

Teaching Year 1 Science in English: How It Can Be Done

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ABSTRACT

The teaching of mathematics and science in English began in January 2003 in Year 1, Form 1 and Lower Form 6. This study examines the teaching practices of a pre-service science teacher in a rural setting. Currently, the teacher is pursuing a KPLI (Rendah) course and will join the first group of graduate teachers to teach in primary schools in 2003. Research instruments comprised: (a) a video recording of a Year 1 Science lesson in English, (b) interviews with the pre-service teacher, her teaching partner and her college mentor, and (c) her journal reflections. Data analysis revealed her pedagogical strengths despite a command of English that can, at best, be described as average. These strengths included thoughtful seating arrangements for pupils; animation and music; mind-break exercises; repetition and reinforcement; motivation; the creation of a non-threatening atmosphere and attractive teaching aids. The study does not propose a recipe for teaching science in English and that teachers need to adapt to their teaching situations based on reflective practices.

Background

The 2003 school year started on a unique note for a large number of newly certified teachers, teachers already serving in schools, pupils in Year 1, Form 1 and Lower Form 6, their parents and other interested parties. This was because English was scheduled to replace Bahasa Melayu as the medium of instruction for Mathematics and Science, starting in the classes mentioned above. Many related questions emerged: Were the newly certified teachers adequately prepared to take up this challenge? Were practising school teachers well-equipped with the resources that the Ministry of Education had prepared? Were they ready to make optimum use of such resources? Pupils would experience far greater use of English in school than previously. What was the nature of their classroom experiences? Parents' involvement in their children's education would also be different, much depending on the parents' own command of the English language. Such was the scenario as we pictured it.

In the teachers' college where we both teach, our concerns focus on the preparation of pre-service teachers. In an earlier study, we looked at the situation of 115 non-graduate primary school pre-service Science teachers (Filmer and Choo, 2002). We shared their views regarding the change in language medium in the teaching of Science. This study, though still focusing on the teaching of Science in English, differs in two ways: First, our interest shifts to the situation of the *post-graduate* primary school pre-service teachers (*KPLI Rendah*). Second, in contrast to the first study which was based on a survey of 115 respondents, we decided on an in-depth study of one pre-service teacher named Su (all names of participants are pseudonyms) – a teacher who joined the teacher education programme several weeks late (with the "third intake"), who taught Year 1 Science during her practicum, and whose command of English, based on her SPM English language grade (C6), Su's own evaluation, and our observation, is average at best. Su, in fact, evaluated her command of English as "lemah" (weak). In other words, Su faced challenges in using English as the medium of instruction.

Our interest in carrying out this study resided in this question: Given Su's background, how would she go about teaching Year 1 Science in English? More specifically, we explored the following two research questions: *First, what was the nature of Su's response when she was given a Year 1 Science class in a rural school during Phase 2 of her practicum? Second, under such challenging circumstances,*



what coping strategies did Su, a teacher without a strong command of English, use in her classroom practice?

Review of Related Literature

In this section we review four areas of literature pertinent to our research questions. First, since our study sought insights into teaching from a classroom observation and interviews with relevant parties, we reviewed literature pertaining to the history of conducting educational research through observation of classroom processes and interviews. Second, our study drew heavily on our major respondent's reflections about her teaching. Through these reflections, we obtained insights into the thinking that went along with her classroom decisions and actions. Our second area of literature, thus, relates to the place of reflective practice in teachers' lives. Next, our study looked into a pre-service teacher's response when faced with a predicament. How did she respond to change? With this question in view, the third area of our literature review deals with change management. Finally, we were interested in studying the pre-service teacher's coping strategies in teaching Year 1 Science in English in a rural school. Our review, thus, included the challenges that beginning teachers face, their adaptive strategies and the question of collegial support.

Learning through Observations and Interviews

Learning about teaching through classroom observations and interviews has a long history. According to Good, Biddle and Goodson (1997), before 1960, most educational research excluded direct examination of the instructional process. Notions about teaching were primarily derived from theory. In contrast, modern research into educational matters includes direct observation of classroom processes and detailed interviews with relevant parties. These data sources (observations and interviews) have generated greater awareness of the complexities of classroom life. Contextualized knowledge has also become more important. Our study which includes both observational and interview data falls within this tradition of educational research.

