

# Enquiry into the effects of bilingual teaching

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## Abstract

This paper considers the advantages and disadvantages of the bilingual teaching of Mathematics to a class with a large number of Turkish-speaking students in a mainstream secondary school. The paper begins with an outline of the research methodology, evaluates the research materials and findings and goes on to reflect on the effectiveness of bilingual teaching based on personal, direct experience. Information was gathered by means of qualitative research methods using questionnaires and observations. Accumulated personal experience in education indicated that bilingual students benefit from hearing explanations in their first language or having the opportunity to use the language in the classroom. This inspired the exploration of whether having access to information bilingually affects students' motivation and attainment, with particular reference to Turkish-Speaking (TS) students, and whether there are benefits for the whole class (mixed class) or whether teaching part of the lesson bilingually has negative effects for the non-Turkish-speaking class members. The data obtained from initial finds appear to suggest that there are positive correlations between the contextualisation of mathematical concepts in a bilingual environment and students' access to mathematical knowledge.

## Setting the Context

In the school that forms the focus of this study, TS students achieve significantly lower GCSE results than other monolingual and bilingual groups. The majority appear to be underachieving and a significant number also have behavioural problems. The issues affecting underachievement of TS students have been repeatedly identified by A.M. Ali (2001) and are clearly outlined in her book.

My role as a TS teacher provided an opportunity to improve students'

attainment and morale, and to foster a more trusting relationship with parents by building some bilingual aspects into teaching practice. The objective was to increase student motivation by introducing culturally relevant concepts, as Vygotsky (1962) emphasised in his work.

### **Bilingual teaching**

The aim of this research was to investigate the effects of bilingual teaching with groups of Turkish speaking (TS) students of different abilities in a variety of settings.

For the purpose of the project, the term ‘Turkish-speaking’ (TS) included Turkish, Kurdish and Turkish Cypriot students and, where appropriate, children from mixed Turkish and other backgrounds. The project therefore set out to determine whether a wider use of bilingual teaching would correspondingly affect the achievement and motivation of a group of TS students. The Vygotskian approach was used as a tool in terms of using children’s culturally related concepts embedded in a historical context.

The research was designed to evaluate students’ response and attitude elicited through multiple qualitative methods consisting of questionnaires and observation. Most bilingual learners use different languages for different purposes, in different circumstances and to different people in their everyday lives (Fishman 1972). In a sociolinguistic perspective, children’s everyday ‘street’ Turkish is used, embedded in culturally related concepts to explain abstract, cognitively demanding mathematical concepts (Cummins 1996). Most bilinguals have a dominant language, though this may not be the same one throughout their lives, relating to social factors (including migration) that play a part in shifting the emphasis on which language to use - in the UK context, Turkish speakers learn English, the dominant language of British society. Simultaneous bilinguals have learned their two languages before the age of three; sequential bilinguals learn one language in the home and another at a later date (Baker 2001).

It takes a minimum of five to seven years to develop academic proficiency in a language (Collier 1997; Cummins 1981, 1984). The students in this study use English in class but use Turkish amongst themselves in the playground (strong peer group influence) and also to their parents at home. Thus, the challenge is how to link spoken ‘London Turkish’, a mixture of Turkish and English, to academic, cognitively demanding, abstract ‘standard English’.

When home languages are brought into the learning process, children’s

identities are foregrounded. This crucial point is made by Cummins (1996): when students' developing sense of self is affirmed and extended through their interactions with the teacher, they are more likely to apply themselves to academic effort.

Similar research was conducted by Dawe in 1983. His study on bilingual Punjabi/English children found a positive correlation between increased competency in the use of the two languages and an increase in children's mathematical reasoning. In his study, he examined the ability of bilingual Punjabi, Mirpuri students to reason deductively in mathematics. He found that students' first language competence was an important factor in their ability to reason in mathematics in English as a second language.

### **Data Collection and Analysis**

The starting point of this research was an awareness of the limited achievement and lack of confidence and motivation among Turkish speaking (TS) students as evidenced in the school's OFSTED report, QCA testing and ongoing written assessment. The research therefore set out to determine whether a wider use of bilingual teaching would correspondingly affect the achievement and motivation of a group of TS students.

Following the bilingual teaching of the TS students in an after school club, revision classes and mainstream mathematics class, as well as the evaluation of the results, an extension of the research was to team teach with a monolingual colleague (MW) in school. A Year 10 middle set Maths class, one of MW's mainstream Maths classes, was selected for the team teaching on the grounds of its composition: there were 24 students in the class; 8 of them TS students, 4 of them English, 2 Somali, 3 Black Caribbean, 3 Bangladeshi, 2 Western European, and 2 Eastern European. The class was working to achieve D or E in their GCSE exam. All students, especially the TS students, needed support to improve their understanding and achievement. This class was also the most suitable class to teach together in terms of scheduling and cover availability. Three lessons were scheduled and jointly planned. In all three lessons, a student teacher observed the session.

#### *First lesson*

At the beginning of the lesson we explained the project (case study) to the students, who were given a questionnaire with open-ended questions. The students had not received any bilingual lessons when the questions were asked.

The topic of the first lesson was Index notations.

The lesson was taught bilingually using Turkish and English together. Generally, this consisted of giving the mathematical terminology in English and Turkish, and explanations in Turkish. The monolingual colleague helped and explained to non-TS students if they needed assistance. In the first 5-10 minutes of the lesson, the non-TS students could not concentrate and complained that they did not understand. After this initial period they started to listen and participate. When they went to individual work to carry out the exercise from the worksheet, both groups of students were helped equally. This gave us the opportunity to assess students. TS students were assisted bilingually. At the end of the lesson the homework was set.

### *Second lesson*

The topic was percentages.

The lesson was taught in English, with support given to the TS students. The homework was collected at the end of the lesson.

Marking the homework revealed that, compared with past efforts, TS students showed better understanding. According to the monolingual colleague, without the opportunity of bilingual support, TS students would not have achieved the same standard of work. She had also observed that, in class, TS students were able to communicate in more depth and detail than usual and with considerable confidence.

### *Third lesson*

The topic was percentage increase and decrease.

The lesson was jointly planned and taught. At the beginning of the lesson, MW explained in English, after which explanations were given in Turkish. English was used to model how to answer one of the questions; the approach to answering another question was then modelled in Turkish. Students working individually or in pairs were helped and supported.

At the beginning and at the end of the three lessons the same questionnaire was given to all students.

There were two open-ended questions in the questionnaire.

Q1. What is the difference between monolingual and bilingual lessons?

Q2. Which lesson will be more useful and why?

*Figure 1: Responses to Q1 before the three lessons taught*

Analysis of Q1 answers (Figure 1) revealed that students had no previous experience of bilingual lessons.

*Figure 2: Responses to Q1 after the three lessons taught*

After the lessons (see Figure 2) the students gained knowledge about how

A (No difference)	19%
B (Monolingual 1 lesson bilingual 2 lessons)	24%
C (Using different languages)	10%
D (Splitting class into two groups)	19%
I (Not a language lesson)	10%
J (Different pupils speak different languages)	5%
K (Do not know any other language)	5%
L (Translating into either English or Turkish)	10%

bilingual lessons worked and were aware that it was helpful to the Turkish-speaking students. Also, students described the bilingual lessons as more explanations in both languages in the lesson. In B Category, students stated that the monolingual lesson is teaching only in English. One student responded that

A (No difference)	8%
B (Monolingual only one language whereas bilingual two languages)	50%
C (Using different languages)	4%
D (Two teacher taught)	8%
E (More bilingual explanations)	13%
F (It helps TS pupils-helpful to bilingual speakers)	17%

the monolingual lesson is using the same language and that it must be the home language if all the students are Somali. Pupils understood the meaning of monolingual and bilingual lessons. Furthermore, students determined that the bilingual lesson means using both languages, using the home language and English together in class, sharing the same language/home language between students and the teacher. One student stated that a bilingual lesson consists of using different languages to improve students' understanding. Another student answered that the bilingual lesson involves two teachers who help in different languages.

