

USING WEBLOGS AS A TOOL FOR REFLECTIVE LEARNING

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ABSTRACT

This study explores the phenomenon of reflective learning through weblogging among pre-service teachers enrolled in an undergraduate technology course. Teacher trainees used weblogs to record their experiences in learning to use technology in teaching and learning. Although weblogging has emerged as a new form of mainstream communication among younger 'digital citizens' (Premsky, 2001), it has yet to be widely studied in the teacher training program in Malaysia, as a tool for reflective learning. This study seeks to find out the practicability of introducing weblogging in an instructional setting by examining the focus and level of reflection weblogging is able to facilitate. The findings from the content analysis of individual weblogs and focus group interviews show that the sample of six pre-service teachers were generally at ease and optimistic about using weblogging to reflect on a range of content. However, some weblogs were more reflective than others and seven factors were found to influence the level of reflection in the weblogs. This paper reveals that assessment in weblogging for reflective learning is contentious and may be a culture-specific issue. It is suggested that weblogging is generally a viable tool to facilitate reflective learning; not only about course content but also professional values, attitudes and learning strategies. The condition is that instructional design elements must be observed.

Keywords: Weblogging, Teacher Training, Instructional Technology, Instructional Design.

INTRODUCTION

Malaysia's education faces a grave problem at the brink of a new century. A government survey conducted by the country's Economic Planning Unit (EPU) reveals that nearly 60,000 graduates are unemployed due to lack of experience and communication skills among the graduates (MalaysiaToday, 2005). Graduates should respond to employers' needs for workers, who not only have knowledge but who possess soft skills as well. Soft skills include the ability to communicate effectively and to analyse and solve problems efficiently. Corder et al. (1999:103) observes that employers seek graduates who are "adaptive, adaptable and transformative". Adaptive graduates are able to fit into the workplace. Adaptable graduates initiate new ideas and persuade others to accept and develop their own ideas while the transformative graduate innovates, inspires, anticipate and lead changes. This appears to be a tall order for new graduates. Yet, the idea to be conveyed is that graduates well-equipped with reflective skills would get a better chance in fulfilling the set criteria.

The skill of reflective learning is vital in the context of the

teaching profession as teachers need to keep up with the plethora of information so easily accessible through the internet, books and mobile technology. Future teaching is envisaged to be cross-curricular and not subject-based with more emphasis on hands-on skills such as thinking and problem solving skills instead of content knowledge per se. Beyond that, pedagogic skills including the need to use a repertoire of teaching strategies could never be more critical in these days as students come in a wide range of abilities and temperament. Thus, teachers must learn how to think on their feet because many of the teaching situations encountered are not only trying but unique in each case. There is no single book that is able to provide a solution to every teaching problem. Bearing these in mind, the ability to practice reflectivity, as illustrated by Schön (1983) is a vital and indispensable skill that has to be inculcated.

The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understandings which have been implicit in his behaviour. He carries out an

experiment which serves to generate both a new understanding of the phenomenon and a change in the situation. (P.68)

Weblogging and learning

The term 'weblog' was first used in 1997 and is functionally defined as frequently modified web pages in which dated entries are listed in reverse chronological sequence (Herring et al., 2004). Original weblogs were link-driven sites with a mixture of links, commentary, personal thoughts and essays. Later the definition expanded to encompass personal diaries, work-related progress reports and even summaries of current events on newspaper websites.

During the early blogging days (in the late 1990's), bloggers had to hand code their sites unlike present days where free blogging tools and hosting services are available. Bloggers who choose to use free blog hosting services (eg. *blogger.com*, *blogspot.com*) do not need to worry about page formats or HTML syntax. Presently, weblogs have emerged as the new form of mainstream communication (Catalano, 2005; Rosenbloom, 2004). In fact, web logging is identified as among the top "10 tech trends to watch in 2005" by *Fortune* magazine (Vogelstein et al., 2005). *www.technorati.com*, a well-recognized site for its blog tracking and ranking service, also reported that weblog popularity has surged over the last few years, resulting in 6 million active blogs worldwide at the end of 2004. Every day, over 12,000 new weblogs are created and every second, an average of at least 4.6 weblogs is being updated.