Reflective Practice

There is much support for reflective practice in professional life. Certain types of reflection such as reflection-in-action and reflection-on-action have been differentiated (Schon, 1987). The first, reflection-in-action, happens when something

unexpected or surprising happens. Often, the reflection gives rise to the trying out of new actions. Reflection-on-action, however, focuses on thinking back on what we have done. While other writers might categorise reflection differently, there is common agreement that reflective practice helps practitioners to develop a greater level of self-awareness about the nature and impact of their performance, an awareness that creates opportunities for professional growth (Osterman & Kottkamp, 1994). Thus, implementing a reflective process approach to teaching is recommended as it allows one to stand back and gain a new, deeper perspective about what one is doing in the classroom (Goethals & Howard, 2000).

Change Management

It is often said that the only constant in life is change. Change is central to our study. More specifically, the change in the medium of instruction for Mathematics and Science is a major change facing pre-service teachers. When pre-service teachers embark on their practical training, they tend to have certain expectations. However, in certain cases such as having to teach a Year 1 Science class in a rural setting during the practicum, the reality departs from one's expectations. In the literature on change management in education in the last decade, some educators question the wisdom of preparing teachers with clear expectations of what will happen in classrooms. Prescriptive measures are also treated with some skepticism since contexts are never identical. Thus, Floden and Buchmann (1993) recommend a change: "Preparing teachers for *uncertainty*." This recommendation is preceded by a description of different uncertainties in teaching and learning to cope with them.

Coping Strategies

The topic of coping strategies is also central to our study. When pre-service teachers are engaged in practical training, many tasks and challenges greet them in the classroom. They need to develop certain strengths or coping strategies. Our literature review indicates that in the case of novice teachers, classroom management is usually of immediate and great concern (Veenman, 1984; Featherstone, 1992). There tends to be an exclusive focus on managing student behaviour at the expense of instruction geared towards achieving curricular goals. In other words, by focusing narrowly on classroom management, subject matter instruction tends to be marginalized.

This brings us to the question of collegial support for novice teachers. In some contexts, there is the feeling of isolation as beginning teachers learn to handle their classroom challenges (Krasnow, 1993). In contrast, there are contexts where support is available to beginning teachers, where teachers closely collaborate in a variety of matters related to classroom instruction. This is especially so in the case of certain schools in China (Paine & Ma, 1993). Such collegial contexts highlight the role of mentors in the lives of beginning teachers.

Methodology

This section starts with an account of how we selected Su as the major participant of this study in September 2003. Next, we briefly describe the context of the study. Following this, we present an overview of the data collection and data analysis procedures.

Selection of the Major Participant

Initially we sought information from college mentors from the Science Department regarding mentees who might be teaching Year 1 Science in English. None had any such mentee. This was not surprising since pre-service teachers are seldom given Year 1, a class with special challenges since the pupils are experiencing their first school year. We then sought a candidate among non-Science lecturers who were mentoring Science pre-service teachers. We were pleasantly surprised when we learned that Julia, a lecturer with 16 years' experience in teacher education, had two such mentees. Su was chosen as the primary participant. Based on the information we received about her from Julia, Su had ordinary anxieties such as lack of mastery in using English – but she was also perceived as a "natural" teacher with the ability to reflect and articulate reasons for her actions. Our hunch was that an in-depth account of her classroom practice would provide valuable lessons for others, teacher educators and pre-service teachers alike. Amy, Su's teaching partner, would also have made an interesting study if time had permitted. Our readers will hear both voices in this study.

Context

Su and Amy taught in a rural school in mainland Penang during Phase 2 of their practicum. According to them, the Year 1 pupils did not speak or understand much English unlike their Phase 1 practicum pupils from an urban school on the island. The second researcher spoke briefly with the first Senior Assistant of the rural

school. Her impression was that the Senior Assistant was very supportive and took a keen interest in the pre-service teachers' practical training and progress.

