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STUDENT TEACHERS' REFLECTION ON CLASSROOM PRACTICES

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INTRODUCTION

In working toward innovation and improvement in teacher education in Singapore, it is important to have visions of the kinds of teachers required for the 21st Century. It is not enough for teachers just to know about the subjects and the children they teach. They have to learn how to learn to keep pace with the rapid developments in the economic, political and scientific realms and the impact upon the children of tomorrow. Teachers nowadays have to be more responsive to the changes in and around them. This means that they have to be more self-regulated, self-directed and self-actualizing. The have to be more reflective in their practice so that they can change their behaviour according to the needs and demands of the situations.

Reflective teaching has been one of the three main goals of the pre-service teacher education programmes in the National Institute of Education (NIE), Singapore since the late 1980's. The other two goals focusing on the professional education of knowledgeable and competent teachers have been the aims of teacher education in Singapore for the past 40 years. Expanding the aims of teacher education is due to several reasons, among them, the need for teachers to develop their pedagogical habits and skills in tandem with advances in our understanding of cognition and learning, intelligences and expertise, the design of instructional innovations, and the rapid economic, social, political, scientific and technological changes in the world and in Southeast Asia.

Though reflective inquiry has been the guiding theme in all of the academic, curriculum and education courses as well as the practicum of all the pre-service education programmes, little is known about the source, mode, use, process, and product of the student teachers' reflection on their knowledge about the subject matter, pedagogy, students and the social context. Some research has been done in Singapore regarding student teachers' cognitive styles (Yeap & Wong, 1991), student teachers' expertise (Chen, et al. 1988, 89, 90, 91; Kaur 1991), and learning strategies (Chang, 1991), and how these may have an effect on their pupils. However, there is no study on how student teachers develop pedagogical knowledge and skills necessary for self-directed professional growth.

The present investigation of student teachers' reflective thinking seeks to inquire if and how undergraduate and graduate students in a teacher education programme reflect on their own teaching actions, the pedagogical principles underlying teaching decisions and actions, contextual factors affecting the application of the principles, and moral/ethnical or political issues surrounding a teaching experience.

CONCEPTUALISATION OF REFLECTIVE TEACHING IN SINGAPORE

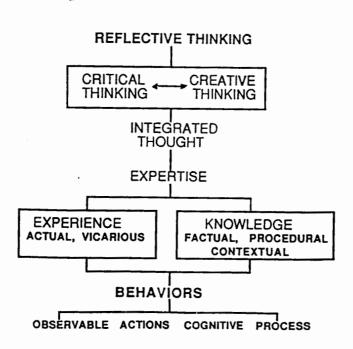
The focus of this study is on the beginning stage of teacher development and on how student teachers think about instruction. Perry's (1970) stages of intellectual and moral development, Kolb (1984) and Schon's (1983, 1987) proposals for educating the reflective practitioners are employed to construct a conceptual framework for inquiry. Specifically, the study seeks to describe how the student teachers learn from the results of their actions in a developmental way. The RPT Framework (Framework for Reflective Pedagogical Thinking) of East Michigan University (1989) is adapted for use among the Singapore student teachers. The entire cohort of Postgraduate Diploma in Education

(Primary), BA/BSc with Diploma in Education and Diploma in Education students are sampled to enable comparison on four dimensions which American and European research findings suggest may influence teacher thinking and the process of learning to teach: academic qualification, content area, type (quality) of teacher preparation programme and working experience. Of particular interest to the National Institute of Education, Singapore, this study hopes to examine the efficacy of its preservice primary education programmes in helping the student teachers to become more reflective during training.

For the purpose of establishing a common base, a definition of reflective thinking has been proposed. Reflective thinking is an integrative thought process. It is an interaction of critical thinking and creative thinking in the course of problem solving and decision making (Figure 1). It connects a teacher's private thought process with the subject matters, the learners and social context. As one considers what one knows about the content, the pupils and instructional strategies and materials for the classroom and the school, one has to decide on the best representations of that knowledge in terms that are understandable and appreciated by the pupils. This dialectal interaction between critical and creative thought process is operational at all times while the student teacher is planning future teaching actions, or reflecting on the present teaching act, or the wisdom of past practices as recommended by the NIE lecturers/supervisors and the cooperating teachers in schools. A teacher could make certain choices and monitor them by analysing and evaluating the decision in terms of observable actions and cognitive processes.