Blogs in education, called edublogs, are also on the rise. The Educational Bloggers Network, sponsored by the Bay Area Writing Project and Weblogger.com, has a blogging community of some 120 educators (Downes, 2004). In this paper, the concern is on the potential of weblogs to be used for learning or instruction. Weblogs' instructional

functions can be placed on a continuum between standard web pages and asynchronous computer-mediated communication (adapted from Herring et al., 2004).

From existing studies, the weblog appears to have an edge over other web-based instructional possibilities (Martindale and Wiley, 2005) and most definitely conventional journals (Wagner, 2003). As Nardi et al. (2004) discover, the motivation for weblogging is in its ability to allow bloggers to 'think by writing', to express opinions to influence others, to seek opinions and feedback and to release emotional tension. Nardi et al.'s research (2004) based on 23 social blogs maintained by university students' accounts for the social dimension of weblogs, claims that 'blogs create the audience, but the audience also creates the blog'. Wagner (2003) asserts the benefits of weblogs over conventional learning logs are three-folds; to instructors, students and the learning system.

Richardson (2004) suggests that web logging has a unique dimension of thinking called "*metablognition*" likened to a digital zone of proximal development where different elements of learning are synthesized, questioned, altered or even rejected. Blogging, thus, has great potential in developing critical thinking skills, writing skills and information literacy, offering students a chance to synthesize disparate learning experiences reflect on their collective relationship and relevance. Additionally, blogs are said to be an excellent developmental tool for students and junior researchers, as bloggers need to write in a confident and unambiguous voice in order to formulate and stand by opinions reflected in the words of others (Mortensen and Walker, 2002).

Methodology

The weblogging experience was designed as an integrated activity throughout the 14-week semester for the 'Technology in Primary Education' course. Learners were introduced to the technology through hands-on demonstration and informed in advance regarding the expectations of submitting a weekly blog after each lecture. The weblogs were reviewed regularly and used as

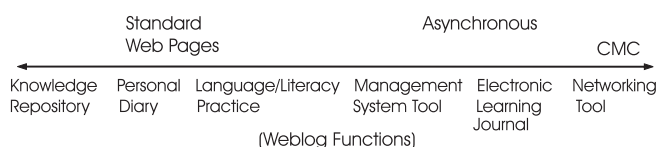


Figure 1. Weblog Functions (On a continuum between Standard Web Pages and CMC)

an assessment of their learning development. The lecturer does this by frequently providing feedback during lectures or in-between lectures (via the class online group or writing comments in individual weblogs). Feedback was to be constructive rather than judgemental in order to provide specific insights for further improvement and motivation to continue blogging quality insight. The lecturer adjusted instruction accordingly based on the results of regular assessment of the weblogs.

The participants of the study consisted of six pre-service teachers who were enrolled in the 'Technology for Primary Education' in a local higher institution of learning. Six pre-service teachers were selected from the accessible population of 73 pre-service teachers. As far as possible, the selected pre-service teachers were selected to represent the gender and race distribution of the population. They were handpicked for the specific purpose of being able to provide significant weblog content that are updated regularly, promptly and of acceptable quantity and quality; meaning that their weblogs are updated within three days after their weekly lectures and they write a substantial amount of comments that are typical of a reflective journal. This sampling strategy is employed to ensure that chosen weblog contents would provide meaningful and truthful data that are sufficient to answer the research questions set out in this study.

Content analysis of the six individual weblogs and focus group interview was conducted to answer two research questions.

- 1) What is the focus of reflection in the weblog?
- 2) What influences the level of reflection in the weblog?

For the first research question, coding categories were informed by initial theory and revised based on categories that *emerge* from the data during analysis. For the second research question, the researcher identified the level of reflections in the participants' weblog using a coding scheme developed and tested by Kember et al. (1999) based on the work of Mezirow (1991) who is an established proponent of reflective thinking (See Figure 2).