Data Collection and Data Analysis Procedures

We collected data in the following ways: (a) qualitative field notes taken during a classroom observation of a Year 1 Science lesson taught by Su; (b) an analysis of the video-tape recording of Su's Science lesson; (c) interviews with Su, the major participant; Amy, her teaching partner, and Julia, their college mentor, and (d) Su's written reflections in her journal and record book.

Our data analysis drew on interpretive methods within the qualitative research tradition. The field notes taken during the classroom observation combined with the analysis of the video-tape recording helped the researchers to ascertain Su's coping strategies or pedagogical strengths as well as her limitations.

Immediately after the classroom observation, Su was interviewed. The interview focused on certain actions taken by Su during her lesson and the thinking that went along with these actions. This post-teaching interview also produced many insights into Su's pedagogical practice and reflective abilities.

A joint interview with both Su and Amy took place a few days after the classroom observation. The joint interview produced an opportunity for further clarification of information given by Su during the first (i.e., post-teaching) interview. We were also presented with an opportunity to compare and contrast the professional experiences of the two pre-service teachers.

A structured interview with the college mentor took place a few days after the observation of Su's lesson. This complemented the informal conversations that the second researcher had with her previously, prior to the observation. The structured interview served different purposes. First, it provided an opportunity to cross-check information given by Su as related to the role that Julia played as her college mentor. Second, the interview provided the means to compare the college mentor's perceptions about Su's teaching abilities with our own. This was important as Julia had a better knowledge of Su's capabilities and thinking than we had. While she had been with Su for a whole semester, we became acquainted with Su only towards the

end of the practicum. The interview with Julia helped us to clarify as well as confirm our perceptions of Su as a classroom teacher.

Insights emerging from the classroom observation, reviews of the video tape, interviews and written reflections collectively resulted in the following findings.

Findings

Earlier, we shared two specific research questions. We discuss the findings accordingly.

Teaching Year 1 Science in a Rural School: Su's Response

The first research question focused on Su's response when she was given a Year 1 Science class in a rural school during her Phase 2 practicum. Su seemed apprehensive at the beginning and this was made known both in the interviews with her as well as in her written reflection: "Pada mulanya saya agak keberatan untuk menerima tugas ini." (Journal entry, 29/9/2003). Amy, her teaching partner, felt the same as revealed during a joint interview with the two teaching partners. During *Phase 1* of the practicum, both Su and Amy taught Science in Year 1 as well. So why were they comparatively more apprehensive when asked to teach Year 1 Science in *Phase 2*? According to them, Phase 1 was completed in an urban school on Penang Island. They explained that the pupils in the urban school could already speak and understand English and so being given Year 1 Science did not result in the same level of apprehension. Further, Phase 1 was a much shorter period. On the other hand, the pupils in the rural school on the mainland (Phase 2 of the practicum) could hardly comprehend English and the duration was much longer than Phase 1. This explains the greater anxiety that they faced during Phase 2.

After much consideration, Su (and Amy) took up the challenge of teaching Year 1 Science. Based on information collected during the joint interview with Su and Amy as well Su's written reflections, we perceived that the college mentor's positive attitude towards their situation had something to do with the pre-service teachers' decision. Su explains:

Namun apabila berita mengenai ini dikabarkan kepada pensyarah pembimbing saya, beliau begitu berminat untuk saya terus menerima tugas ini. Atas dorongan dan nasihat yang diberikan saya menerima walaupun pada dasarnya saya agak keberatan. Ini kerana saya tidak yakin dengan kebolehan saya untuk mengajar di tahun satu ditambah

dengan penguasaan bahasa Inggris yang lemah. (Journal entry, 29/9/2003)

During the interview with the college mentor, we learned that the mentor would have helped Su to obtain a change if there were indications that Su would not be able to manage the challenge well. The college mentor was confident that Su would be able to cope. Incidentally, the first Senior Assistant of the school had also explained that Su was asked to try teaching the class, but if she could not handle the challenge, a request for change would have been entertained.

