

The Medium of Instruction Issue Revisited*

LO Lam-fat

The Chinese University of Hong Kong

The present study reviews the current status of the medium of instruction issue in Hong Kong and further investigates the effect of different modes of medium of instruction on student achievement in major school subjects. A total of 779 secondary-3 students from different schools took achievement tests in English and in mathematics. The English and mathematics teachers of these sampled students were surveyed to determine the modes of instruction in their classes. In addition, information regarding teacher and student characteristics was collected by means of questionnaire survey on the participating teachers and students. The findings reveal that in terms of mathematics achievement, students in the Chinese-dominant classes excel those in the English-dominant and Chinese-and-English-mixed classes while students in the latter classes are not significantly different, and that in terms of English achievement, the Chinese-and-English mixed mode is superior to the English-dominant mode.

本研究嘗試檢討香港中學教學語言問題之現況，並探求不同教學語言對學科成績之影響。研究樣本選自不同學校779名中三學生。該等學生曾參加數學、英文兩科學科成績測試。教學語言乃由該兩科教師填報。至於樣本學生與有關教師特性之資料則由調查問卷中獲得。研究結果顯示：(一)以中文為主要教學語言之學生，其數學科成績較以英文或中英夾雜為主要教學語言者為高；(二)以英文為主要教學語言及以中英夾雜為主要教學語言之學生，二者之數學成績無顯著分別；(三)以中英夾雜為主要教學語言之學生，其英文科成績勝於以英文為主要教學語言者。

The medium of instruction is a focal issue in the education circle in Hong Kong for the past 15 years. Historically, The Hong Kong government adopted the English medium of instruction in the majority of secondary schools as a firm language policy until the eighties. This language policy has its root associated with political, administrative and economic advantages favoring the Hong Kong government and its superordinate, i.e. the British government, rather than educational effectiveness (Cheng, 1979; Fu, 1981; Lo, 1987).

Since the early seventies, a number of enthusiastic educators in Hong Kong have raised serious questions on educational ground about the suitability of using the English medium of instruction in Hong Kong have raised serious questions on educational ground about the suitability of using the English medium of instruction in Hong Kong secondary schools (Cheng, 1979; Ho, 1987, 1989). Studies done by Cheng (1979), Cheung (1974), Ho (1982, 1986, 1987), Loi (1986), Siu and Mak (1989), and Siu et al. (1979) showed that student achievement was superior when using the Chinese medium of

instruction in some situations and was of no difference whether the Chinese or English medium is used in some other situations.

Partly as a response to the urge of adopting the Chinese medium of instruction as a language policy by the public and more importantly as a consequence of the Sino-British Agreement on the Future of Hong Kong after 1997 (1984), the Hong Kong government in the early eighties began to look seriously into the issue of the medium of instruction and to review its language policy on the same issue. The same government appointed an international panel to review the education system in Hong Kong, resulting in the publication of the Llewellyn Report (1982), which has an important section on the medium of instruction in schools. To implement many of the recommendations made in the Llewellyn Report, the government also set up an Education Commission to formulate education policy, which has published three reports, the first two of which (1984, 1986) partly deal with the issue of the medium of instruction. Very recently, two government reports dealt directly with the medium of instruction issue. The Education Department of the Hong Kong government published a report of the Working Group Set Up To Review Language Improvement Measures, which also has a substantial section on the medium of instruction (1989). The Education Commission Report No. 4 (1990) proposes a

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scheme of streaming secondary school students into four groups, one receiving Chinese medium of instruction in a monolingual school, one receiving English medium of instruction in a monolingual school, and the remaining two receiving Chinese medium and English medium, respectively, in a bilingual school. Based on their language ability, students in a bilingual school can switch groups in the same school when they move from junior secondary level to senior secondary level. All these reports showed that in the past 10 years, the government had a tendency of changing its attitude toward the medium of instruction from supporting the English medium at its early position, to encouraging the use of the Chinese medium at a later position, and to making a positive policy on the use of the Chinese medium of instruction in the majority of secondary schools in Hong Kong, while maintaining a small portion of elite students to learn through the English medium of instruction, at its current position.

In order to investigate further into the

relationship between the medium of instruction and the academic achievement, the present study is intended to seek answer to the following questions:

- (1) To what extent the Chinese medium is superior to the English medium regarding student achievement in mathematics?
- (2) Would the mixed mode of Chinese and English media of instruction be an advantage for students learning English in school?

