts in a way that the students could easily understand and digest, and thus moving learning from concrete to abstract. For example, Teacher 6 taught pressure and surface area by getting the students to build parachutes. Teacher 4 used diagram, videos, pictures, and animation that are presented using technology to help her students understand progress more clearly. Teacher 2 taught the concept of radiation by using information from the Internet to show the tug-of-war in the nucleus between the proton and neutrons.

Practice of Doing Helps Learning

Excerpt 2 shows the manner in which Teacher 5 shared how she had helped her students to understand the functions of the eyes by getting her students to dissect a cow's eye in groups following a video presentation.

Effective Learning Requires Feedback

There was no evidence of teachers sharing how to give feedback to their students. However, there was clear evidence of feedback given by the teachers to support each other, as indicated in Excerpt 3. Teachers 3 and 4 praised the teachers who had posted useful ideas. Teacher 1 went

EXCERPT 1

Occurrences of Progression in Learning from the Concrete to the Abstract

> *The most interesting topic Force and Motions (Relationship between Pressure and Surface Area). In this topic, students learned how to relate the pressure and surface area by doing a meaningful activity like build the parachute. In this activity ... they can use their ideas involving concepts that they was learned before….*
>
> *In this lesson, they observed ... how the concepts were working.*
>
> *I always ask students to apply the concepts by doing simple activities and relate to their life.*
> *The interactive modules also help my lesson in my class. By using this module, especially the simulation, it will give my students more understanding.*
>
> *Teacher 6*
>
> *... i'll make sure that my lesson is as simple ... i'll explain by using simple english to make sure they can understand. With the help of technology i will show them all the diagram, videos, pictures, animation and etc so that they could see the process clearly….*
>
> *Teacher 4*
>
> *In most text books or reference books, the explanation for radioactive decay is: caused by its unstable nucleus…. What actually causes a nucleus to be unstable is not explained in these books.*
>
> *In my lesson, I served the internet to get information about why a nucleus is unstable before it emits radiation. Then, the information is presented using PowerPoint.*
>
> *It is actually caused by the attractive force and repulsive force acted on the protons and neutrons in a nucleus. These 2 forces reveal a tug-of-war in the nucleus. When the term tug-of-war is used, 'wows and ohs' are heard which means the students understood and they found it interesting – something which they can't get from books.*
>
> *Teacher 2*

further in giving a counter suggestion to further enhance the lesson by presenting their mind maps via powerpoint presentation.

Collaborative Practice

The blog postings in Excerpt 4 show the teachers sharing ways to initiate collaboration among the students in their classes. For instance, Teacher 4 explained how she had tried to introduce self-access learning and project-based learning by getting her students to work in small groups. She took gender, race and academic achievements into consideration when dividing them into groups.

EXCERPT 2

Examples of how practice of doing can help learning

Sense of Sight and light. I stressed on the structure of an eye. It is an experiment on observing the structure and function of the human eye.

The experiment that i did with them is dissection of cow's eye. With the help of technology i manage to download the video from this website and i asked my student to carry out this experiment in class. Basically we carry out this experiment with the help of the video that i have downloaded before to make sure they know what they are doing.

What i did is, i divide my students into 6 groups and ask them to bring a cow's eye for each group. Then they will follow the video that i have downloaded as i show it on the screen by using LCD projector. I will paused and play as they did the disection to make sure they are on the correct path.

This was different than other lesson because they have an experience to see the real structure of an eyeball. Humans eyeballs have the same structure as the cows eyeball. So in order to understand the real structure in theoretically they get to feel and see by themselves. This will improved the level of understanding of my students. The reason this lesson successful is because of they get the experienced to see the structure of an eye and relate it with the functions for each part of an eye.

From here, i learned that my students needs a hands on approach with the help of ICT approach to make them understand a certain topics better. This will also make my lesson more interesting.