Looking back, Su said that teaching Year 1 Science was a good decision. She used the word "enjoy" a couple of times when referring to her teaching experiences in the class. Although it had been difficult at the beginning when her lessons had to be scripted, all ended well. She attributed her success partly to her teaching partner who also taught Year 1 Science to the same class. According to Su and Amy, since they shared the same situation, they mutually supported each other, adding that they often planned their lessons together and had discussions with each other in English.

Su's Coping Strategies

In initial conversations, the college mentor had shared her views with the second researcher that she perceived Su as a "natural" teacher. She spoke about the latter's strengths as a teacher while being fully aware that the pre-service teacher made language errors in teaching. Although we did not doubt the college mentor's favourable evaluation of Su, we decided that a classroom observation as well as video-tape recording would help to authenticate Julia's view as well as provide specific information as to the way Su taught. Su consented graciously to being videotaped, interviewed, and having her story shared with others. Indeed her co-operation was instrumental in helping us to provide a grounded answer to our second research question: *Under such challenging circumstances, what coping strategies did Su, a teacher without a strong command of English, use in her classroom practice?*

The classroom observation revealed that Su made several grammatical errors in her teaching – and made them "confidently". The same grammatical errors were often repeated. But this was a Science lesson, a lesson on the topic of animals and the variety of sounds made by them. Bearing in mind that this was a Science lesson and not an English language lesson, we put aside the language errors as they did not

impede understanding, and focused on other pedagogical elements in Su's lesson. However, we will return to the language issue in the "Discussion and Recommendations" section of our paper.

Based on several reviews of the video-tape and discussions about it, we were in agreement with the college mentor: Su performed well in several important aspects of classroom practice. Her skills in these areas helped her to cope and effectively made up for her lack of mastery of English. The following stood out as her pedagogical strengths which simultaneously served as her coping strategies:

Classroom management. Su managed her Year 1 class like an experienced teacher. The college mentor elaborated that she had noticed this ability in Su early in the practicum. At the beginning of the lesson, Su instructed all the pupils to sit on mats in front of the class. She then presented her lesson and subsequently gave her pupils opportunities for oral practice in groups as well as individually. It was only when she had finished teaching them and after she had given clear instructions on how to complete the worksheets that the pupils returned to their original seats and desks. These seating arrangements comprised an important part of her classroom management strategy.

When interviewed about her classroom management after the lesson, Su explained that classroom management was a concern at the beginning of her practicum. In other words, it did not come naturally to her. She worked at it. She took the initiative of seeking advice from her school mentor (the co-operating teacher) in order to learn how to cope. Su shed further light on her classroom management by referring to some activities which, to the inexperienced eye, might seem somewhat unrelated to her instructional objectives. For instance, she had them perform certain exercises like moving their hands and arms in the middle of her lesson on animal sounds. The exercises, Su explained during the post-teaching interview, were carried out because young children cannot sustain being attentive for long periods of time. Thus, physical exercises prevented monotony and paved the way for continued interest in her lesson. Su elaborates in writing:

. . . saya perlu menyediakan aktiviti sampingan sekiranya saya dapati murid menunjukkan reaksi yang mereka mula bosan. Reaksi ini dapat dikesan apabila mereka mula mengganggu rakan-rakan, mengantuk, tidak lagi menumpukan perhatian dan mula bercakap-cakap. Untuk memecahkan rutin mereka itu saya akan menyuruh mereka

mengangkat tangan kanan, kiri dan kedua-dua tangan dan goyang.
(Journal entry, 29/9/2003)

According to the college mentor, Su used similar "mind breaks" during other lessons that she had observed. She also had the ability to make routines seem like fun, thereby re-engaging the pupils effectively in her lessons.

The power of teaching aids. Teacher educators often remind pre-service teachers that teaching aids are important in classroom teaching for a variety of reasons. Su practised what teacher educators preach. There was variety in her large, attractive and colourful pictures. Her pictures were clearly visible from the back of the class. The animal pictures indicated movement and specific details. Keeping the fun element alive in class, some teaching aids appeared in the form of animal masks. Su shares her thoughts:

Apa yang paling penting dalam mengajar murid di tahun satu ini ialah alat bantu mengajar yang menarik. Untuk itu setiap kali sesi pengajaran dijalankan saya akan pastikan ABM saya adalah yang baru dan berwarna warni. (Journal entry, 29/9/2003)

The college mentor was asked whether Su used such attractive and well-prepared teaching aids regularly. She confirmed that it was part and parcel of Su's teaching practice to use attractive teaching aids.

Communicating through actions. We illustrated above that Su communicated through large, attractive and colourful pictures. In addition to that, she communicated well in another non-verbal form: Through gestures and actions. This stood out right at the beginning of the lesson when Su moved in an animated and unabashed manner, moving her hand to her back to indicate the moving tail of one animal, or both hands above her ears to indicate the horns of another. Su explains in detail:

*. . . murid luar bandar adalah lemah penguasaan bahasa Inggerisnya.
. . . Untuk menjayakan objektif pengajaran saya . . . saya menggunakan gaya untuk menjelaskan maksud yang hendak disampaikan. . . . Untuk menjelaskan lagi binatang yang diperkenalkan saya menunjukkan reaksi tanduk di kepala bagi menjelaskan lembu mempunyai tanduk. Begitu juga dengan ekor lembu yang panjang. Bagi 'teeth' saya menunjukkan gigi dan meminta semua murid menunjukkan gigi untuk mengukuhkan lagi apa yang dimaksudkan dengan 'teeth'.* (Journal entry, 29/9/2003)

Multiple intelligences at work. In *Education Studies*, pre-service teachers learn about many topics including Howard Gardner's *multiple intelligences* and the

relevance of these intelligences in classroom teaching. In Su's classroom teaching, we saw the consideration of several of Gardner's intelligences. Su started the lesson with a song, appealing to the children's *musical* intelligence. She invited the pupils to sing along with her and this was repeated in the later part of her lesson as well. Besides music, there was *bodily-kinesthetic* movement especially during the "mind breaks" or exercises that we referred to earlier. Su herself used plenty of gestures and actions, imitating animals unabashedly. Her teaching aids which were large, full of colour and attractively drawn indicated that she was mindful of catering to children's *spatial* intelligence. Furthermore, pupils participated in small groups where they collectively uttered the sounds made by animals. This was an indication that Su saw the value of developing children's *interpersonal* intelligence through group tasks. In addition, Su set aside time for tasks which required pupils to act independently. This involved *intrapersonal* intelligence. Most significant was the *linguistic* element at work: Pupils enthusiastically participated when they were asked to say aloud the sounds made by specific animals. They went: "Croak! Croak! Croak!"; "Chirp! Chirp! Chirp!"; "Quack! Quack! Quack!" in a crescendo manner. Su certainly made repetitive routines seem like a lot of fun. The active participation of the pupils, besides illustrating good interaction between teacher and pupils, provided evidence of the consideration of linguistic intelligence in the children. It was interesting to watch the teacher integrate the multiple intelligences -- musical, bodily-kinesthetic, spatial, interpersonal, intrapersonal and linguistic -- into her classroom practice.

A safe environment. A "safe" environment often suggests a place that is physically secure. But equally important is emotional security. In order to learn well, pupils need an environment where it is safe to attempt, safe to have fun, and safe to make mistakes. Indeed, emotional security suggests that it is safe even to fail at the tasks that teachers set for pupils. In observing Su's classroom actions, we had evidence that Su put much emphasis on emotional safety. One good example is that she constantly sought group response. There were opportunities for individual responses, but responding in groups appropriately preceded individual responses. When one of the groups seemed to have problems performing a task set by the teacher (making the sound of a particular animal), Su unhurriedly invited them to try again. After repeated but unsuccessful attempts to get the group to give the answer in unison, Su made a thoughtful decision. She strengthened this "weak" group by asking a few pupils from a "strong" group to join the former. Thus, fulfilling the group task by the weak group did not involve any reprimanding or "loss of face." It was

interesting to watch how strengthening the weak group with new recruits happened without any fuss. In addition, the new members participated as enthusiastically as they did when they belonged to the stronger group. Su gave evidence of being able to think on her feet when trying to solve a problem.