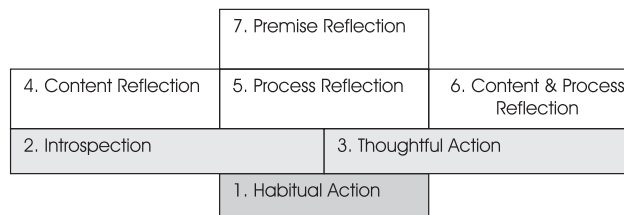


Figure 2. Reflective Learning Coding Categories (Kember et al., 1999)

This coding scheme was chosen as it is specifically designed for any professional development course which requires students to write reflective journals (Kember et al, 1999). The coding categories are thus able to determine the level of reflective learning in written journals and provide a means for determining whether the various teaching and learning strategies for encouraging reflective thinking are succeeding; which are crucial questions to be answered in this study.

In the coding scheme developed by Kember et al. (1999), the level of reflection increases from the bottom to the top of the diagram. Shaded lower levels indicate non-reflective action while upper unshaded levels indicate reflective action. Table 1 summarizes the description of each level of reflection.

Two rounds of focus group interview was later carried out to validate and supplement information provided in the weblogs and to find out participants' first-hand perceptions and impressions on their weblogging experience. It is also to gain their suggestions and

Level of Reflection		Description
Non Reflective	1. Habitual Action	Activity performed automatically with little conscious thought
	2. Introspection	Feelings or thoughts about self.
	3. Thoughtful Action	Action makes use of existing knowledge without attempt to appraise. Learning remains within pre-existing meaning schemes and perspectives.
Reflective	4. Content Reflection	Reflection on what we perceive, think, feel, or act upon
	5. Process Reflection	Examination of how one perform the functions of perceiving, thinking, feeling, or acting and an assessment of efficacy in performing them.
	6. Content and Process Reflection	Combination
	7. Premise reflection	Involves, becoming aware of why we perceive, think, feel or act as we do. Possibility of perspective transformation

Table 1. Level of Reflection (Kember et al, 1999)

recommendations for future use of the technology in similar settings.

Two rounds of interview were conducted with two groups of three pre-service teachers each time. The teachers were randomly allocated into the two groups according to their availability during the time and day of the interview and by their own choice. Two rounds of interview were conducted to check validity and reliability of data. The interviews were audio taped so that the researcher was free to carry on conversation with the interviewee without the interruption of writing, thinking and asking questions at the same time. The interview data was analysed from recorded conversations, transcribed with the help of 'Transana'. ('Transana' is a research tool for the transcription and qualitative analysis of audio and video data). Sections that corresponded and may be of use to the findings are highlighted and marked. The highlighted sections are read during one sitting to facilitate the identification of similar themes from the weblogs and to discover emerging trends and patterns. Highly repetitive themes are noted and an explanation would be attempted based on literature review and inductive reasoning.

Findings

Focus of reflection in the weblogs

The six participants focused on seven areas of reflection in their weblogs - documentary, commentary, catharsis, metacognition, information, evaluation and community. The findings demonstrate the capacity of weblogging in facilitating multi-faceted reflection as each participant focuses on different aspects.

Documentary: The findings reveal that documenting significant lecture experiences can be valuable for pre-service teachers as they are able to reflect on the pedagogy and methodology of the lecture experience. Participants reveal that blogging wholly on documentary focus and narrating in exact chronology is less reflective. Reflective bloggers include a perspective of themselves in the documentation of the week.

Commentary: The participants also focused on the discussion of a highlighted issue of the week where they

share their views and opinions. The findings reveal the transformational benefits of reflection through weblogging in settings where: class is large, students have low self-esteem, students are anxious public speakers, students are shy personalities. Due to extended time available, students who are more vocal in class also benefit as the 'eureka' spirit in them are activated during after-class weblogging reflections. There were many instances of rhetoric questioning and teacher-talk in the participants' reflection. This occurrence appears to be an adjustment to the audience factor in weblogging as they blogged in full awareness of public readership. Their viewpoints were illustrated, exemplified and rationalized as if they were teachers online. It was later discovered that the act of questioning helped to generate more answers (and questions) courtesy of their audience or from their own 'unearthing'.