Undoubtedly both reflective thinking and reflective teaching are very complex processes including both the personal and social dimensions. Reflective teaching consists of three main phases the pre-instructional phase, the instructional phase and the post-instructional phase. These phases should be examined from all perspectives: personal, academic, social, and moral. The developmental approach is adopted to capture as much of the possible sources, modes or processes that may stimulate the development of the student teachers' reflectivity as possible.

Figure 1 Reflective thinking as an integrative thought process



There are assumptions about reflective thinking in current research literature that should be examined. The following are those that would be re-looked at as NIE reviews its teacher education programmes, their goals, thrusts, structure, and delivery modes and systems.

ASSUMPTIONS TO BE EXAMINED

- Graduates in academic disciplines are generally more effective classroom teachers and are, therefore, more reflective about teaching than non-graduates and graduates not having been educated in an academic discipline.
- 2. Experienced teachers have more knowledge about the subject, their pupils, and teaching strategies and are more reflective than novice teachers.
- Teachers who are more sensitive to the social context and the assessment of classroom activities would be more reflective and committed to bringing about social change.
- Teachers who are sensitive to pupils' interests, learning styles, thinking and patterns of developmental growth would be more reflective resulting in more self-regulated behaviours.
- 5. Well designed programs which are taught by good lecturers/supervisors will nurture motivated and self-actualizing teachers.

RESEARCH QUESTIONS

Against the background of renewed interest and concern to improve the reflection of teachers, a study on improving the reflective thinking of student teachers through the NIE coursework and practicum was proposed in 1991. The following research questions have been raised in the Singapore study:

- 1. Are undergraduate and graduate student teachers able to reflect on a given teaching episode and give reasons for some successful teaching actions?
- 2. If they are able to reflect, what do they think about the teaching episodes and actions, particularly of their own teaching?
- 3. Are the teaching actions based on some instructional principles and/or learning theories?
- 4. Do contextual factors affect the application of the instructional principles and learning theories, and impede their teaching actions?
- 5. Are the contextual factors related to some moral or ethical, social or political issues?
- 6. Does improvement in reflection lead to improvement in teaching behaviour and success in student learning?
- 7. What are the best strategies for encouraging reflection on practice?

RESEARCH DESIGN AND DATA COLLECTION

This study uses both quantitative and qualitative methods to inquire into the student teachers' thinking. It is our intention to examine how student teachers think about teaching in the preservice programmes, how they identify the constraints they have about teaching, how they identify learning problems and to see what happens to their teaching behaviours as they move through the coursework into teaching practice and into the first year of teaching.

METHODOLOGY

The study is being carried out in three phases. The first two phases of the research which are reported here focused on how preservice student teachers thought about classroom teaching in general and their own teaching in particular. The first phase is an attempt to describe the student teachers' initial reflective thoughts and the second study explores how journal writing helps the student teachers to reflect on their own practice. For both the two phases of study, the RPT

Framework (Framework for Reflective Pedagogical Thinking) of East Michigan University (Sparks-Langer et al. 1990) is adapted for use among the Singapore student teachers for the stimulated recall and reflection (see Appendix 1, The Reflective Teaching Questionnaire), and the structured journal writing (see Appendix 2, Weekly Journal Writing Guideline).

Phase One or the Entry Phase involved all the student teachers in the 1991 cohort of NIE's preservice programmes for primary teaching. There are 122 students in the BA/BSc 4-year programme, 450 non-graduate students in the 2-year Diploma in Education programme and 234 graduate students in the 1-year Postgraduate Diploma in Education (Primary) programme. All the student teachers were then going through their first year initial professional primary teacher preparation. They had not been exposed to instructional theories and strategies though they had acquired some subject matter knowledge and pedagogical content knowledge or skills during the term of study. The student were asked to view a video tape of a classroom English language lesson for Primary Five pupils. The lesson was taught by an experienced teacher on the theme Road Safety. Using the stimulated recall method, the student teachers were then asked to critique the lesson according to four questions raised (Appendix 1).

During Phase Two, a random sample of about 40 student teachers in the Diploma in Education and Postgraduate Diploma in Education programmes supervised by members of the research team, were invited to participate in journal writing. They were asked to follow some guidelines intended to stimulate their reflective thinking and to tap their personal, ethical and social concerns (Appendix 2).