*Figure 3. Responses to Q2 before the three lessons taught*

Before the bilingual lessons, students thought an English only lesson to be helpful. Even TS students wanted the lesson to be taught in English because they are not fully literate in Turkish and some of them were embarrassed to take the lesson in Turkish. There was also a discernable mental barrier to them perceiving Turkish as part of

academic school life and an appropriate medium for teaching and learning.

After the bilingual lessons, students either found bilingual lessons more

i (Both will be useful)	10%
ii (Do not know)	5%
iii (Both will be useful as I speak both languages)	24%
iv (English is better as I do not speak Turkish)	48%
v (Monolingual is helpful as I get confused if the lesson is in English and Turkish)	10%
vi (English is better as all other lessons are in English)	5%

helpful or found both lessons helpful. Non-TS students found the bilingual lessons helpful because they contained more explanation. TS students found the lessons helpful because they gained clearer understanding. They also found the slightly slower pace of the lesson helped them to process information more easily.

*Figure 4. Responses to Q2 after the three lessons taught*

After the lessons, the outcomes of the lessons were discussed with the colleague (MW) and the student teacher.

The student teacher who observed the bilingual Maths lessons reported that, when using the key words bilingually, as well as bilingual written and spoken forms of explanation, mathematical concepts were communicated more clearly to the pupils in the classroom. Misconceptions often arise when there is a discrepancy between what the teacher means and what the pupil thinks the

i (Both useful)	17%
ii (Do not know)	4%
iii (I understand both languages)	8%
iv (English is better)	17%
v (Monolingual is better)	17%
vii (Bilingual lessons better)	38%

teacher means. Bilingual teaching and student support allow identification of these misconceptions. In the lessons, clarification and interaction took place in both languages; this enables the student to reactivate existing concepts that are in Turkish; it also helps clarify conceptual misconceptions as well as misconceptions because of the language use, since two communication mediums are used, both of which are embedded in social and cultural reality.

The monolingual colleague (MW), who worked collaboratively and delivered the three lessons, reported that EAL (English is an Additional Language) students

have experience of numbers and symbols in their home language. Bilingual teaching has benefited TS students as they received a level of clarity and explanation, enabling them to begin the translation-thought process correctly.

Assessment of EAL learners can be problematic. This is mainly because the national assessment of Mathematics is through standardised tests. These should not also be tests of the understanding of English. However, in real terms, this is difficult to achieve, as any method of assessment will involve some use and understanding of English language.

The challenge for teachers of EAL learners is to devise methods of assessment that are appropriate for evaluating their understanding of concepts and ability in Mathematics which are not first and foremost a test of their ability in English. Collaborative teaching helped us to identify misconceptions and to assess TS students more reliably.

The main points that we agreed on are:

- It was a good project and the lessons were highly beneficial for TS students.
- Bilingual lessons provided more time, more help and more one to one support for students. Turkish-speaking students answered more questions and produced more class work when compared with past lessons.
- The collaborative teaching gave us, as teachers, more time, more flexibility and a supportive atmosphere.
- Turkish-speaking students gained better understanding from Turkish explanations.
- TS students felt more comfortable and confident in considering problems more thoroughly and providing answers to questions. TS students' understanding of the language of Maths in English increased.
- English-speaking students were stimulated to consider other strategies and gained an appreciation of Turkish speakers.
- Bilingual lessons opened the students' eyes to the value of other languages for communicating the same concepts. Maths became seen as universal.

