

# *Illuminating English*: how explicit language teaching improved public examination results in a comprehensive school

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**SUMMARY** *The project described here is based on a linguistic analysis of the language of GCSE textbooks, coursework and examinations across the curriculum. It was hypothesised that explicit teaching of the linguistic features which distinguish these genres would produce an improvement in performance across the curriculum. A 3-year course was developed and taught over a period of 8 years to Years 7–9 in a comprehensive school. The methodology adopted was that of Teaching English as a Foreign Language, and the course was administered by teachers without special training. The project was monitored at every stage. The hypothesis was found to be correct, when the number of pupils gaining 5 or more GCSEs at Grades A–C was dramatically increased among those pupils who had followed the course, compared with other schools in the Borough and the national average.*

## **Introduction**

This is a success story. Unlike most educational projects it started, not with a problem, but with a solution—a linguistic solution.

*Illuminating English* is the title of what is now a 3-year language course. The title sums up the theory on which the whole project was based: that thought is not merely *reflected* by language, it is *constituted* by language. The pleasing ambiguity of the title is symbolic of the project: learning illuminates English and English

illuminates reality—by imposing upon it the framework of language and so enabling us to think about it.

Educationally, the project was based on the belief that what prevents many young people from achieving success within the terms of the school curriculum is their failure to master the appropriate language. Materials based on modern linguistic analysis were trialled and monitored at a comprehensive school in Wigan over an 8-year period. They were trialled by hard-pressed teachers from several departments with no special training.

The present article gives an account of the project and its results in the General Certificate of Secondary Education (GCSE) examinations of 1990 and 1991.

### Shevington High School

Shevington is a dormitory suburb of Wigan, consisting of mixed private and council housing. In common with the rest of the area, there is a high rate of unemployment, for example 14.6% in 1992.

Shevington High School, Wigan, is an ordinary 11–16 urban mixed comprehensive school. The school accommodates the whole population of the area with little creaming-off to other schools. The distribution of 'ability' reflects the normal distribution of the total school population nationally. (For example: the mean Verbal Reasoning score for those pupils entering the school in 1984 was 98.)

From 1984 onwards all new intakes were taught in mixed ability groups in all subjects from Years 7 to 12. All these pupils were entered for nine subjects in the GCSE examinations 5 years later. Staff turnover during the years 1984–91 was low, several of the new staff coming to the school under redeployment.

### Public Examination Results 1989–91

In 1989 30.3% of Shevington's 177 Year 12 pupils obtained five or more passes in GCSE, Grades A to C. (The comparable results in Wigan as a whole were 29.6%, and 32.8% nationally.)

In 1990, the percentage of the 159 Year 12 pupils obtaining five or more passes in GCSE, Grades A–C was 46.6% (as against 33.9% in Wigan and 34.5% nationally).

In 1991, the percentage at Shevington had risen to 55.6% (144 pupils), while the results for Wigan were 36.1% and the national percentage was 35.9%.

These results are shown in Tables I and II.

TABLE I. Percentage of pupils gaining five or more GCSEs, Grades A–C

	1988	1989	1990	1991
National*	29.9	32.8	34.5	35.9
Wigan	24.3	29.6	33.9	34.6
Shevington	28.0	30.3	46.6	55.6

\* Department of Education and Science, *Statistical Bulletins*.

TABLE II. Percentage increase, 1989-91

National	9.45
Wigan	16.8
Shevington	50.4

### Reason for the Improved Performance

The startling improvement in Shevington's public examination results in 1990 and 1991 coincides with the development and introduction of *Illuminating English*.

The pupils who took their public examinations in 1990 had studied systematically the completed and published versions of Books 1 and 2 and the first draft version of Book 3. The pupils who took their public examinations in 1991 had used the published versions of Books 1 and 2, and also the rewritten materials later published as Book 3. During those 3 years no other significant change in the policy, teaching staff or organisation of the school took place which could account for this dramatic improvement in performance of 50%.

The project was conducted in an environment favourable to innovation: Wigan was an innovative Borough, and Shevington High School was in the forefront of the innovations being pioneered at that time—INSET, Records of Achievement, and evolving teaching and learning strategies whereby young people were encouraged to take responsibility for their own learning.