PHASE ONE OF STUDY AND RESULTS

78 preservice student teachers were randomly drawn from the 2 nongraduate and 1 graduate NIE preservice teacher education programmes. These were students who had the necessary qualification and language proficiency and had been successful in interviews and admitted into the programmes. For non-graduates, they have a minimum of a 'A' level Cambridge High School Certificate. For the graduates, they possess at least a degree from a recognized university. Altogether 54 students were drawn from the non-graduate pool and 24 from the graduate pool.

In order to determine the nature of reflective thinking, the Framework for Reflective Pedagogical Thinking (RPT) is used. This is based on an evaluation study on reflective thinking of trainee teachers done by Sparks-Langer et al. (1990). The RPT Framework attempts to describe and determine the type of reflective thinking shown by the respondents. It includes seven levels as shown in Table 1 below:

Level	Description
1	No descriptive language
2	Simple, layperson description
3	Events labelled with appropriate terms
4	Explanation with tradition or personal preference given as rationale
5	Explanation with principle or theory given as the rationale
6	Explanation with principle/theory and consideration of context factors
7	Explanation with consideration of ethical, moral, political issues

Sparks-Langer et al. (1990)

The progression in levels shows a growing sophistication of the teacher's cognitive constructs about teaching from very technical concepts and rules to more contextual and ethical thinking. All

students in the First Phase of Study were asked to comment on a videotaped classroom episode and write their answers on a prescribed form: the Reflective Thinking Questionnaire. The tape was shown to the students at the initial phase of training at the beginning of term. They were asked to describe the episode, refer to successful teaching actions in the episode, and make a generalization about the episode related to any broader societal or professional issues that are thought provoking.

Four faculty members used the RPT framework to rate the students' written responses independently and blindly; the interrater reliability was 0.78. Out of the total of 78 student teachers, none were functioning at levels 1, 6 and 7. The majority of students were at Level 3 (42.3%) and Level 4 (37.1%). The average mean RPT score is 3.48 (see Table 2).

Programme	Mean	SD	N
Dip Ed	3.50	.804	42
BA/BSc	3.58	.193	12
PGDE	3.38	.189	24

Table 2 Levels of reflective thinking

The non-graduates, particularly those in the BA/BSc programme, appeared to show a slightly higher level of reflective thinking. This is an interesting finding contrary to the general belief that teachers with greater subject matter knowledge should be able to reflect on a teaching act at a higher level. But it could also be explained that one's reflective ability seemed to be adversely affected if one were going through great emotional trauma as was the case with one of the participant student teachers in the PGDE pool.

PHASE TWO OF STUDY AND RESULTS

18 students from two programme groups: the Diploma in Education (non-graduates) and the Postgraduate Diploma in Education (graduates) were randomly sampled to form a small cohort for a longitudinal study. These students were asked to describe in journal writing their reflection on 5 classroom episodes. For each they were to identify and reflect upon episodes which contain problematic teaching/learning concepts or strategies or issues. The questions for the journal writing have been prepared to closely parallel the levels of reflection in the RPT Framework (see Appendix 2). The student teachers were observed and interviewed as they move from pre-practicum through practicum (teaching practice).

An analysis of the student teachers' journal writing shows that the non-graduate and graduate students are reflecting at levels 3 through 6 on the RPT Framework. The overall mean rating was slightly higher for the graduate students than the non-graduates but not of significance. Though there are a few student teachers who are at levels 5 and 6. These results are compared with data obtained during classroom teaching observations and interviews made during the practicum. Presented below are some excerpts of the student teachers' journals and our interpretation of them.

One DE student teacher Alice (007) has one year of relief teaching experience before joining the DE programme. In Phase One of the Study, she was able to describe a teaching episode using pedagogical principles (Level 5) e.g.

"What I feel is that, if the teacher is warm and has enthusiasm in wanting to impart knowledge to the children to ensure their understanding of certain concepts, she will strive her best to make them understand. For a lesson to be successful, I feel that there's a need for interaction and participation among the teacher and the children. Having a non-threatening atmosphere with the children will enhance learning in group teaching".