Some difficulties were encountered when delivering these lessons. We agreed that the time was too limited; the lessons should ideally continue for one term, but it was difficult to arrange cover to run and plan the lessons, as there was no support. Furthermore, while the lessons were beneficial for TS students, they

made no additional provision for the other ethnic minority students. It would therefore be helpful if there could be more bilingual lessons in different languages.

## **Conclusion**

In mainstream schooling, where bilingual students are learning through the medium of English, the first language is either excluded in the classroom completely, or used in quick communication between same language speakers, or even to express things they do not wish the majority, including the teacher, to hear. Outside of the classroom, it is used to reinforce friendships and solidarity between members of the same language group. However, it can separate them and even cause them to be perceived negatively by other students.

In contrast, in bilingual classes, the first language was seen as a means not only of the teacher supporting students' learning but also of the students supporting each other in a learning situation.

This project has reinforced the strong commitment to the principle and practice of bilingual teaching, though we recognise the necessity of modification according to the teaching context. The positive results for Turkish-speaking (TS) students are convincing, both in terms of understanding and the development of greater self-confidence. The research also suggests that greater teaching skills in identifying and presenting key concepts benefit non-Turkish-speaking students; furthermore, these students have learnt to develop a more tolerant and positive attitude towards their bilingual classmates. We are confident that presenting lessons in both languages has helped them to understand the equal validity of all languages for communication of important information as well as social interchange.

In this project, team teaching in Turkish and English with a non-Turkish-speaking colleague demanded a high level of detailed planning, providing the opportunity to examine teaching styles as well as curriculum content. This proved to be an invaluable learning experience. As well as providing excellent teaching for our students, it presented them with respectful and positive role models of diversity and complementarity.

In addition, this cooperation provided greater insight into the underlying reasons for the underachievement of TS students in the school and, in the future, the opportunity to work effectively toward developing strategies to achieve an

improved education situation for these students, leading to greater success.

There is evidence of understanding of tasks and/or acquisition of mathematical concepts, which correlate with using Turkish and English during peer group interaction. Students emphasised that using two languages together among their peers and when interacting with the teacher gave them self-confidence and better understanding of the task. Turkish/English bilingual speakers' participation in the lesson was increased.

This study yielded results similar to those of Dawe (1983), but this time the target group was bilingual Turkish/English children. There was also a positive correlation between increased competency in the use of the two languages and an increase in children's mathematical reasoning. This study has shown that as children's confidence and competence grows through bilingual interaction, this has positively affected their acquisition of mathematical concepts. We explored how the children used cognitively undemanding information passed by on the teacher to make sense of cognitively demanding mathematical tasks (Cummins 1984).

According to Cummins (2000), there was a gap of several years, on average, between the attainment of peer-appropriate fluency in the second language (L2) and the attainment of grade norms in academic aspects of L2. Conversational aspects of proficiency reached peer-appropriate levels usually within about two years of exposure to L2, but a period of five to seven years was required, on average, for immigrant students to approach grade norms in academic aspects of English (Cummins 2000).

During this period, it is essential that educational practitioners involved with these students work creatively towards developing strategies to enable their progression to an age-appropriate level of academic language acquisition. The study's original hypothesis that, where possible, support in the first language is of major importance in achieving this objective, has been supported by the project's (albeit limited) results.

During the course of the project, the department was informed of our progress and at the end our results were discussed. It was agreed that this had been of great benefit to the TS students and the rest of the class concerned, both in terms of increasing their mathematical understanding and social interaction, in that there was now a greater understanding and mutual acceptance among students

from different backgrounds. Other staff members in the mathematics department have expressed their interest in conducting similar projects not only with TS students, but also with students from other language backgrounds. We are currently exploring together the practicalities of progressing to this next stage in our professional practice. This is one of the most positive results of the project. We are very aware of the limited nature of the project and we are looking for ways of extending it over a longer period of time. We are also hopeful that if this and similar means of teaching are successfully presented by the mathematics department to the rest of the school, it will influence methods of teaching in other subject areas and improve the overall success rate of the students.

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