Catharsis: The weblogs were not just cognitive vessels. Participants used the weblogs to reflect their emotions and feelings. Heartfelt sentiments, sincere feelings and pent-up emotions were released while reflecting on the weblogs. This was found to be a liberating experience for the participants as they are able to reflect with a sane and clear mind. In this respect, reflection through weblogging has an advantage over conventional journaling as it is able to provide bloggers with tangible emotional support from other readers. The empathy and appreciation from other readers can be traced from the comments posted and personal acknowledgement. Other than that, reflection through weblogging appears to be more exciting and invigorating than conventional journaling as it offers participants the opportunity to be creative as 'owners' of weblogs. The potential for weblogging in facilitating reflective learning is immense due to the novelty and relevance of the technology tool to the new generation of learners.

Metacognition: In this study, metacognition focus is recorded when participants think about their thinking thus questioning frames of mind. Metacognition is closely linked to critical reflection (Gore and Zeichner, 1991) and its presence in participants' weblogging experience is found to expedite the inquiry learning process.

Metacognitive reflection happens when bloggers verbalise their action plan or question overtly as they try to comprehend a concept. This process is likened to a trial and error experimentation of thinking, which helps to sustain the reflection cycle. Metacognitive reflection through weblogging is able to provide fresh solutions or new problems on a deepened level of inquiry as there is the added dimension of mental participation from audience and self. Electronically stored reflection in weblogs enable easy retrieval of previous reflections, facilitating continuous retrospection of past reflections. This paves the way towards self-improvement and a transformed personality.

Information: Information focus in the weblogs achieves two aims. Firstly to satisfy own curiosity and ignorance; secondly to share the new knowledge with other bloggers. The information-laden weblogs of the participants depicts the relative ease in getting information while reflecting online. The bloggers search for information from printed books and journals to supplement their reflection, but mainly from online references. As teaching involves practical skills, ease in getting extra information helps teacher trainers to link theory into practice. Scanning of a wide array of reading materials from the internet, books and many more are literacy skills of the era. Moreover, sharing and posting information in the weblogs require the skills of speedy, discerning and reflective reading. The advantage is that information can be shared with others through simple publication procedures via weblogging.

Evaluation: Evaluation in the weblogs consists of the appraisal on the lesson, the instructor, the course, the technology used, the peers and themselves. Evaluation was beneficial to the instructor in providing feedback for lectures to evaluate the instruction. It was also beneficial for the participants in two ways - in informing the status quo of their learning development and in providing the publicity to bring peers and lecturers to help them solve problems they encounter. Reflecting through weblogging affords the two-way communication between teachers and students as both parties seek to understand and be understood. The participants acknowledge that

reflection through weblogging enhances the learning collaboration between teacher and learner as communication can be achieved through both speech and writing. A phenomenon uncommon in typical Asian settings was observed in the weblogs where there was hardly negative feedback but plenty of appreciative comments and affirmative praises for the lecturer.

Community: The participants establish friendship, rapport and connect with the wider audience through their weblogs. The casual ambiance in weblogging creates a community of kinship where there is less conspicuous power hierarchy. The public readership in the weblogging community helps the participants to reflect in a more meaningful and authentic manner. It is interesting to note that the participants do not feel uncomfortable in revealing personal accounts of their life in relation to the formal sharing. When self-defensive barriers and channels of communication are opened up, reflective learning becomes a social constructivist experience. Participants' responses show that they appreciate being able to reflect within the social structures of weblogging as there is reflective scaffolding from the audience such as their peers, lecturer and tutors. The participants also revealed their enthusiasm for weblogging as they enjoy connecting with the community - through reading and writing weblogs.

Influences on the level of reflection in the weblogs

This research question was answered by first identifying the levels of reflection in the weblogs *qualitatively*. Analysis of data based on Kember et al.'s (1999) reflective learning coding categories reveals that the six participants vary in their capacity for reflective learning. This finding is consistent with other studies by Hatton and Smith (1995a), Bain et al. (1999) and Sparks-Langer et al. (1990).