Method

Sampling

Schools. A total of 18 secondary schools with diversified characteristics were involved in the present study. Table 1 shows the breakdown of these schools according to their histories, sizes, types of financial support, types of student sexes and types of streams.

TABLE 1
Breakdown of Sampled Schools

Years of Establishment	1-5	6-10	11-15	>15
Number of Schools	2	5	4	7
Number of Classes	<18	18-23	24-29	>29
Number of Schools	1	2	7	8
Number of Teachers	<31	31-40	41-50	>50
Number of Schools	1	2	11	4
Number of Students	<901	901-1200	1201-1500	>1500
Number of Schools	3	13	1	1
Type of Financial Support*	GO	GA	PA	IN
Number of Schools	1	15	1	1
Type of Student Sex**		Boys	Girls	Coed
Number of Schools		2	3	13
Type of Stream			Chinese	Anglo-Chinese
Number of Schools			2	16

* GO = Fully Government-Supported

GA = Government-Aided PA = Private-Aided

ID = Independent

** Coed = Coeducational

The classification of categories and their meanings in Table 1 carry the connotations of current practices in Hong Kong. The breakdowns show that the sampled schools are representative of the population of all secondary schools in Hong Kong to a great extent.

Classes and Students. In general, one secondary-3 class was selected from each of the sampled school for the study. However, three of the sampled schools provided more than one

secondary-3 class instead. Altogether, there were 21 sampled classes with 779 students participating in the study. The secondary-3 level was chosen because students at this level were presumably mature enough in cognition to produce a reliable measure of academic achievement and they had had more than two years of exposure to the same medium of instruction in their own schools. Table 2 shows the breakdown of sampled students by sex and by age.

TABLE 2
Breakdown of Sampled Students

Age in Years	12	13	14	15	16	17	
Number of Students (%)	8 (0.4)	139 (5.3)	1103 (41.8)	845 (32.0)	281 (10.7)	65 (2.5)	
Sex						Male	Female
Number of Students (%)						330 (42.4)	449 (57.6)

Despite of a fair percentage of over-age (>16) and under-age (<14) students, the age distribution of the sampled students was not too much different from that of the population of all secondary-3 students in Hong Kong. The sex distribution was considerably weighted on the female side as compared with the same population of which girls were slightly more than boys.

Teachers. Although the teachers who taught English or mathematics were invited to complete a teacher questionnaire which would provide information on their media of instruction and teacher characteristics, only 43 teachers (>80%) returned the questionnaire. Table 3 shows the breakdown of the sampled teachers by sex and by years of teaching.

TABLE 3
Breakdown of Sampled Teachers

Years of Teaching	1-3	4-6	7-9	>9		
Number of Teachers (%)	15 (34.8)	22 (51.2)	5 (11.6)	1 (2.3)		
Sex					Male	Female
Number of Teachers (%)					26 (61.2)	17 (39.8)

Instruments

Questionnaires. Two self-constructed questionnaires, which were actually information

sheets, were used for the present study. One questionnaire required sampled students to provide information on sex, age and student

number of the Junior Secondary Education Assessment. The other questionnaire, consisting of items regarding the information as shown in Table 1 together with the respondent's characteristics and his or her report on student results in the Junior Secondary Education Assessment and use of medium for instruction in the sampled class, were sent to teachers of the participating schools to collect data.

Junior Secondary Education Assessment. The Junior Secondary Education Assessment (JSEA) was taken by the majority of all secondary-3 students in Hong Kong in the period where the present study was conducted. Only three major subjects, viz. Chinese, English and mathematics were required for the assessment. The JSEA was a standardized test which was constructed, administered and scored by the Education Department. The validity and reliability of JSEA were guaranteed by the test developer.

The student's results in JSEA were recorded in the school file as letter grades in each of the examination subjects, with grade A denoting the highest and grade H denoting the lowest. For the purpose of the present study, only grades in English and mathematics subjects were needed and the letter grades were converted to marks (8 for A, 7 for B, 6 for C and so on) to facilitate statistical analysis. The sampled students' grades were reported by the teachers who completed the questionnaire.

Results

Achievement in Mathematics

Table 4 shows the means and standard deviations of groups of students by different modes of instruction and their F value. The achievement in mathematics is significant between groups. Pair-comparisons in the same achievement show that the Chinese-medium is superior than either of the other groups ($t = 2.83, P < .01$ between the Chinese the Chinese-medium and the mixed-medium groups; $t = 1.87, p < .05$ between the Chinese-medium and the English-medium groups). However, the difference in mathematics achievement between the English-medium and the mixed-medium groups is not significant ($t = 1.44, p > .05$).