Another example to illustrate the safe environment created by Su is the constant use of words of praise and motivation when warranted. For instance, Su would say "Give a big clap to you!" and the children would clap in unison.

In connection with the same idea of a safe environment, Su practised wait-time (Rowe, 1974). After presenting a question, there was no hurry to get pupils to respond. The time lapse between presenting a question and eliciting a response made it possible for the pupils to think before answering, thus increasing the chances of a correct answer.

Alternating instructional strategies. Su's classroom practice was a good example of principled eclecticism. Eclecticism can be said to be double-faced. A collection of teaching techniques or activities used just for the sake of variety and without careful thought about their underlying principles is an indication of unprincipled eclecticism. This often happens among novices who have a wide array of techniques or activities to call upon, who remember to vary their techniques or activities, but who may not have given enough thought to the underlying principles or anticipated consequences. Through a careful analysis of Su's lesson as well as reading Su's lesson plan and reflections, we perceived that hers was eclecticism of a principled kind. She alternated her teaching strategies, moving smoothly from the expository to guided inquiry and then to eliciting cooperative group response. She alternated between telling, especially in the early part of the lesson, and questioning, especially during the practice/application phase. She requested repetitions and drills, but these were carried out in context and with an element of fun through animation. Su started with a whole-class activity, moved on to her being the "teller" and the centre of control, subsequently utilising group work and individual work, and finally reinforcing her teaching with a whole-class activity of singing a now-familiar song.

A principled eclectic also reflects on the effectiveness of his/her strategies with a view to improvement. Su reflected critically on how a certain aspect of her lesson could have improved through a minor change:

Sekiranya diberi peluang untuk mengulang kembali, saya rasa saya ingin mengubah pada fasa aplikasi . . . sewaktu menyusun semula bunyi-bunyi pada gambar yang betul. Saya sepatutnya memanggil nama murid dari cabutan kotak untuk mengelak murid-murid dari berebut untuk menjawab. (Record book, 29/9/2003)

Su also reflected on the incident where a group seemed passive and did not answer in unison, and how she dealt with that situation:

Sewaktu pembahagian kumpulan juga saya telah membahagi kumpulan yang salah dimana kumpulan 'Cow' saya menempatkan sebilangan murid yang pasif. Untuk itu, pada fasa ini pengajaran agak kucar kacir kerana kumpulan ini tidak membunyikan 'lembu' dengan baik. . . . Saya telah menarik 3 orang pelajar yang agak aktif untuk turut serta dalam kumpulan ini. Pengajaran akhirnya berjalan dengan lancar. (Record book, 29/9/2003)

The above reference to how she solved her problem with the passive group is an example of Su's ability to "reflect-in-action" (Schon, 1987).

Assessment. Towards the end of her lesson, before the pupils returned to their seats, Su explained what they had to do in the worksheets. This was strategic because if she had sent them back to their seats and then tried to give instructions on how to complete the worksheets, she stood the chance of not getting the attention of all the pupils. Since instructions were given while they were still sitting on the mat in the front of the class, the pupils returned to their seats quietly. Before starting on their worksheets, Su asked them to sing the same song once again, thus reinforcing their learning.

As the pupils started on the worksheets, we observed that Su removed the animal pictures that she had used on the board as well as the matching word cards that indicated the sounds. This was a good move in terms of ensuring proper assessment of learning that had taken place.

The worksheets required the pupils to match the pictures of six animals with six sounds. One set had not been taught, that is the sound made by an elephant ("trumpet"). This was intentional. The other animal sounds had already been taught so the unfamiliar set would feature as an enrichment exercise. In other words, through matching and elimination, pupils would eventually match the picture of the elephant with the correct sound even though she had not taught them that particular set.

During the observation, it was difficult to ascertain how many of the pupils could answer the worksheets correctly. Su provided us with an analysis of the results a few days after the lesson. The analysis, given in numerical form as well as in the form of a pie-chart, indicated that 71% of the class had all-correct answers. The rest got at least half of the questions correct.

Discussion and Recommendations

Su's story carries with it several important messages for college mentors and pre-service teachers. The most powerful message is that of hope. At the beginning of this paper, we gave details of Su's background: She was a "third intake" candidate which strongly suggests that many other applicants were perceived as better candidates than Su. Since Su registered at the teachers' college several weeks later than others, there was much "catching up" to do. She did not have a strong command of English. She did Phase 2 of her practicum in a rural school where pupils could hardly comprehend English. She taught Year 1 Science in English – and we believe that, language aside, she taught well. The message, thus, is that having difficulties in English need not be perceived as a major obstacle to teaching Science in English successfully. Julia, the college mentor, expressed it in this way: Language can be expressed in many ways – through gestures, through music, and through pictures. These can compensate for one's language weaknesses to a certain degree. The college mentor and we, the researchers, acknowledge that a better command of the language would have enhanced Su's classroom practice. However, this is a transitional period, a period of adjustment. Teachers, regardless of their current proficiency levels in English, still need to teach. In terms of immediate, compensatory measures, weaknesses in language can be compensated by focusing on other pedagogical strengths as shown in Su's case. However, long-term measures in handling the language issue are necessary as well so that teachers do not reinforce poor language use or adversely affect pupils' learning of the English language. We recommend that (a) all teachers having language problems make a concerted, long-term effort to improve in their proficiency; (b) opportunities for teachers to improve in English be made available; (c) the quality of instructional resources provided for school use be of the highest standard in both content and English usage, and (d) there should be closer monitoring of the use of reference books and workbooks produced for the open market. These measures would go a long way towards ensuring that Science teachers who are less proficient in English do not compromise the work done by English language teachers.

The second important message is that pre-service teachers need much support. Support can come from different parties. The college mentor in this study played a crucial role in some aspects, especially in helping pre-service teachers see opportunities rather than threats. At the beginning, Su was apprehensive and was not confident of being able to teach Year 1 Science in English. If Su had asked *not* to teach Year 1 Science, and if the college mentor had intervened or negotiated that for her, the result would have been a missed opportunity for a valuable professional experience. But that did not happen and Su is able to share this happy ending to her story:

Setelah dua bulan mengajar di tahun satu apa yang dapat saya katakan sebenarnya tugas mengajar murid ini tidaklah sesukar yang digambarkan sebelum ini. Saya mula berasa "enjoy" bersama mereka dan saya mula berasa sayang pada mereka. . . . Saya sentiasa berpegang pada peribahasa "seribu langkah adalah bermula dengan langkah yang pertama." Jika tiada langkah pertama pasti kita tidak dapat melakarkan seribu langkah yang berikutnya. (Journal entry, 29/9/2003)

Valuable support came from others as well. Su said that she obtained much help from her school mentor, especially in terms of classroom management. In addition, Su had the support of her teaching partner, Amy. They were in the same position: Both were asked to teach Year 1 Science in a rural school. They mutually supported each other; they planned together and they constantly discussed with each other. How they became so supportive of each other makes another amazing story: Both women, and not just Su, were "third intake" candidates. The bond between them started with both being in the same boat, that is, experiencing similar difficulties in "catching up" with coursework during the first semester as they joined the teachers' college much later than others. They became teaching partners in both phases of their practicum. The example of collaboration that they have set leads to our next recommendation: We need to encourage more teacher collaboration. The collaborative culture that we have in mind includes (a) professional dialogues in the form of sharing of experiences, problems, views, and expertise; (b) joint work in planning, instruction and other curricular matters, and (c) assuming collective responsibility for working together.

The third message emerging from the study touches on the perennial debate: Are teachers born or made? Although the college mentor perceived Su to be a "natural" teacher, Su's story tells us otherwise. Becoming a Year 1 teacher, Su reflects, is a difficult process:

Pertama kali ditempatkan untuk mengajar di tahun satu begitu merunsingkan. Pengalaman pertama praktikum pada fasa pertama telah membuka mata saya bahawa mendidik murid-murid di tahun satu bukanlah satu tugas yang mudah. Selain daripada perlu banyak bersabar melayan kerenah mereka guru juga perlu pandai menyesuaikan diri untuk berada di alam mereka. Tahap pemikiran perlu diubah menjadi selari dengan pemikiran mereka. (Journal entry, 29/9/2003)