Teacher 5

Creativity and Teaching Beyond the classroom

Teachers also shared creative methods they used in their teaching. As illustrated in Excerpt 5, Teacher 4 used creative tools like diagrams, mind maps and interactive courseware, whereas Teacher 1 exchanged roles with her students and that resulted in students giving very creative powerpoint lessons. She also related stories to liven up a class of bored students.

Teachers also provided examples of how they had gone beyond the classroom to motivate their students. Excerpt 6 shows how Teacher 9 taught the "Balance of Nature" by bringing her class of students outside to look for insects, identify and witness the insect that made up the food web.

Having presented the findings derived from inductive analysis of blog entries, the subsequent section present findings that were derived from the focus group interview using the same procedures employed in analysing the blog data.

EXCERPT 3

Examples of feedback that can help effective learning

It is interesting. Your suggestion to do the simulation (the force of tug-of war) interesting too. I can use the idea to teach my students.

Congratulations! You succeeded to teach your students very well.

<div align="right">

Teacher 4

</div>

it was an interesting lesson to have students involved in a hands on experience! and of course with the assistance of the technology, it can help us to explain complex things to students even clearer. I bet that your students find this experiment to be the most enjoyful class and hopefully it will help them remember well too :)

<div align="right">

Moderator's comments to Teacher 5

</div>

T2's methods of teaching benefits the weak students but we can also let the students come up with their own mind mapping at the end of the lesson and let them show and explain it to the class.My students came up with interesting power point presentation and every group was eager to present their powerpoint.

<div align="right">

Teacher 1

</div>

RESULTS FROM THE INTERVIEW DATA

Principles of Teaching and Learning

There was only limited evidence of teachers sharing ideas they have used to enhance their teaching and learning in the interview data. However, there is a striking example on the use of creativity in teaching and learning. Teacher 5 brought up the example of using a certain Biology book that could help weak students in Biology. She went on to explain:

> *There's one Biology book which is a comic book…has topics on digestion etc. That will interest them. So may be ask them to create comic story. …*
>
> <div align="right">*Teacher 5*</div>

Another teacher, Teacher 4, further brought up the example of a website using a comic story to teach DNA.

> *There's a website that introduces heavy topics like genetics, DNA in a very simple way. With animation etc. they make the genetics topic lighter. May be you can view the website. It is an example of the comic story. It's online and the students enjoy it very much. They can see the DNA…the link between your DNA, your parents, your ancestors and show you how DNA works, what is gene etc.*
>
> <div align="right">*Teacher 4*</div>

EXCERPT 4

Examples of how teachers try to promote collaborative learning among their students

> *… Based on self-access and project-base-learning approaches, I always ask the students to get into small groups and each group is responsible to complete a special task, one group entitle to one organelle. Teacher introduces, give the main aspects and the basic concept of organelle only. Then, give clear instruction/ guidelines and provide standard template for everybody. Enough time is given to prepare the hand-out and power point presentation. ..... all students have the diagrams/ characteristics/functions of all that 14 organelles. Again, indirectly, I inculcate the interest and encourage scientific communication in the class. Of course, there is a room for improvement; I start with giving 'organelles quizzes' before move to the next subtopic.*
>
> *Teacher 4*
>
> *Plan well before hand and help the students in forming the group - harmony in terms of gender, racial and academic achievements. In a nut shell, the best always comes from you*
> *Teacher 2*
>
> *The lesson went quite well I guess because the students enjoyed the lesson, happy and loosen up because they were given chance to do outdoor study.*
>
> *Teacher 4*

Thus, it is clear that there is sharing of ideas among these teachers and the sharing does cover all the teaching and learning principles described. The challenges faced by teachers in using blogs as a tool for their professional development will be explained in the subsequent section.

Problems Faced by the Teachers and Their Suggestions for Improvement

Out of the nine teachers from five Smart schools who participated in this study, four admitted they were new to blogging. Although all of them contributed their postings to the blogs, a number of them also expressed their dissatisfaction with the approach suggested for blog sharing. They

felt the demands to post video clips of their perceived best and worst lessons, and to comment on the peers' posting were too cumbersome and unhelpful. They suggested that the approach to share teaching practices should be conducted in a less threatening environment, such as face-to-face discussions or sharing in designated places.