Achievement in English

Table 5 shows the means and standard deviations of groups of students by different modes of instruction and their F value. The achievement in English is significant between groups. Pair-comparisons in the same achievement

show that the mixed-medium group excels than English-medium group.

TABLE 4
Analysis Results in Mathematics Achievement

Group	N	Mean (SD)	F	df (Between/Within)
Chinese-medium	125	4.58 (1.37)	4.79**	2/776
Mixed-medium	411	4.22 (1.20)		
English-medium	243	4.35 (0.96)		
TOTAL	779	4.32 (1.16)		

** $p < .01$

TABLE 5
Analysis Results in English Achievement

Group	N	Mean (SD)	F	df (Between/Within)
English-medium	404	3.58 (1.41)	200.02**	1/777
Mixed-medium	375	4.86 (1.07)		
TOTAL	779	4.20 (1.41)		

** $p < .01$

Summary of Results

- (1) Students receiving Chinese medium of instruction had superior achievement in mathematics to those receiving either English medium of instruction or bilingual instruction (i.e. using both English and Chinese media).
- (2) Students receiving English medium of instruction and those receiving bilingual instruction were not different in the achievement in mathematics.
- (3) Students receiving bilingual instruction had greater achievement in English than those receiving English medium of instruction.

Discussion

Mathematics is a school subject which is heavily loaded with figures and symbols, thus much less dependent on verbal instruction.

Therefore, the medium of instruction whether it is English or Chinese would have less effects on student learning of mathematics. However, the findings from the present study show the contrary, because the Chinese medium of instruction had a positive effect on learning of mathematics as compared with English or mixed medium of instruction. It is believed that this facilitating effect of the Chinese medium rests on its nature as a mother tongue which has communicative and interactive functions in classroom learning. Based on this communicative and interactive interpretation, it will be inferred that the Chinese medium of instruction would have even greater effects on learning of non-language subjects in schools, which are more verbal and less symbolic and figural.

The communicative and interactive interpretation of the Chinese medium of instruction seems consistent with the finding regarding learning of English. It would be expected that English, as a school subject, is learned more effectively through the English medium of instruction by secondary-3 students who have been exposed to English subject since primary levels. But this is not supported in the present study. Again, the use of Chinese as part of the medium of instruction would enable students to communicate and interact better in learning English than the use of English as the mono-medium of instruction. As a usual practice, the bilingual medium of instruction is used when teaching students who have not reached the proficiency level of English. When they have reached the proficiency level, they should effectively learn English through the English medium, as theorized by the language experts. How does one explain the above finding, which contradict with the language experts' theories? The following offers possible explanations:

- a. The secondary-3 students have not reached the required level of English proficiency.
- b. The English teacher are not competent enough to teach English in the English medium of instruction. Competence in this context is referred to not only fluency in English but also curricular knowledge and teaching skills.
- c. The English curriculum does not match the students' level of English proficiency.
- d. The students' cognitive structure can neither assimilate nor accommodate the new knowledge.
- e. The subject content and teaching methods do not meet with students' individual needs.

The implications of the above discussion are three-fold:

- (1) The theoretical and empirical support for the abolition of mixed medium of instruction in learning non-language subjects are not adequate. Therefore, elaborative work in the direction of theory building and experimental verification to control the influencing variables such as medium used in textbooks, medium used in homework and medium used in tests and examination should be carried out before a definite language policy can be adopted.
- (2) The theoretical and empirical support for the use of English medium in learning non-language subject by a small percentage of high-ability students are also not adequate. If this group of elite students are selected for teaching in the English medium of instruction, five criteria must be met, viz. the student's English proficiency, the teacher's English competency, the match of the curriculum with students' English proficiency, the match of the subject knowledge with students' cognitive structure, and the match of subject content and teaching method with students' needs.
- (3) Some measures in the areas of professional training and curricular and instructional improvement to ascertain the effectiveness of language teaching are urgently needed. With an effective language teaching, the secondary-5 leavers of high-ability students after taking so many hours in English lessons from primary levels up through secondary-5 should have a good command of English when they enter the job market or continue their post-secondary studies. Therefore, there would be no need for this group of students to be streamed out for instruction across all non-language subjects in the medium of English.

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Author

Lo Lam-fat, Senior Lecturer, Department of Educational Psychology, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong.