

BILINGUAL MICROTEACHING: AN ANALYSIS OF QUESTIONING SKILLS

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Introduction

The task of teaching is a complex one and involves a large number of skills. In order to produce an effective lesson, the teacher has to put together many of these skills. The technique of microteaching breaks down the task of teaching into a number of specific skills, each of which the teacher practises. On evaluation of his performances of these skills, the teacher is able to obtain a measure of his strengths and weaknesses. Of all the teaching skills, those of questioning are probably the most important. The effective use of these skills produces active, thoughtful pupils who participate to a great extent in the learning process. Without them, the lesson is reduced to a dull monologue, with passive pupils who gain little in understanding and less in inspiration.

Most microteaching courses include the practice of questioning skills. In the past few years, research has been undertaken in a number of countries to determine the most effective way of doing this. Borg (1970)¹ in the United States developed a course which was adapted for use in Great Britain by Perrott et. al (1972-74)². The latter course is designed to help the teacher improve 12 questioning skills or habits which reduce teacher talk and bring about more active pupil participation in discussions. This course was adapted for use in Hong Kong and forms the basis of the study outlined in this article.

In Hong Kong, there is a need for teachers to be able to teach in the medium of the Chinese language and also in the medium of the English language. The present study takes the 12 skills from the British work and gives pre-service teachers the opportunity of practising them in both languages. The study is an extension of

previous work by the author which involved an investigation of the *overall* effects of microteaching on the technique of questioning in both Chinese and English. In this, pre-course and post-course lessons in both languages were analysed using two measures of performance – the number of questions asked, and the percentage of higher-order cognitive questions. The microteaching course produced *significant* improvements in performance in both measures from the pre-course lessons to the post-course lessons in both Chinese and English. In addition, no significant differences were found between the improvements obtained through teaching in one language as compared with teaching in the other language. The results of this earlier study are fully described in an earlier article.³ The present study goes a step further and looks more closely at the specific skills which were part of this programme.

With this background in mind, the objectives of the present study are two-fold:

a) to investigate the effects of a microteaching course on 12 specific skills practised in both the medium of Chinese and the medium of English.

b) to compare the questioning skills of pre-service teachers in Hong Kong with those of pre-service teachers in other countries.

The Questioning Skills

The questioning skills are the same as those used in the International Microteaching Research Unit of the University of International Microteaching Research Unit of the University of Lancaster by Perrott et. al. They are described elsewhere but are repeated here for convenience. See Table 1. Although some of the skills listed appear simple and obvious, teachers often fail to use them, even when it is pointed out that

they are not being used. Overseas workers^{4,5} have shown that when such skills are practised in microteaching, teachers not only transfer them to the normal classroom situation but also continue to use them.

Research Method

1) Experimental Design and Subjects

As described in the previous Chinese University Education Journal (pp. 47-49), pre-service Chemistry teachers involved in a microteaching programme taught 20-minute lessons before and after the programme. Each pre-service teacher taught two pre-course lessons – one in Chinese

and one in English—to different groups of school pupils. These lessons were repeated in the post-course lessons. The subjects were pupils from local secondary schools, chosen randomly, and then divided into groups of six. The same pupils were used for the microteaching course as well as for the pre-course and post-course lessons.

2) Measures of performance

The pre-course and post-course lessons were recorded on videotape. Each lesson was scored for 15 measures of teaching performance. Most of these had also been assessed in similar studies in the United States and Sweden. The

Table 1: The questioning skills and related objectives used in the microteaching programme

Session A	
Objective:	To encourage pupils to respond
Skills:	1. Pausing 3-5 seconds after asking a question before calling on a pupil to answer 2. Treating incorrect responses in an accepting manner 3. Calling on non-volunteers as well as volunteers to answer a question
Section B	
Objective:	To improve pupils' initial responses
Skills:	4. Prompting pupils who are unable to respond 5. Asking for further clarification of incomplete responses 6. Refocusing the pupils' response
Session C	
Objective:	To increase the level and amount of pupil participation
Skills:	7. Asking questions that call for longer pupil responses: (a) asking questions that call for sets of related facts (b) discouraging one-word responses from pupils 8. Asking questions that require pupils to use higher-order thought processes 9. Redirecting the same or a modified question to other pupils
Session D	
Objective:	To eliminate habits which disrupt the flow of discussion
Skills:	10. Avoiding repeating one's own question 11. Avoiding repeating pupils' answers 12. Avoiding answering one's own questions

measures are :