Some suggestions were put forth on improving the blogs to make them more accessible and less threatening. They suggested alternative online tools, such as chats forum to discuss and share practices, including agreeing on a proposed free day and time to chat. Teacher 6 did not like the idea of commenting on the blogs of other teachers as she felt that she was not qualified

EXCERPT 5

Examples of how teachers try to make their lessons creative

> *Physiological processes (e.g. : electrochemical events in nervous system) and Biochemical processes (e.g. : photosynthesis) are long processes with many steps, it takes place in the cells, many enzymes and chemicals/ions involved.*
>
> *A long process should be break into shorter processes, to make it looks easier. students awake and enjoy much, if teacher elaborates step by step on the board, using the best simplified diagrams or mind map, pause many times asking questions (base on my personal experience).*
>
> *Then only show the animation using biology interactive coursewares, before giving them worksheets. Teacher must answer the essay question together with them, practice the systematic way of answering and emphasies on the usage of keywords in answers.*
>
> *Teacher 4*
>
> *I decided to exchange role where students got into groups of four and presented me with powerpoint while l sat at the back and listened. They came out with colourful, well prepared powerpoint presentation and took pride in explaining their presentation. In fact one of the students brought a digital camera to video taped their presentation. There were so much fun as the students were free to question the group that did the presentation. After the presentation i replayed the video for students to see them in action. I believe that at times we must break monotony and let the students show their talent*
> *Teaching chemistry to rural students back in the nineties was a real challenge to me because most students were not interested to come to school. It was a chore and chemistry seemed alien to them. So what i did then was to focus on being friendly and most of the time end up telling them stories instead of chemistry*
>
> *Teacher 1*

EXCERPT 6

Examples of teaching beyond the classroom

> *I taught on the topic of 'Balance of Nature' on that time. The aims were to identify the organisms in a food web and the role of food webs in maintaining the balance of nature.*
>
> *First, I brought the students to the school gardens to look for various organisms such as insects, plants or other living things. They had to list down all the living things that can be found … . …in the class, they built food webs based on the data that was collected. After that, we had a discussion on how the food webs play the role in maintaining the balance of nature.*
>
> *Teacher 9*

to do so since she majored in a different discipline from many of them and taught only lower forms. Teacher 4 had a similar opinion. She also felt that it would come across as 'showing off'.

> *My problem is I can't comment on other people's work because they major different subjects. They teach Chemistry, Biology. For me, I'm teaching the lower forms and the science for lower forms is very basic and so I don't need to go into details. Very big difference.*
>
> *Teacher 4*

> *That's one of the reasons. We're worried that we are a bit show off, like as if we are so good, but we are not.*
>
> *Teacher 6*

Other teachers were reluctant to comment as they did not want to offend their team members. In addition, they were not comfortable to respond in the blogs as they were afraid of being criticised in return. As Teacher 4 added:

> *... and at the same time we are not comfortable with other people criticizing us, they may say funny things.*
>
> *Teacher 4*

This led to teachers being very cautious and hesitant in putting too much on the blogs. The teachers were also not able to perceive the blog as a platform that could help them to improve their teaching practice and to solve the problems they faced in the classrooms. This is indicated in the following excerpt:

> *May be the tasks given to us, the approach must be made more friendly. .... Everybody wants to say something, comment on each other.*
>
> *Teacher 4*

The teachers also faced problems in getting access to computers to perform the blogging activities in their schools as they had to share computers with other teachers. As Teacher 4 lamented:

> *....Like for me, I'm teaching Form 6 and am away from the main block. We have our own building without any facilities, computers. So for any facilities we have to come to the main block. By the time we come to the main building either a teacher is using the materials or the computers or the computers have broken down. Always break down. That's the problem.*
>
> *Teacher 4*