### The Theory Underlying *Illuminating English*

#### (1) *That Language can be Taught*

All teachers know that there are differences between the language which children learn for purposes of socialisation in the home and the streets (everyday language) and the language which they need for success in school (academic language). The principal thesis underpinning *Illuminating English* is that *what can be described can be taught*. Hence, if the features which distinguish academic language from everyday language can be described, they can also be taught.

The methodology used in *Illuminating English* is essentially that used in Teaching English as a Foreign Language. Everywhere in the world business people, scientists and administrators are having to learn English quickly and well. A multi-million dollar industry has grown up to meet this demand, and since this learning is often privately funded, it has to produce results.

New books teaching non-native speakers how to learn the language of (for example) engineering, medicine and business appear every year. These teach the content and the language as an indivisible whole. Without the capacity of human language to create abstract words and connections, the concepts would not be

possible. This is true, no matter what the particular language being used. Where (as in much of Africa, for instance) the language of the schools is English, which is the first language of very few of the learners, the abstract concepts of education are taught through the medium of English rather than the first language.

Our own culture is so monoglot even now that most teachers remain unaware of the role of language as the constituting medium of thought. Except for teachers trained very recently, the chief use of explicit language teaching, especially 'traditional grammar', was to sap pupils' confidence in their ability to use their native language 'correctly'.

*Illuminating English* is based on the thesis that native speakers can be taught by the same methods to master quickly and well those parts of their own language which they need to have success in school.

## (2) Concrete and Abstract Language

There is a continuum between academic language at university level and the language of school textbooks. Academic language has been well described by applied linguistics teaching foreign scholars doing their higher degrees in English at English and American universities. Certain optional linguistic features, described below, dominate this kind of writing. They occur rarely in everyday spoken language.

In a linguistic breakthrough in 1983, Mary Mason described these differences at the level of the word ((a) and (b) below). Her findings were first published in this journal, and subsequently in linguistic journals (Mason, 1987, 1988a, 1989a.) Added to other well-known features of academic language, this completed a description of the language which pupils need in order to succeed in school. Briefly, these linguistic features are as follows:

(a) All abstract words are based on concrete words. They are made out of concrete words by:

- (1) changes of word-class, especially nominalisation (that is, changing other word-classes into nouns—for instance, *preserve* (verb) to *preservation* (noun); *warm* (adjective) to *warmth* (noun);
- (2) metaphor, including personification; for example, *chain* reactions, the *aim* of research.

(b) In English the link between the concrete base and the abstract development is often lost, because the concrete words are Germanic in origin and the abstract words are Latin or Greek. For example: The apple *hangs from* the tree (concrete); an argument *depends upon* close reasoning (abstract—Latin: *dependere* —to hang from).

(c) Verbs in the passive voice (often without the agent). For example: The solution *was heated* in the test tube.

(d) Long sentences with clauses logically connected, by conjunctions, relative words, sentence adverbs, participial forms, etc.

(3) *Discourse Structure*

The above analysis is at the level of the word and sentence. There is an impressive body of analysis of academic text at discourse level—that is, language above the level of the sentence.

The work of Eugene Winter in the field of clause relations has provided a seminal analysis of how scientists combine sentences to make larger meanings. His work has been taken further by Michael Hoey, whose *On the Surface of Discourse* forms the theoretical basis of Book 3 of *Illuminating English*.

Briefly, the structures which underlie both narrative and non-narrative discourse in our culture are:

- (a) problem–solution;
- (b) compare and contrast;
- (c) general–particular.

***Illuminating English: a description of the contents***

The course consists of three books:

*Book 1. Language Awareness;*

*Book 2. Reading for Learning;*

*Book 3. Writing for Learning.*

The aim of the course was to give pupils confidence in their ability both to read and write academic language. Since pupils selected their GCSE options at the beginning of Year 10, the course had to be completed during Years 7 to 9.