Table 3 Demographic Characteristics RPT Scores in the DE and PGDE (Pri) Programmes

Programme	Subject	Gender/Age	RPT Scores Videotape Journal
DE (non-grads)	001 002 003 004 005 006 007 008 009	F 22 F 19 F 20 F 21 F 21 F 21 F 21 F 21 F 21	2.5 4.4 2 2.8 3 4.3 6 5.7 5 4.6 5 4 4 5.2 3 3.2 5 3.75
Mean		20.5	3.94 4.22
PGDE (grads)	010 011 012 013 014 015 016 017 018	F 25 F 22 F 23 M 26 F 26 M 26 F 22 F 32 F 29	4 3.5 4 5.2 2 3.7 5 4.4 4 4.8 3 4.6 3 3.4 4 4.3 5 4.3
Mean		25.7	3.8 4.24

After 3 weeks of teaching practice in school, this same student teacher wrote showing greater awareness of pupil needs and learning.

"I met with him after class and taught him how to spell four words. The boy spelt all the four words correctly... From our meeting, I realised that this boy could learn and quite easily too given the proper motivation, experiences and guidance... This boy is in this position because he is basically left on his own to do whatever he wishes at home".

Others on the DE programme shows similar improvement in their reflection as they were able to use pedagogical principles in thinking about their lessons, e.g. Cathy (005) wrote about her use of flashcards in a music lesson:

"I realised that if I had to revise the names of different notes and rests through teaching them again, the children would definitely be bored... so I decided to play a game with them using the flashcards... The children seemed to enjoy themselves and learned at the same time".

Yin (003) wrote about her management skills:

"While I was doing my evaluation of that day's lesson, I realised that I had made a mistake. I learned that I should not have grouped them up into such a big group... It is hard to get them not to talk so loudly so that they can be heard".

The PGDE student teachers show a little more understanding to the problematic teaching situations in their journal writing than in the Reflective Thinking Questionnaire, e.g. one of the top students during teaching practice (018), who is a Social Science graduate and has four years of working experience in a management position, in responding to the question "Does this teaching episode bring to mind broader societal or professional issues that are thought provoking to you?" in Phase One of the Study:

"As I observed the teaching episode, I began to consider other possible alternative teaching strategies - guided groupwork or small group discussion that can stimulate greater pupil participation and discovery learning".

Three weeks into Teaching Practice, she wrote about using stories to teach Maths at Primary Three Level showing greater understanding of instructional principles and greater ability to implement the principles:

"This episode was significant because it showed the great potential of using stories with concrete materials in maths teaching. In fact Maths and English could be more integrated in the curriculum... Pupils were keen to learn, and were excited to participate in the development of the story".

The other PGDE student teachers show similar improvement in their reflective thinking even though they were not performing in as high a level as Student 018.

Student teacher Yin (014) wrote about her own over-teaching to Primary 5 pupils in a Science lesson. She is a science graduate with three years of working experience. The journal shows greater awareness of students' needs besides her own teaching behaviours and greater commitment to change.

"Today is my supervisor' second observation..., the topic was on reproduction of non-flowering plants... The lesson was conducted smoothly. The kids had the opportunity to observe the specimen while I explained. They handled the materials, did some recording on the worksheets I had prepared... However, at the end of the lesson, I realised that the brighter kids enjoyed the fast pace but the average kids were confused and got all muddled up with all the concepts that I've taught... I should have chunked the info and taught at a slower pace... I have to re-teach some of it again the next day".

Another student teacher Lim (013) shows greater awareness of contextual factors and more social concern in his English and Science lessons for Primary Five pupils. He is an arts graduate.

Excerpt of journal of an English lesson: In this lesson, the use of the Accidents and Emergency Unit in the hospital was discussed. The A & E Unit was meant for those who needed immediate attention. However, many patients use it for minor sickness and accidents. In their discussion the pupils understand the moral responsibilities and social principles involved in using public facilities for one's own personal benefits and ignore the welfare of others.

Excerpt of journal on a Science lesson: The lesson provided an opportunity for me to teach the pupils on the social and moral responsibility of any invention. The lesson on gunpowder enabled the pupils to discuss whether the invention helped or harmed mankind... It was initially meant for clearing hills and blowing up tunnels for mining. However, it was used to make bombs to destroy enemies.

PHASE THREE OF STUDY

A purposive sample of six teachers from the 18 student teachers of the PGDE (Pri) and DE programmes of the low, medium and high levels of reflective thinking will be further observed and interviewed. They will be encouraged to continue to write journals. Data collected from these studies will be analysed to see whether they support, elaborate or substantiate the tentative findings of the Phase Two of Study.