Teachers also complained that computers were not functioning most of the time. This can be a great hindrance to them as it can kill enthusiasm. However, time seemed to be the biggest obstacle for these teachers. The teachers claimed that in view of the fact that they had to spend a lot of time preparing lessons, they did not

have time to participate more actively in the blogs. For this, Teacher 7 said:

I also have problem with time as a lot of time I spend to prepare my lessons. Because I concentrate on my teaching because this is the first time I'm teaching Form 5 Biology. There's a lot of pressure on me. I've got to prepare the teaching materials. So sometimes I'll do until midnight. So it is hard to find the time to do blogging.

Teacher 7

Teacher 9 further complained about having to attend meetings and carry out administrative work. Hence, she claimed she did not have the time to participate in the blogs.

FINDINGS AND DISCUSSION

The exploration of blogs, as a resource in enhancing teaching and learning, fulfilled several goals set out in the current research study. At one level, the experience was designed to increase awareness in the Science teachers about the power of blogging. At another level, one goal was to help teachers develop a sense of themselves as creators of knowledge, rather than just consumers of information, and to see themselves as meaningful contributors to professional development. At yet another level, their participation in the online community (blog) suggested the idea that peer sharing among teachers could be seen as a valuable source for professional development, a connection that would ideally be continued long after the completion of this study.

In exploring whether blogging actually leads to sharing of good teaching and learning practices, it can thus be concluded that blogging does to a large extent lead to the sharing of teaching and learning practices. The sharing of practices, as evinced in the findings discussed, shows that blogging can be used as a platform to discuss and share practices among teachers from different schools, which otherwise would not be possible due to geographical differences. With the use of blogs created for subject experts that offer an abundance of advice and information to teachers (Clyde, 2005), teachers have more access to information and resources within their grasp, and the geographical factor of collaborating with other teachers can be eliminated with an online community of educators. Through blogs, teachers can communicate and support one another as they continue to learn and develop in their respective schools. This study has also indicated that the blog studied here demonstrate a community of practice, albeit at an infancy stage, in that it was used by the participants as a discussion space. It was a forum that required teachers to share their perceived best and worst practices by discussing beliefs, learning from each other, and demonstrating to each other how they would act in their actual classrooms. The blog is a place for these teachers to voice their doubts, struggles, discomforts, and successful and unhappy teaching and learning experiences because the participants share very similar

experiences of being Science teachers. Dewey (1933) claims that if we want to make our experience educative, it is essential to support ongoing growth in a process of continuing new inquiry. Getting together in a group armed with the same concerns for Science teaching and learning enabled these teachers to identify persistently problematic questions, work together to think through the questions, and push their thinking further as a group.

As reported earlier (Lee, 2009), one of the major challenges confronting Smart School teachers is the lack of opportunities for teachers' professional development. Blogging in this study provides an avenue for reflective learning, thereby supporting the findings of Chen *et al*. (2005), and Ferdig and Trammel (*in* Williams & Jacobs, 2004), as discussed earlier. Blog postings made it possible for the teachers to reflect on the practices and ponder their potential utilisation in Science teaching and learning contexts. It also has the potential in breaking down the "firewall around the classroom" and opening lines of communication between teachers, researchers, and teacher educators (Carraher, 2003). Posner (1993) adds to the discussion, stating that reflection allows teachers "to act in deliberate and intentional ways, to devise new ways of teaching rather than being a slave to tradition, and to interpret new experiences from a fresh perspective" (p. 21). Therefore, the advantage of purposeful reflection is that it enables practitioners to be proactive rather than reactive when organising learning environments.