- (1) mean length of teacher's pause after asking a question but before calling on a pupil;
- (2) the number of times the teacher asks a prompting question;
- (3) the number of times the teacher seeks further clarification;
- (4) the number of times the teacher asks a refocusing question;
- (5) the number of times the teacher redirects a question to another pupil;
- (6) the number of questions which resulted in pupils giving longer responses;
- (7) the mean number of words in pupils' responses;
- (8) the number of questions which resulted in pupils giving one-word answers;
- (9) the percentage of the teacher's questions requiring pupils to use higher-order thought processes;
- (10) the number of times the teacher answers his own questions;
- (11) the number of times the teacher repeats his own questions;
- (12) the number of times the teacher repeats pupils' answers;
- (13) the total number of questions asked;
- (14) the percentage of discussion time taken up with the teacher talk;
- (15) the percentage of discussion time for pupil participation.

The 15 measures analysed gave an indication of the performance of the pre-service teachers on 10 of the 12 specific questioning skills practised in the course (Table 1). No measure was included for "treating incorrect responses in an accepting manner" (skill 2) as this occurred naturally, probably because small groups of pupils were used rather than normal classes of 40 or more, as well as the fact that the lessons were filmed. Similar findings have occurred in overseas studies. The measure of "the percentage of non-volunteers called on" to assess skill 3

was not included because it could not be reliably determined from the videotapes. This same difficulty was experienced in the American studies⁶ but was overcome in the British study by placing a staff member in the classroom to record whether a pupil called on had volunteered or not.⁷ Due to the lack of teachers, this latter procedure was not possible in the Hong Kong study.

"The percentage of teacher talk", "the total number of questions asked", and "percentage of time for pupil participation" were also included. These reflect overall objectives of the course and were analysed in depth in the author's previous study. However the results are included again in this study for the sake of completeness and for comparisons to be made with other countries.

3) Rating Procedures

Each pre-course and post-course lesson was assessed by a trained research assistant. Each tape was rated once for each skill, with the whole 20 minutes of each lesson being assessed. This was felt preferable to taking samples of lessons (for appropriate skills) because of the nature of the lessons. These involved Chemistry topics and as demonstrations were often included, 5-minute samples might not be representative of the whole lesson.

Hypotheses

1. For lessons taught in either Chinese or English, there were expected to be:
 - (a) significant *increases* from pre-course lessons to post-course lessons in the mean length of pause, the frequency of prompting, clarification, refocusing and redirection, the number of longer responses, the mean number of words per pupil response, the number of questions, the percentage of higher-order questions, and the percentage of time for pupil participation.
 - (b) significant *decreases* from pre-course lessons to post-course lessons in the

number of one-word responses, the frequency of answering own questions, repeating own questions and repeating pupils' answers, and in the percentage of teacher talk.

2. No significant difference were expected in mean improvements between pre-course lessons and post-course lessons on each questioning skill for lessons taught in Chinese and those taught in English. Statistical significance was determined using 't' tests for differences between correlated pairs of means at the 0.05 level or less. Because of the directional form of the hypotheses, one-tailed tests were used.

Results

- 1) Bilingual microteaching in Hong Kong
For each of the 15 measures, an analysis was made of the mean differences between the pre-course lessons and the post-course lessons. A summary of the outcome of the analysis is shown in Table 2.

For lessons taught in Chinese, 10 of the 15 measures show significant improvements between pre-course and post-course lessons. The frequency of refocusing, the number of one-word responses, the skills involving repetition of questions and answers, and the answering of the teacher's own questions do *not* show significant improvement. In fact the number of one-word responses actually increases in the post-course lessons!

For lessons taught in English a similar pattern emerges. Nine of the 15 measures show significant improvements. Of those that are not significant, three have differences in the direction opposite to that hypothesised. The number of one-word responses, the number of times the teacher repeated his own questions, and the number of times the teacher repeated pupils' answers all increase from pre-course to post-course lessons!

Analysis was also carried out to compare the improvements on the 15 measures for the lessons taught in Chinese with those taught in English. None of the

measures showed any significant difference except for the number of times the teacher repeated his own questions ($t = 2.14$; $df = 5$; $p < 0.05$).

A further analysis was carried out to compare the differences from pre-course to post-course lessons for the increases in questions requiring one-word answers to the increases in questions yielding longer responses for lessons in Chinese and in English. Table 3 summarizes the outcomes of the analysis.

Although the skill in asking questions that require longer responses shows improvement, the ability to discourage questions that give one-word answers does not (as the number actually increases from pre-course to post-course lessons in both Chinese and in English). The increase in the number of longer responses over the number of one-word responses is significant for lessons taught in Chinese but not in English.

- 2) Comparing the results of microteaching in Hong Kong with those in other countries.

A comparison was made of the effects of microteaching on the questioning skills of Hong Kong pre-service teachers with those of pre-service teachers in the United States and Sweden.⁸ Table 4 summarizes these findings. In order to make a comparison on a first language basis, the Hong Kong results are only for lessons taught in the medium of Chinese.

In the Hong Kong study, 7 out of the 12 teaching skills listed show significant improvements between pre-course and post-course lessons. The studies from both other countries show significant improvements in only 5 of the skills. None of the studies obtained significant differences for the skill of refocusing. In only one case — length of pause after question — did all three studies obtain significant differences.

Discussion

- 1) The effects of microteaching on the

Table 2: Differences in measures of teaching performance related to questioning technique between lessons taught in both Chinese and English before and after a course in microteaching.

Measures	Lessons in Chinese			Lessons in English		
	Mean Scores		t df = 5	Mean Scores		t df = 5
	Before	After		Before	After	
A. <i>Skills to encourage pupils to respond</i>						
1. Mean length of teacher's pause after questions	0.20	1.45	4.66***	1.53	1.88	0.49
B. <i>Skills to improve pupils' initial responses</i>						
2. Number of times teacher used prompting	0.00	2.33	11.05***	0.00	1.00	2.04*
3. Number of times teacher sought clarification	1.00	4.00	3.50**	1.50	5.33	2.58*
4. Number of times teacher used refocusing	0.00	0.00	<1	0.00	0.00	<1
C. <i>Skills to increase the level and amount of pupil participation</i>						
5. Number of times teacher used redirection	1.33	4.33	2.62*	0.83	5.00	8.74***
6. Number of questions yielding longer responses	0.33	8.50	2.04*	0.50	9.50	3.63**
7. Mean length of pupils' responses in words	1.82	4.57	4.02**	2.33	6.48	2.58*
8. Number of one-word responses	4.83	6.50	<1	3.67	8.50	<1
9. Percentage of questions requiring higher-order responses	6.15	58.80	7.43***	4.35	52.50	4.88***
D. <i>Skills to eliminate habits which disrupt the flow of discussion</i>						
10. Number of times teacher answered his own questions	2.67	0.67	1.94	2.33	1.00	1.19
11. Number of times teacher repeated his own question	0.50	0.33	0.35	0.33	2.33	<1
12. Number of times teacher repeated pupils' answers	6.33	5.83	0.08	3.00	5.33	<1
E. <i>Global measures of performance</i>						
13. Number of questions asked	10.00	22.70	4.10***	6.50	21.70	5.46***
14. Percentage of discussion time taken by teacher talk	79.20	60.15	3.93*	78.70	60.80	2.75*
15. Percentage of time for pupil participation.	2.15	11.30	4.45***	1.80	12.70	3.01*

*p < 0.05; **p < 0.01; ***p < 0.005; one-tailed

Table 3: Mean increases from pre-course to post-course lessons in two specific questioning skills for lessons taught in Chinese and in English (taken from Table 2).

Medium of instruction	Mean increases (pre-post)		Difference	t (df = 5)
	No. one-word responses	No. longer responses		
Chinese	+1.67	+8.17	+6.50	2.70*
English	+4.83	+9.00	+4.17	0.79

*p < 0.05

Table 4: Pre-service teacher performance on questioning skills in three countries for lessons taught before and immediately after a course in microteaching.