So far two student teachers, a medium (014) and high (015), to be known as Yin and Heng in the study have been further observed during classroom teaching and have been interviewed (Appendix 3). Both teachers showed marked cognitive and professional development during their teaching in two neighbourhood schools. They had excellent rapport with their pupils and showed a keen sense of awareness of their pupils' needs and interests. One taught English Language and the other carried out two science lessons.

During the post observation conference, Yin spoke with enthusiasm and confidence. Reflecting on her language teaching, she shared her special concerns for pupil learning and for choosing the right approach, activities and materials for a particular topic and class. She believes in the mastery of basic concepts and the opportunity and quality of pupil learning. Despite having a very active class, she was able to show her strength in classroom management and used role play to reinforce learning after a reading lesson on the Story of A Little Brown Monkey. Yin shared her secrets on how to keep the class interested, active yet quiet while watching a role play and how she used self-questioning and mental rehearsal to plan and improve her lessons.

Speaking to the inquirer, Heng showed his usual thoughtful and serious nature with an occasional mystic smile as he described the trouble he took to plan his lessons on dry ice and energy. He greatly believed in teaching the interconnectedness between scientific concepts while getting the pupils to really enjoy and make sense of scientific concepts. Heng had a special knack of stimulating the pupils interest and keeping them in suspense during his demonstrations and experiments by "showing, telling and questioning". For example he showed that dry ice was made of carbon dioxide and not water and how dry ice will look if water with different substance were poured on to it. To ensure that they truly understand the concepts, he integrated a lot of hands-on activities and originated worksheets for the lessons. Though dry ice was not a topic in the primary science syllabus, Heng knew that it appeared in some examination papers and pupils who knew more could score higher grades. Therefore he included the topic in his teaching with the full blessing of the Head of Science in his school.

Heng also showed his insight and concerns for the weaker pupils or socially underachieving ones. He took the risk of appointing an isolate to be a groupwork leader thus drawing out the pupil and helping him to become acceptable to his peers. His very good relationship with his pupils was very apparent and all the pupils interviewed described his lessons as "very interesting" and "fun" and him as their "humourous" and "best teacher" after having been taught by him for only three months.

DISCUSSION

From the inquiry so far, three distinct phases of teacher cognitive development can be distinguished: the amorphous stage, the situation-oriented stage and pupil-centred stage. These stages of cognitive development appears to correspond quite closely to both Fuller's Stages of Teacher Concerns - survival, teaching situation and pupil concerns (1969) and Feiman-Nemser's Stages of Development - beginning survival stage, consolidation stage and mastery stage (1983).

During the amorphous stage, student teachers irrespective of their qualifications, academic background and work experience were not able to make much sense of classroom episodes. Their perception and understanding of classroom situations were expressed in laymen's terms and language. Their concern was more with the "teacher" as a person and not as a "professional" involved in

helping and inspiring learning among a group of pupils with special characteristics, needs and interests in specific contexts. However with conscious engagement on reflective thinking about their teaching and with experience, however short it may be, spurts in their cognitive development appeared to have taken place. They became not only aware of the complexity of classroom teaching but also showed ability to transform that awareness, understanding and knowledge into acts that generate learning that is usually permanent, meaningful and enjoyable.

IMPLICATIONS AND RECOMMENDATIONS

From the experience and findings of the two studies, it would be interesting for us to probe further:

- 1. What are the significant personal, social/political factors that caused the greater increase in reflective thinking among the graduate student teachers during the practicum and whether reflective thinking help enhance the teachers' professional development, at least during the first year of their work as qualified teachers?
- Whether there is truly a relation between experience, knowledge of subject matter, reflective thinking and effective teaching?

On the teacher education front, we are convinced that coaching for reflective thinking is valuable in enhancing the student teachers' cognitive, pedagogical and professional development. This can be carried out during clinical supervision sessions which should be more systematically and comprehensively implemented, that is as many of the lecturers/supervisors be persuaded to commit themselves to the supervision cycle and coaching their supervisees for reflective practice.

For precessional practice, we believe that teachers who reflect on their practice would be more inclined to find better ways of teaching different types of pupils than just using the whole class teaching method all the time. For teachers to be more self-regulated, self-directed and self-actualized, it is important that they critically analyse their own teaching in the context of changing pupil and social needs and demands and make creative and practical decisions and firm commitment to the education of the young.