In examining the opportunities afforded and the challenges faced in using blogs for teacher professional development, the focus group interview data revealed that the teachers faced a number of challenges, ranging from difficulty in accessing computers to the lack of time for active engagement. One of the most revealing findings concerns the teachers' reluctance to accept an audienceship for their written diaries, along the line of Oravec's (2003) concept of a 'community diary', where a group of learners establish and maintain thoughts and share their insights. One possibility for such reticence might be attributed to the public nature of blogs, where teachers may feel threatened. However, they may have been anxious for many reasons and further research will need to be conducted to find out what those reasons might be.

Thus, in overall terms, the findings seem to indicate that blogging has succeeded to a certain extent to encourage collaborative efforts among teachers to share their best practices; however, further probing via focus group interviews revealed that the teachers exhibited concerns relating to their awareness, readiness and competency in embracing the changes expected of them. Thus, as researchers and moderators, we have important roles to play to further support their learning experiences in terms of initiating and encouraging further teachers' participation. Since blogging is a new experience for many of the teachers, further scaffolding will need to be provided. With more experiences of this nature, we

are confident that teachers will contribute more and look at blogs as a non-threatening environment for enriching their practices.

CONCLUSION

This study has shown that blogs can to a certain extent be used as an extra tool for Science teachers to engage in computer-supported communication that resulted in better teaching and learning. Most teachers who experienced teaching as an isolated job, and one where they bear a heavy burden of responsibility behind the closed doors of the classroom (Hawkes & Romiszowski, 2001) should find blogs useful to break down the firewall around the classroom, open lines of communication, and help them to become reflective practitioners. While blogging appears to be helpful in encouraging and supporting teachers to be engaged in reflective practice with one another, caution has to be exercised as well on the basis of the partial evidence presented here, i.e. the public nature of blogs can be simultaneously a motivating and threatening resource for teachers, as most of whom are not accustomed to publishing their ideas for worldwide consumption via the Web. Finally, simply making blogs available in the context of this study is unlikely to be enough to motivate teachers to make full use of these resources. The degree to which mentors should participate in the online discussions, as a strategy to encourage teachers to join in and stay in the conversation, needs to be determined and clearly worked out. Moreover, since sharing of practices and reflection via blogs

does not happen magically, as with any knowledge, skill, or disposition, teachers must acquire, and reflective blogging must be promoted and supported. Our research team ought to think of purposeful steps to encourage teachers to develop the habit of engaging in this activity if it is ever to become generalised into the teachers' professional lives.

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APPENDIX A

Task 1 and Task 2 in the blog.

Dear everyone,

Thank you for participating in this Online Continuing Professional Development project. We appreciate your participation and commitment. We assure you that this blog is private; therefore, nobody from 'outside' the group will be allowed to view the entries in this site. So, please do not hesitate to share your views here. Now, please look at the questions below and answer them as best as you can.

Task 1:

1. Describe one of your lessons that went very well. For this lesson, explain what you were teaching, how you were teaching and how you knew it went well. In your description of your lesson consider the following:

a.   Where did your ideas for this lesson come from?

b.   How was this different from other lessons?

c.   What do you think made the lesson successful?

d.   Did you learn anything from the experience?

e.   If you want to improve this lesson how would you do it?

f.   Have you shared your experience with anyone else?

Task 2

All teachers experience challenges. Could you describe one that was very challenging. Where did your ideas for this lesson come from?

a.   Where did your ideas for this lesson come from?

b.   How was this different from other lessons?

c.   What do you think made the lesson challenging?

d.   Did you learn anything from the experience?

e.   If you want to improve this lesson how would you do it?

f.   Have you shared your experience with anyone else?

Now read the other entries posted by your online community and discuss them. You might consider what you have learnt from reading each others' entries.

Posted by eCPDelt: Model 2020 at 3:46 PM

APPENDIX B

Questions for the interview

1. How do you find the blogging activities?

2. What about the blogging activities that you like?

3. What about the blogging activities that you don't like?

4. What are some of the problems you faced (if any)?

5. How do you think things can be improved?

6. How do you feel about the role of the mentors in this?

7. What do you want more?

8. What do you want less?

9. How do you feel about your involvement so far?