Country	Hong Kong			USA			Sweden		
	Pre-Course	Post-Course	% Change Pre-post	Pre-Course	Post-Course	% Change Pre-post	Pre-Course	Post-Course	% Change Pre-post
Sample Size	7			32			32		
<i>Teaching Skills</i>									
Redirection	1.33	4.33*	225.6	21.78	28.86	32.5	23.11	31.75*	37.4
Prompting	0.00	2.33*	-	2.01	2.10	4.5	.92	3.50*	280.4
Clarification	1.00	4.00*	300.0	2.93	6.02*	105.5	3.73	4.77	27.8
Refocusing	0.00	0.00	-	-	-	-	0.00	0.04	-
Repeating own question	0.50	0.33	-33.4	3.26	2.73	-16.3	3.72	2.92	-21.5
Answering own question	2.67	0.67	-74.9	1.18	.92	-22.0	.52	.22	-57.7
Repeating pupils' answer	6.33	5.83	-5.2	18.01	8.63*	-52.1	9.47	2.59*	-72.7
Length of pause after question	0.20	1.45*	625.0	1.43 ^a	2.35** ^a	64.3	1.88	3.72*	97.9
Percent higher cognitive questions	6.15	58.80*	881.0	52.94 ^a	44.35 ^a	-16.2	38.00	49.00*	28.9
Percent teacher talk	79.20	60.15*	-23.8	45.85	33.36*	27.2	37.27	27.48	-26.3
<i>Pupil Skills</i>									
Length of response	1.82	4.57*	151.1	6.76 ^a	10.28** ^a	52.1	10.93	9.19	-15.9
Number of one-word responses	4.83	6.50	34.6	4.72	3.02	-36.0	-	-	-

* Significant at p < .05. Represents significant change pre-course to post-course.

^a Based on 5-minute sample.

questioning techniques of pre-service teachers in Hong Kong

Before the course of microteaching, the performance of Hong Kong pre-service Chemistry teachers in the use of questioning skills is poor. This is true for lessons taught in the medium of Chinese as well as in the medium of English. In the 20-minute pre-course lessons, an average of only 10 questions were asked for lessons in Chinese and 6.5 for lessons conducted in English. Of these, about half were simple questions requiring one-word answers. Most of the remaining questions asked yielded no response from the pupils, and teachers showed almost no skill in probing in order to elicit some response. There was almost a total absence of questions which require pupils to think and to give longer sentence-type responses. This resulted in lessons in which the teacher lectured and the pupils remained passive. The teachers talked for an average of 79% of each lesson, while pupils were involved in discussion for only 2% of the time. To account for these results, cultural influences must be taken into account. In the Chinese context, pupils have traditionally remained passive with the teacher being the learned authority who dispenses knowledge and wisdom. When the present pre-service teachers were at school, this was the way the teaching was done. Having had no other model of teaching, they naturally tend to repeat teaching methods with which they are familiar.

However, by following a course of microteaching in which specific questioning skills are practised, the post-course lessons showed substantial improvements. Lessons taught in both languages showed a much higher use of questioning skills. The amount of teacher talk had decreased, there was more time spent in pupil participation, and the important probing skills of prompting and clarification showed significant increases. As shown in Table 3, teachers were able to increase the number of questions which required longer responses. However, they still tended to

ask too many questions which required only one-word answers. This was particularly true for lessons in the medium of English, in which pupils were more reluctant to give longer answers in a foreign language. This difficulty also occurred when higher-order cognitive questions were asked. Although more than half the questions in the post-course lessons were of this type and required the pupils to think, they did not require long pupil responses. The student-teachers on the programme commented on the difficulty experienced in trying to discourage one-word or brief responses. Further evidence of this difficulty is reflected in the length of the teacher's pause after asking a question. For lessons in Chinese, the mean length in the pre-course lessons was 0.20 sec as simple, brief responses do not need long pauses. For the corresponding lessons in English, the pause was 1.45 sec. Although most questions still required one-word answers, the longer pause reflected the greater reluctance of pupils to volunteer answers — even simple answers — when using English, resulting in a longer pause before the teacher asked for an answer. Improvements occurred in the post-course lessons, with the mean length of pause being similar for lessons in both Chinese and English. It is clear from this that future microteaching courses will need to allow more opportunity for teachers to practise the skill of asking questions which require longer responses and which discourage one-word responses.