Indeed, learning to teach involved hard work and a high level of commitment. As mentioned earlier, Su's first few lessons had to be scripted in view of her language difficulties, and only later was she confident enough to teach without scripting:

Untuk mengatasi masalah penguasaan bahasa Inggeris ini saya membuat skrip untuk menyakinkan lagi saya berdepan dengan murid. Pada permulaannya saya berasa agak janggal memandangkan saya terpaksa menyediakan skrip setiap kali ingin masuk ke kelas. Namun lama kelamaan saya sudah tidak memerlukan lagi skrip untuk tujuan ini. (Journal entry, 29/9/2003)

Besides scripting her lessons, Su also realized the importance of using attractive teaching aids. As mentioned earlier, each lesson preparation involved new teaching aids. She resorted to singing and animation in order that her pupils paid attention to her lesson. Classroom management was not a natural strength either. Like many other pre-service teachers, she was troubled by classroom management issues. One difference is that she herself sought help from her school mentor, and then worked at ways to improve. *In brief, Su wanted to succeed and invested much time and effort into cultivating good teaching practices.*

Yet another message derived from this study is the importance of critical self-reflection. There are many instances where we shared Su's written reflections verbatim. We chose not to translate those extracts into English for the sake of authenticity and also because we wanted to preserve the flavour of her reflections for a bilingual audience. Su's reflections led her to examine her beliefs and experiences, to think about her work and its purpose, and to consider the consequences of her actions. It is our hope that in time to come, she (and other pre-service teachers as well) might reflect on questions such as the following: *How do I enhance my teaching using technology? How do I learn to see opportunities instead of threats when faced with uncertainties or predicaments? How do I collaborate with veteran teachers and other colleagues?* According to Richert (in Goethals & Howard, 2000), it is through constant reflection of the numerous dimensions of teaching that a teacher obtains an elevated awareness of the teacher role. Thus, we close with one final recommendation: That greater emphasis be placed on learning to reflect in teacher

education programmes because it is primarily through the reflective practice that the teacher comes to know the complexities of the professional teacher's work.

References

- Featherstone, H. (1992). Learning from the first year of classroom teaching: The journey in, the journey out. East Lansing, MI: Michigan State University, NCRTL.
- Filmer, I., & Choo, V.M. (2002). Teaching Science in English: Perceptions of Science student teachers. Jurnal Pendidikan GERAK, 14, 1-13.
- Floden, R., & Buchmann, M. (1993). Between routines and anarchy: Preparing teachers for uncertainty. In M. Buchmann & R. Floden (Eds.), Detachment and concern: Conversations in the philosophy of teaching and teacher education (pp. 211-221). New York: Teachers College Press.
- Goethals, M., & Howard, R. (2000). Student teaching: A process approach to reflective teaching. New York: Merrill.
- Good, T., Biddle, B., & Goodson, I. (1997). The study of teaching: Modern and emerging conceptions. In B. Biddle, T. Good & I. Goodson (Eds.), International Handbook of Teachers and Teaching: Part Two (pp. 671-679). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Krasnow, M. (1993). Waiting for Thursday: New teachers discover teaching. Paper presented at the Annual Meeting of the American Educational Research Association (Atlanta, GA, April 12-16, 1993).
- Osterman, K., & Kottkamp, R. (1994). Rethinking professional development. In N. Bennett, R. Glatter & R. Levacic (Eds.), Improving educational management through research and consultancy (pp. 46-57). London: Paul Chapman Publishing Ltd.
- Paine, L., & Ma, L. (1993). Teachers working together: A dialogue in organizational and cultural perspectives of Chinese teachers. International Journal of Educational Research, 19(8), 675-697.
- Rowe, M. (1974). Wait-time and rewards as instructional variables, their influences on language, logic and fate control: Part one -- wait-time. Journal of Research in Science Teaching, 11(2), 81-94.
- Schon, D. (1987). Educating the reflective practitioner. New York: Basic Books.
- Veenman, S. (1984). Perceived problems of beginning teachers. Review of Education Research, 54(2), 143-178.