Some participant blog non-reflectively when the weekly blogging requirement became a habitual action for them. Examples of non-reflective habitual action are documenting lecture events and posting information collected from books or online texts. There was also disparity in the way participants expressed feelings and thoughts about self. Non-reflective introspection in

weblogs were recognized through the superficial explanation of what the bloggers experience; while reflective introspection involved more profound deliberation of the *what*, *how* and *why* the participant perceives something.

Another type of non-reflective weblog content is identified when the participant makes use of knowledge wholesale without attempt to appraise the suitability and relevancy of the information. New information is not assimilated or accommodated into the bloggers' own schema. When there is no attempt to understand "what is blogged", the writing would not be considered reflection in Kember et al.'s (1999) terms. Consequently, what is thought to be reflective would not have any transformative effect on the blogger's professional development.

Certainly, there were reflective weblog contents which reflected Kember et al.'s (1999) four levels of reflection and as expected, there was very little reflection at the highest level of *premise reflection*. Subsequently, seven factors were found to influence the level of reflection in the weblogs: Perception of reflection, Attitude to weblogging, Peer support, Instruction and Instructor role, Audience, Time and Assessment.

Perception of reflection: Analysis of data reveals that the bloggers reflected at certain levels because they were convinced that their perception is reflective. They also blogged according to their preferred style, believing that is their strategy for deeper reflection. However, results show that a mistaken perception could affect the focus and level of reflection in the weblogs.

Attitude to weblogging: Negative attitude such as ignorance and laziness has substantial influence on the level of reflection in the weblogs. It was discovered that bloggers who had intrinsic motivation actively immerse themselves in reflection through weblogging which resulted in gratifying reflective learning.

Peer Support: In this study, bloggers consciously seek inspiration by reading their peers' weblogs. It was revealed that the multiple views from peers' weblogs cause participants to reflect further and deeper. At the same

time, the bloggers are benchmarking the standards of their weblogs with their peers'. This helps bloggers to reflect into the relevancy and positive elements in other weblogs. Other times, the participants check out their peers' weblogs for inspiration. It is learnt that the support from peers' weblogs makes the weblogging experience less solitary and less daunting.

Instruction and Instructor Role: All evidence show that the instruction and instructor made a positive impact on their weblogging experience. The instructors were able to facilitate deeper reflection through giving extrinsic motivation, providing guidance both online and face-to-face, creating a constructive learning environment for technology integration, having knowledgeable and supportive assistants and eliminating apprehension for technical use of weblogging.

Audience: There were mixed reactions regarding the influence of audience on the level of reflection in the weblogs. The positive comments include the opportunity to negotiate meaning and the option of understanding oneself and one's learning experiences from multiple perspectives when comments are posted on the weblogs. On the other hand, some participants were cautious of blogging offensive content in the weblogs which produced more guarded reflections. The realization was that deeper reflection often involves the exposure of vulnerable and personal thoughts in which case the public weblogging space needs to be made 'safe' for optimum reflective learning. Fisher (2003) suggests an environment that preserves the self-worth of the blogger.

Time: Generally, weblogging was found to afford additional time for deeper reflection. More time allocated for reflection could facilitate *deep learning* (Wiegel, 2002), which is deeper level of cognition. In addition, this study also provides evidence for hypothesis that extends the work of other researches. The observation leads to hypothesis that weblogging facilitates deeper reflection among personalities who have the behavioural tendency to be less spontaneous in response. Weblogging is also found to enhance reflection of all bloggers as they build understanding through authentic

two-way communication. The final hypothesis is that the online medium of weblogging extends reflection beyond the limitations of time and space during lectures.

Assessment: Assessment continues to be a contentious issue in weblogging to facilitate reflective learning. There was evidence that assessment increased bloggers' reflection effort to match the standards required by the lecturer. However, the main finding is that assessment primarily influences 'focus' and not 'level of reflection'. Some participants suppress certain reflection to avoid confrontational comments which, they think, would affect the lecturer's grades for them. This inclination was traced to cultural upbringing of a traditional Asian family and not so much the assessment per se. Other participants do not avoid the controversial discussion in their weblogs but they would also use agreeable language to avoid conflict.