*Book 1. Language Awareness*

This book prepares the pupils for the work on the move from concrete to abstract language in Book 2. It therefore introduces:

- (a) grammar: all the word-classes (“parts of speech”) except the conjunction (which is taught in Book 2); the structure of the sentence;
- (b) Latin and Greek roots;
- (c) language varieties: written and spoken, English dialects, pidgins and creoles, etc.

There is an important interaction between (a) grammar and (c) language varieties. The illumination of language varieties is enhanced by having a metalanguage to analyse them with. Conversely, the use of learning grammar is immediately apparent. Unlike ‘traditional grammar’ teaching, the grammar needed for this purpose is taught in such a way that all pupils can succeed.

There are three important by-products of the book:

(1) It makes an important contribution to multi-cultural education. We have found all too few ways of giving value to the linguistic expertise of those pupils in our schools whose first language is something other than English. In this book each

grammatical point made about English is illustrated from seven other world languages. This provides an opportunity to use and value our bi-lingual and multi-lingual young people by using them as linguistic informants.

(2) A further useful multi-cultural illumination is that it becomes inescapably clear that all human languages have the same basic structure and are equally complex.

(3) The fact that languages differ in certain minor ways (in technical language: they realise differently the same universal underlying features of language) is helpful to foreign language learning. For example, all languages consist of clauses encoding Subject-Verb-Object, but the order in which these structural items appears is not the same in all languages. (Welsh clauses are ordered: Verb-Subject-Object; Urdu: Subject-Object-Verb, for instance.)

### *Book 2. Reading for Learning*

The linguistic description of the features of academic language is independent of the mode in which it is realised—speaking, listening, reading or writing.

A decision was made to teach the features of abstract language in relation to *reading*. The aim of the book thus became specifically to enable pupils to read school textbooks. It therefore opens with work on finding the meanings of unknown words.

Then the features outlined above (passive, change of word-class, metaphor, Latin and Greek roots, structure of complex sentences) are systematically taught, always in relation to the understanding of specific texts taken from school textbooks across the curriculum.

It was hoped that, if the mysteries of these sample texts could be dispelled, other similar texts on the syllabus would be more readily understood.

### *Book 3. Writing for Learning*

The discourse structures of our culture also obtain, no matter what channel of communication is being used—listening, speaking, reading or writing. It was decided to attach the teaching of the discourse structures described above (problem-solution; compare and contrast; general-particular) to the *writing* of GCSE course-work and examinations.

The material used was that actually produced by pupils preparing for GCSE at Shevington in 1988–89 and was taken from subjects across the curriculum.

Telling stories, both orally and in written form, is a fundamental part of education from Year 1 onwards. (Discourse analysis shows how vital this is for pupils' *cognitive* development as well as their imaginative development, since the basic structures of narrative texts are the same as those of non-narrative texts.) Hence Book 3 is organised in pairs of chapters: narrative followed by non-narrative. The pupils practise each structure first in stories and then in academic writing.

### ***Illuminating English: description of the methods recommended***

As indicated earlier, the methods underpinning the organisation of these textbooks are those used extensively in Teaching English as a Foreign Language. When a point is to be taught, it is first defined (briefly and simply), then practised in several different ways, and finally applied. This is a classic method of teaching English to foreigners who have enough English to understand the definitions and presents no problems to the first and second language learners in secondary schools in this country. It has the advantage of being democratic in that it is totally explicit: the pupils know what they are doing and why. It dispels the confusion about language which undermines the confidence of so many young people.

Another method widely (but not exclusively) used in Teaching English as a Foreign Language is pairwork. The books recommend that the teacher trains the pupils in habits of independent study. Each chapter consists of activities which the pupils are instructed to work through in pairs at their own pace. The only equipment needed, apart from one book between two, is paper and a writing implement. Each chapter consists of two parts—a 'core' component, that everyone should work through, and an 'extension' for pupils finishing the core early.

The role of the teacher in using this course is therefore that of facilitator rather than being the source of all knowledge. Since only the most junior and least influential staff in schools have any knowledge of modern linguistics, this approach was forced on the writer of the course. The 'answers' are obvious enough, but, at the request of the teachers, a book of answers was provided for each book to give them confidence. The 'marking' (and, more important, the discussion and encouragement that go with it) can easily be done by the teacher as s/he goes from pair to pair within class time.

In practice, the many teachers involved in the trials followed their own predilections in organisation. Some started and/or ended each lesson with class discussion, others merely directed the pupils to hand out the books and (having trained them in habits of independent work) left them to work alone. Some kept the class together in the same chapter, others let the pupils work through the whole book at their own pace, so that some finished the whole book and others did not. Some teachers preferred pupils to work in threes or larger groups.

This describes only the least eccentric ways in which the books were used: there is no way in which an author can control what happens to his/her books in use!

### **Development of the Course at Shevington**

#### *(1) Language Awareness*

1984–85: 17. In 1983 Mary Mason talked to Tony Quayle, then Head of English at Shevington High School, about her description of academic English. He agreed that it would be interesting to see if explicit teaching of these features produced an improvement in pupils' performance. To test the hypothesis, he taught the first

draft materials of *Book 1. Language Awareness* to 1J, one of seven unstreamed Year 7 classes, during 1983–84.

A result from an unexpected source came at the end of that academic year. The Head of Modern Languages found that 1J had performed disproportionately well on the York Language Aptitude Test (LAT), used at Shevington and in many other schools to help determine which pupils' language aptitude would lead to their being placed in the top sets for Modern Languages. 1J, it was discovered, had not been remarkable for high scores on the NFER Verbal Reasoning Test at the beginning of the academic year—their mean score had been average in relation to the other classes.

This unlooked-for success had two consequences. First, the Modern Languages Department agreed to unstream their teaching. 1J's success had undermined the idea that pupils succeed in learning modern languages because of some (presumably innate) aptitude for it, since it was clear that 1J's aptitude for language learning had been dramatically increased by explicit teaching about language. Secondly, the English Department agreed to teach the revised *Language Awareness* materials to half of Year 7 during 1984–85, using the other half as a control group.

*1984–85: controlled experiment.* The York LAT was administered to the pupils in Year 7 in October 1984. This brought a surprise: the control group performed significantly better than the experimental group. The whole group took the York LAT again in October 1985. Now the scores of the two groups were almost the same. In other words, the experimental group had improved more than the control group, see Table III.

TABLE III. York Language Aptitude Test, 1984–85

Group	Number	Pre-test		Post-test		Increase	
		Mean	SD	Mean	SD	Mean	%
Control	61	25.41	9.84	29.30	9.57	3.89	15.3
Experimental	88	21.89	10.80	29.90	11.30	8.01	36.6

*1985–91: standard curriculum for Year 7.* From this point on, the materials, published in 1988 as *Illuminating English, Book 1. Language Awareness*, were taught as part of the school curriculum to all pupils in Year 7 from 1985 until a new Headteacher was appointed in 1991.

## (2) *Reading for Learning*

*1984–85: 27.* This class, now in Year 8, trialled the first draft of materials later published as *Illuminating English, Book 2. Reading for Learning*.

1985-86: *controlled experiment*. The rewritten materials had more substantial trials with the experimental group of 87 pupils.

Since the aim of this part of the course was to improve the reading of academic texts, a reading test seemed the most appropriate way to test its effectiveness. At this point a snag appeared: there was no standardised reading test difficult enough to test the kind of reading on which these pupils were working. Therefore, a Cloze procedure test was devised, using unknown passages of similar difficulty to the ones being examined in the course.

The scores were as shown in Table IV.

TABLE IV. Reading test, 1984-85

Group	Number	Mean	SD
Control	69	28.5	8.2
Experimental	87	31.0	6.0
			$p=0.034$

In view of the higher scores of the control group at the beginning of their involvement with the course, we regarded this as sufficiently encouraging to continue the trials.

1986-90: *standard curriculum for Year 8*.

### (3) *Writing for Learning*

1987-88: *first trials*. The whole of Year 8 at Shevington used the first draft of the materials later published as *Illuminating English, Book 3. Writing for Learning*. (See below for results.) The course was substantially rewritten, using different material, for the following year.

1988-91: *standard curriculum for Year 9*.

*Further testing*. The results of these trials were sufficiently encouraging for the Metropolitan Borough of Wigan to second Brian Heap as teacher-fellow at the University of Lancaster during 1987-88, with the brief of carrying out tests over a larger number of pupils and in other schools in the Borough. His results were as follows:

#### (a) *Book 1. Language Awareness*

Two other schools in Wigan offered a total of three classes for the experimental group, along with three matched classes for control purposes. For comparison the whole of the first year at Shevington was also tested. Since Shevington was unstreamed, this group comprised the whole school population, while the other

schools excluded 'remedial' classes. The York Language Aptitude Test was used for these tests. See Table V.

TABLE V. York Language Aptitude Test, 1987-88

Group	Number	Pre-test		Post-test		Increase	
		Mean	SD	Mean	SD	Mean	Percentage
Experimental	73	24.88	7.58	34.27	8.05	9.40	37.8
Control	63	25.65	7.67	32.85	8.31	7.21	27.8
Shevington	80	19.54	10.82	26.54	12.16	7.00	35.8
$p=0.042$							

(b) *Book 2. Reading for Learning*

For this test the experimental group was the whole of the second year at Shevington, and the control group the whole of the second year at another school. The same kind of Cloze test was devised as had been used in the previous trials at Shevington. The results were as shown in Table VI.

TABLE VI. Reading test, 1987-88

Group	Number	Pre-test		Post-test		Increase	
		Mean	SD	Mean	SD	Mean	Percentage
Experimental	103	26.25	7.21	32.38	7.37	6.13	23.4
Control	136	26.24	8.34	30.23	9.11	3.99	15.2
$p=0.003$							

(c) *Book 3. Writing for Learning*

This was being piloted for the first time at Shevington during 1987-88. The whole of the third year at Shevington acted as the experimental group, and the whole of the third year at another school formed the control group.

For each test pupils were asked to write for 30 minutes on a non-narrative subject. Their scripts were impression marked on a scale 1-5 for organisational coherence. The results were as shown in Table VII.

TABLE VII. Writing test, 1987-88

Group	Number	Pre-test		Post-test		Increase	
		Mean	SD	Mean	SD	Mean	Percentage
Experimental	123	2.76	0.96	3.20	0.96	0.44	15.94
Control	128	2.80	0.93	2.85	1.04	0.05	1.79
$p=0.000$							

## GCSE Results

The test results detailed above demonstrated to the project team that their hypothesis was correct. However, this was small satisfaction to the pupils involved. The project bore fruit for them when it was reflected in their GCSE results. Table VIII is a summary of the development of the project at Shevington, relating it to the GCSE results.

TABLE VIII. Summary of project and GCSE results

Year of entry	Book 1 (Year 7)	Book 2 (Year 8)	Book 3 (Year 9)	GCSE year	Percentage A-C†	Percentage increase/ decrease national/ Shevington
1983	1J*	2J*	—	1988	28.0	-6.4
1984	C/E*	C/E*	—	1989	30.3	-7.6
1985	All	All	—	1990	46.6	+35.1
1986	All	All	All	1991	55.6	+53.7

\* First draft materials.

† Percentage of total year-group.

## Conclusion

The project team is, of course, delighted with the results made public in this article. They are delighted not only for the sake of the pupils who achieved greater success in public examinations as a result of taking part in the project, but also for the sake of the many teachers who co-operated in it, especially those at Shevington High School [1].

These results also vindicate those academics who early recognised its possibilities and gave encouragement and support [2].

Finally, it must be said that the success of the project could not have been achieved without the moral and financial support of the Metropolitan Borough of Wigan. Moreover, because the project took place in Wigan, the materials were published much earlier than they could have been elsewhere—by TRACE, a company set up in the first instance with LEA funding [3].