Under the heading "habits which disrupt the flow of discussion" there was a significantly greater tendency for the teachers to repeat their questions when teaching in English. In fact, the percentage of questions repeated increased from about 3% in the pre-course lessons to just over 11% in the post-course lessons. Again this is probably due to a lack of pupil response in English. Teachers tend therefore to repeat their questions rather than to encourage the pupils to answer them. There was little tendency for the teachers

to answer their own questions, in either language, in the post-course lessons. However, they repeated pupil answers too often. This is a habit characteristic of the teacher and not a product of the lessons, as a similar number of answers were repeated during post-course lessons given in Chinese as well as in English.

- 2) Comparing the level of questioning skills before and after microteaching of Hong Kong pre-service teachers with those in other countries.

A comparison the pre-course lesson performance in Table 4 indicates that on almost every questioning skill, the standard of the Hong Kong pre-service teachers is lower than their overseas counterparts. This is particularly true for the skills of redirection, percent higher cognitive questions, percent teacher talk, and length of (pupil) response. On only two skills – repeating own questions and repetition of pupils' answers – were the Hong Kong teachers better than those in both other countries. This can be interpreted in terms of cultural differences. The traditionally passive nature of Chinese pupils discussed earlier is contrasted with their Western counterparts who for several generations now have been encouraged to participate actively in lessons. Pre-service teachers in Western countries have experienced this themselves and so it is natural that they should use questioning skills to a greater extent in their own pre-course lessons.

A comparison of the lessons taught immediately after the Hong Kong microteaching course shows that by providing untrained teachers the opportunity to practise questioning skills, dramatic improvements are possible. The percentage improvement from pre-course to post-course lessons for many of the skills is much greater for the Hong Kong course than for those in the United States and Sweden. (This also helps to explain why 7 of the skills in Table 4 show significant improvements even though the Hong Kong sample size was small). On 6 of the questioning skills, the performance of the

Hong Kong group is comparable to, or better than, that of the overseas groups. This is particularly so for the percent of higher cognitive questions asked, and for the number of times teachers repeated their own questions. However, Hong Kong teachers still talk too much when compared to overseas teachers, and ask too many questions which require only one-word answers and thus have a shorter mean length of pause after each question. Although microteaching improves the skill of redirection in Hong Kong teachers are having greater difficulty in involving pupils in class discussions.

Conclusions

This study confirms the effectiveness of microteaching in improving the questioning skills of teachers, even in a bilingual setting. As well as bringing about a reduction in the amount of teacher talk, there are improvements in more specific questioning skills such as prompting, redirection, the asking of higher-order cognitive questions, and the number of questions calling for longer responses. Improvements occurred for lessons taught in the medium of Chinese as well as in English. Except for one skill – repeating questions – there were no significant differences in performance for lessons taught in either language medium.

With the present day emphasis on the discovery approach, and the need for teachers to encourage pupils to think things out for themselves rather than to be passive recipients of teacher explanations, teachers must be able to use the technique of questioning effectively. The study shows that microteaching is one effective way of improving questioning skills. If the results obtained in the pre-course lessons are typical of the many untrained teachers in our secondary school system, then the situation is depressing. Criticisms are frequently heard of the inability of out school graduates to think for themselves. Often, the use of English as a medium of instruction is held up as the cause. This may only be part of the reason. As the study show, pre-course lessons in both Chinese as well as English show a low standard of questioning ability. This too is

probably a major contributing factor. Further research with existing but untrained teachers is needed.

The study shows that after a course of microteaching, the standard of questioning skills of Hong Kong teachers is comparable to that of teachers in other countries. Certain deficiencies are apparent in the comparison, especially in the ability to redirect questions in order to increase pupil participation, and to obtain longer responses and fewer one-word responses from pupils. There is still a tendency for teachers in Hong Kong to talk more than their overseas counterparts.

Based on the findings of this study, several modifications could be made to future microteaching courses. Firstly, greater emphasis needs to be put on questions which increase the level and amount of pupil participation (Table 1, skills 7-9). This could be done by including an additional session to practise these skills. Secondly, for lessons taught in the medium of English, teachers need to be made more aware of how to use questioning skills so that the tendency to repeat their own questions when pupils hesitate to respond is avoided.

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