Discussion

This study exposes what the pre-service teachers consider worthy of reflection and the various factors influencing the level of reflection in their weblogs. The findings confirm the theoretical benefits of technology integration in assisting the development of learning communities within a constructivist setting (Wilson and Marsh, 1995; White, 1996), in the engagement of technology as a cognitive partner (Anders and Brooks, 1994; Jonassen, 1995) and in the value of supporting tools to externalize thinking and ideas (Lee and Kim, 2002).

The evidences potentially point to the viability of weblogging in facilitating reflective learning, following the vast recognition of conventional journals. This finding does not contradict the established benefits of conventional journaling as a technique to promote reflective learning. Rather, it highlights the additional social paradigm afforded in weblogging. As attested by Lee and Kim (2002), social collaborative learning in an electronic learning environment provides a creative environment with rich learning resources which, in this case, enabled bloggers to extend their reflective learning experiences with multiple perspectives.

The findings further distinguish weblogging from other

forms of electronic journaling (as a reflective learning tool) as summarized in Table 2.

Although assessment was a contentious issue, it was culturally induced, and not omnipresent. Hesitation to express controversial issues is distinct among participants who were brought up to be non-confrontational and non-argumentative. They did not have the courage to voice against contentious issues as they feared being penalized by the lecturer. Individuals who were brought up to feel comfortable about questioning assumptions, beliefs, values, understandings would be less anxious about assessment. The institution can help by giving individuals more space and freedom to challenge organizational norms and practices (King and Kitchener, 1994). Instructors should develop a culture of non-punitive assessment. Assessment also has to be introduced discreetly using multiple strategies. Wiltse (2004) suggests formative assessment of weblogs such as using student assessments, using a rubric to standardize assessment and having the instructor participating in the weblog discussion so that assessing while writing becomes less intrusive.

The findings of this study have shown that even first-timers to weblogging are able to manipulate the technology tool to reflect on their learning. This is due to the relative ease of publishing using 'blogspot'. In reality, new bloggers have to handle both the new technology and reflective process. The minimized technical complexities in *blogspot* do not preclude the functional complexities of initiating weblogging. Therefore, in the induction of weblogging, instructors could take note of McGee's (2002) four pointers to train competent weblogging;

FEATURES OF WEBLOGS	FACILITATION OF REFLECTIVE LEARNING
Archival System	Enables easy retrieval of past weblogs by date-posted, via a web browser.
Instant Publishing	Free blog hosting services in www.blogspot.com . Bloggers require minimum technical skills to maintain a weblog.
Personalised Design	Allows free expression of creativity and ownership
Feedback and Comments	Enable open transmission of ideas and immediate feedback in the context of the learning task
Casual Writing Style	Helps bloggers express sentiment and receive emotional support

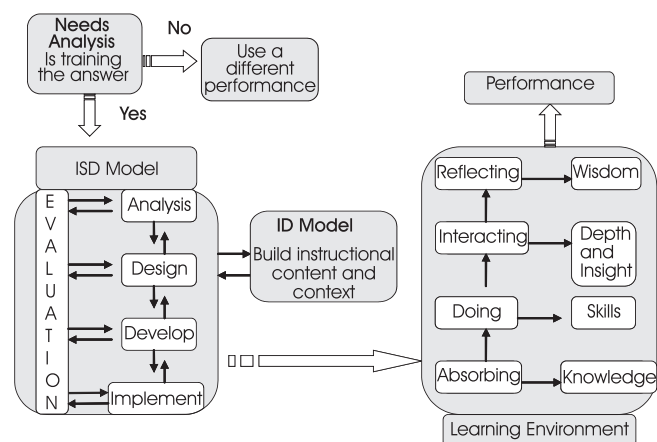
Table 2. Benefits of weblogging

which are learning the technology environment, developing an initial view of blogging, plugging into the conversation, and developing a voice. It would be helpful if implementers first orientate inexperienced bloggers to the process of reflective learning before introducing the new weblogging tool. In the case of reluctant bloggers, instructors could familiarize them to conventional journaling first. After the experience, it would be wise for the instructor to allow the student to *choose and justify* which medium of reflection they prefer. If they are still not convinced to reflect through weblogging, the instructor can coax but should not force them to blog. This is in acknowledgement with that compulsory tasks, if not out of interest, would yield shallow reflection and learning experiences (Lee, Dineen and McKendree, 1997). Furthermore, it is not the intention of this study to preclude other reflective strategies for the use of exclusive pedagogic weblogging.