CONCLUSION

As the study is still evolving, it is our hope that some of the findings will challenge teacher educators to rethink some of the well-cherished assumptions about thinking, learning and teaching. It is hoped that the findings and conclusions reached will assist in the unceasing efforts made to improve the quality, curriculum and system of teacher education in Singapore.

Of particular importance is the concern to inculcate in the student teachers the habit of reflective inquiry about their own teaching and the pupils learning in a dynamic and changing social context. As they develop as professionals in different school cultures and within the education system, they will have to keep a balance between the expectations of the schools and education system and their own unique and innovative teaching acts and the pupils' interests and needs. Perhaps one way of sustaining this balance is to reach out to like-minded professionals and to establish professional networks like this forum at the Educational Research Association of Singapore, with other Asian teacher-researchers and others in the West.

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Appendix 1 (in compressed form)

NATIONAL INSTITUTE OF EDUCATION

Framework for Pedagogical Thinking

Nam	e:	NRIC:					
Sex:	M / F Age:	Date:					
1.	Describe the teaching episode in as much detail as you can remember.						
2.		t seemed successful to you. Why do think it proved to be					
3.		onditions in this particular teaching episode that influenced the n? Do you think any teacher could do the same thing any time xplain.					
4.		ring to mind any broader societal or professional issues that are					

Appendix 2

Weekly Journal Writing Guidelines for Reflection on Classroom Teaching

During your Teaching Practice, please select FIVE classroom episodes to reflect upon. For each "significant" episode (which contains problematic teaching/learning concepts/issues/management issues), reflect on it based on a few of the following questions. Please write at least one page of your of reflection and keep it in the Teaching File.

- 1. Why is the classroom episode significant to you?
- 2. Did you plan for particular things to happen, and how did things happen?
- 3. Did you use any particular principles in planning the lesson/unit? What is it and why?
- Did any personal, social, political, ethical and moral issues surface during the episode?
 Please elaborate.
- 5. Did you observe any change in your pupils (e.g. increase in knowledge, awareness and understanding of specific facts, concepts, principles, institutions)? Why?
- 6. Do you see a connection between the pupils' change and your own understanding of the pupil, or the situation, or the class? Why?
- 7. What do you wish could have happened?

Thank you.		

Appendix 3

REFLECTIVE THINKING: QUESTIONS FOR THE POST OBSERVATION CONFERENCE

Planning

- 1 Have you written a special lesson plan for this lesson? In your opinion, what are the main purposes of planning?
- What types of planning do you give a lot of time/emphasis? (Types: lesson, unit, termly, annual, and contingency planning) Why?
- What key decisions do you make while planning? (Decisions: content, time, organisation, motivation, pupils' learning rate and level, personal needs and interests, social values, government curriculum policy, etc.)
- What steps or procedures do you adopt in planning (lesson, unit, schemes of work for the term, syllabus, curriculum, availability of resource)?
- How much importance do you attach to elements like conceptual or textual difficulty, children's abilities and interests, or their need to pass exams, in planning?
- 6 Does the quantity of work / activities provided seem appropriate to the amount of time available?
- Does the work/activity which is outlined in your plan(s) seem sufficient in content for the children's needs and interests, or does it appear superficial?
- 8 Do you plan to the last detail or do you allow for spontaneity?
- 9 Do you seize an opportunity, e.g. a news report, the publication of a book, a discovery/ invention, a school/community event to incorporate it into the lesson?

Teaching and Evaluating

- 1 How do you feel about the lesson?
- What was satisfying / not satisfying?
- 3 Were you able to teach what you intended / planned?
- 4 Were you able to assess the students' level and teach or interact with them accordingly?
- 5 Do you think the children understand the lesson/perform as expected/enjoy the lesson?
- 6 What do you think were the highlights of the lesson?
- 7 In your own assessment, what are the strengths of your teaching?

INTERVIEW QUESTIONS FOR PUPILS DURING POST-OBSERVATION CONFERENCE

- 1 Do you enjoy the lesson?
- 2 Do you know what the teacher was trying to do? Do you think he/she has succeeded?
- 3 Could you follow every stage of the lesson?
- Were you able to follow his/her instructions, explanations and questions? What did he/she do to help you understand the lesson idea/concept?
- 5 Were you able to do what you were expected to do?
- 6 In your opinion, would you say your teacher is average/OK, good excellent?