The findings of the second research question highlight a crucial belief; that the weblog is merely a reflective device and cannot be independent of the learning contexts. Thus, cultivating deeper levels of reflection requires highly specialised instructional design and instructional environment. According to Clark and Mayer (2003), instructional design in an electronic learning environment requires a balance of three techniques: Receptive, directive and guided discovery technique.

In guided discovery, the instructor is the role expert who leads students towards reflective learning. One of the ways is to model reflective behaviour which would draw attention to the reflective process (Brockbank and McGill, 1998). Weblogging activities may also require a token of receptive instructional techniques so that novice bloggers would not get disoriented by the multiple tools and functions in weblogging. Clark and Mayer (2003) suggest the monitoring of students' blogging closely, limiting experimentation to focus bloggers on information acquisition. Finally, directive technique is requisite to ensure frequent feedback loop in weblogging where bloggers are encouraged to blog frequently to keep track of their learning curve while comments from instructors (and peers) are interacted to facilitate reflectivity.

Other practical implications when introducing weblogging is to include strategies such as providing guidelines regarding content and format, suggesting a theme, giving a clear explanation of the purpose. All these strategies should be adaptable to the instructional situation. For a systematic instructional design framework, practitioners are recommended to apply the ADDIE Model of instructional systems design (ISD). Figure 3 illustrates the role of the ADDIE ISD Model in a cognitive learning environment requisite to reflective learning. (ADDIE is the acronym for the Analysis, Design, Develop, Implement and Evaluation phases). Using the model, instructors can initiate weblogging by planning and implementing an optimum instructional environment that supports reflective learning. As evaluation is to be embedded in each of the five phases, this would translate into the need for instructors to provide the student with feedback and encouragement throughout the process (formative evaluation), which according to Croxton and Berger (2001) could facilitate additional reflection. While the formative evaluation focuses on the processes or activities, summative evaluation should also be performed at the end to evaluate the perceived outcomes. Assessment of weblogs could be one of the ways to obtain summative feedback. However, instructors may want to consider the implications of assessment in weblogging for reflective learning.



Source: <http://www.nwlink.com/~donclark/hrd/ahold/isd.html>

Figure 3. Reflective Learning in the framework of ADDIE Instructional Model

It is suggested that weblogging be introduced in a blended learning environment, especially at the debut stage. Fully web-based blogging could be intimidating for novice pre-service teachers while weblogging in a blended instructional setting provides the reflection of scaffolding. Additionally, privacy issues need to be addressed to facilitate optimum reflective learning in free and open reflection. The instructor and bloggers could negotiate whether to publish openly or limit viewing among the learning community. For practitioners, this implies that instruction has to be suitably flexible. For example, instructors should not dictate the weblogging norm too rigidly; expecting students to blog at one end or another of the continuum or necessitating the use of certain categories of reflection focus. Essentially, this could result in reluctant bloggers blogging obligatory weblogs. If this be the case, the objective of facilitating reflective learning would not materialize. The bottom rule for the instructor is to enable rather than disable. Flexible instructional design, thus, has a special role to play in facilitating the level of reflective learning among the pre-service teachers, so that they do not steer off-course from the stipulated learning outcomes; yet at the same time able to personalise reflection according to their own disposition.

To unleash the full potential of weblogging in producing employable graduate teachers, weblogging has to be introduced as a situated practice across the teacher training education and if possible practiced willingly out of formal instruction. This is because reflective learning is an integral part of a teachers' professional development (Brookfield, 1995; Hatton & Smith, 1995; Adler, 1991; Calderhead, 1989) and should be introduced as routine continuous learning. In our opinion, isolated pedagogic weblogging for specific assignment tasks or for single semester units may be less impactful than introducing weblogging as a flexible, open-ended and cumulative activity. Blogging for semester units would most probably culminate in the 'abandoned weblogs' phenomenon observed in many weblogging situations, including the one in this study.

Recommendation for Further Research

Due to the limitations and delimitations in conducting this study and also the discovery of a wealth of issues during the research process, more research would be welcomed to gather better understanding of this topic from multiple perspectives.

A long-term study beyond the duration of the course would be valuable to examine the impact of weblogging towards the end of professional practice. Longitudinal application would be able to offer greater confidence in the path of this causality and whether it is subject to significant dynamic effects or not.

Future research on this topic could expand beyond the circle of pre-service teachers to include in service teachers or even teacher educators. This move is towards a wholistic aim of improving education in Malaysia by training reflective practitioners at every level. Furthermore, reflectivity among practitioners is linked to professional competence (Schön 1983; Mueller and Skamp, 2003). Therefore, weblogging as a tool to develop reflective practitioners should be experimented as a career-long pursuit.

This study involves participants in a 'Technology for Primary Education' course. As such, the participants were required to blog to fulfill the course objectives. It would be interesting to discover bloggers' motivation if they were required to blog in a subject class where technology is not the field of study. For instance, weblogging could be introduced among English language trainee teachers and research conducted to find out how weblogging helps language skills (eg: writing). Reflective learning using alternative weblog tools such '*Blogger*', '*Friendsters*', '*Live Journal*' or '*Diaryland*' could be explored.

For future studies, a quantitative approach could be attempted where larger samples are studied to provide empirical evidence for the usefulness of weblogging as a reflective learning medium. A quantitative approach would also yield results that are more generalizable in measuring the focus and level of reflection rather than just the trend in focus and level of reflection. A quantitative study in this topic would be valuable to the research circle

as at present, much discussion on weblog effectiveness is based on anecdotal evidence and qualitative data (Du and Wagner, 2005).

As established in the findings, there are a variety of factors that influences focus and level of reflection in the weblogs. Instruction for weblogging is a composite of many factors while learning effectiveness is a function of effective instruction (pedagogical practices). Therefore, the complexity of instructional design would certainly be a potentially rich area for future research. Joy and Garcia (2000) suggest research to research the combination of instructional strategies and delivery media to facilitate the desired learning outcome for intended audience. Hence, it would be good to inform the understanding and practice of functional weblogging pedagogy and methodology by advancing research in the area of instructional variables. Issues that could be examined include:

- In what ways should weblogging be assessed to help bloggers shift from superficial to deeper and more insightful levels of reflection?
- What learning strategies should be integrated into the course to support bloggers in online reflective environment?
- How does the posting of comments enhance reflective learning?

Conclusion

This study was conducted to explore the achievability of using a technology tool in weblogging to facilitate reflective learning among pre-service teachers in our local setting.

From the findings, it appears that the pre-service teachers were at ease with the weblogging tool and were able to reflect on a whole range of content at various levels of reflection. Their reflection was wholesome encompassing the evaluation of the past, the understanding of the present and the anticipation of the future. This initial weblogging experience was positive and durable for the pre-service teachers.

This study also established the fact that the development of a professional identity goes beyond technical

knowledge and skill alone. Introducing weblogging in the technology class enabled the pre-service teachers to reflect on abstract constructs such as professional values, attitudes, thinking skills, beliefs, learning strategies which are valued outcomes for a reflective practitioner (Ghaye and Ghaye, 1998). This again highlights the worth of weblogging for reflective learning.

Weblogging is a collaborative public tool that is both forward-looking and appealing to the new generation. Correspondingly, reflective learning through weblogging is viable in a social participative setting as it allows individualized, personalized reflection with the additional facet of accountability to a wider audience.

The researchers hope that this study will act as an impetus and confidence factor for teacher trainers in higher institutions to introduce weblogging in the training of reflective practitioners. Instructional designers, education leaders and educators should attempt weblogging and custom-make the design and implementation according to the needs and analysis of their setting. Despite of the limiting factors, reflective learning through weblogging development is well worth attention and further exploration, especially in this era where rapid innovations in computer-mediated learning are happening. However, the spotlight should not be on the weblogging tool but on the instructional design for weblogging. As Wiegel (2002) cautions, it is good teachers who open up new worlds for students, not technological tools.

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