## NOTES

- [1] At Shevington, special thanks must go to Bet Southworth, Head of English from 1984, who conducted the trials of Books 1 and 2, and to Lindsey Heaton, Head of Modern Languages from 1987, who trialled Book 3.
- [2] John Sinclair, Professor of Modern English Language at the University of Birmingham, Chris Brumfit, Professor of Education at the University of Southampton and Professor Philip Walkling, Dean of the University of Central England in Birmingham Faculty of Education, were

generous in their encouragement throughout the project. The Centre for Advanced Studies in Education, University of Central England in Birmingham under Professor Derek Cherrington gave substantial help in a number of ways. Florence Davies, then of the University of Liverpool, was also very supportive.

Dr Michael Hoey of the University of Birmingham, whose analysis of the discourse structure of English is used in Book 3, gave a great deal of time to discussing and checking the first draft of that book.

The project team was indebted to Annie Mayo in the Department of Statistics at the University of Birmingham for advice and computer time in analysing and presenting the statistics in Tables III and IV.

- [3] The Director of Education, Kevin Hampson, was firm in his support of the project. The publication of the materials by TRACE owes much to Maureen Layte, the editor of *Illuminating English*.

#### REFERENCES

- BAZERMAN, C. (1988) *Shaping Written Knowledge: the genre and activity of the experimental article in science* (Madison, WI, University of Wisconsin Press).
- BATES, M. & DUDLEY-EVANS, T. (1976) *Nucleus: English for science and technology* (Harlow, Longman).
- BERNSTEIN, B. (1959) A public language: some sociological implications of a linguistic form, *British Journal of Sociology*, 10, pp. 311-326.
- CORSON, D. (1985) *The Lexical Bar* (Oxford, Pergamon).
- DAVIES, F. & GREENE, T. (1981) Directed activities related to text: text analysis and text reconstruction, *26th Annual Convention of the International Reading Association*, New Orleans.
- DAVIES, F. & GREENE, T. (1984) *Reading for Learning in the Sciences* (Edinburgh, Oliver & Boyd for the Schools Council).
- DEPARTMENT OF EDUCATION AND SCIENCE (1988) *Report of the Committee of Inquiry into the Teaching of English Language* (Kingman Report) (London, HMSO).
- DES (1989) *National Curriculum: English for ages 5 to 16* (Cox Report) (London, HMSO).
- HEAP, B. (1988) Teach English proper!, *Link* (University of Lancaster Centre for Educational Research), 9(1).
- HEAP, B. (1989) Wigan Language Project: evaluation of the Language Awareness Course *Illuminating English*, Metropolitan Borough of Wigan (unpublished).
- HENDERSON, W. (1985) The objectives of economics education, in: G. B. J. ATKINSON (Ed.) *Teaching Economics* (London, Heinemann).
- HEWINGS, A. (1990) Aspects of the language of economics textbooks, in: T. DUDLEY-EVANS & W. HENDERSON (Eds) *ELT Documents 134* (Modern English Publications/British Council).
- HOEY, M. (1983) *On the Surface of Discourse* (London, Allen & Unwin).
- MASON, M. (1986) The deficit hypothesis revisited, *Educational Studies*, 12(3), pp. 279-289.
- MASON, M. (1987) The linguistic mechanisms of abstract thought, *ITL Review of Applied Linguistics*, 75, pp. 1-35.
- MASON, M. (1988a) *Illuminating English, Book 1. Language Awareness* (TRACE, Wigan WN1 1TX).
- MASON, M. (1988b) A language awareness project in Wigan, in: C. BRUMFIT (Ed.) *Language in Teacher Education*, pp. 126-127 (Brighton, National Congress on Languages in Education).
- MASON, M. (1989) *Illuminating English, Book 2. Reading for Learning* (TRACE, Wigan WN1 1TX).
- MASON, M. (1990a) *Illuminating English, Book 3. Writing for Learning* (TRACE, Wigan WN1 1TX).
- MASON, M. (1990b) Dancing on air: an analysis of a passage from an economics textbook, in: T. DUDLEY-EVANS & W. HENDERSON (Eds) *ELT Documents 134*, pp. 16-28 (Modern English Publications/British Council).
- MCCLOSKEY, D.C. (1986) *The Rhetoric of Economics* (Brighton, Wheatsheaf Books Ltd.).
- MYERS, G. (1990) *Writing Biology: text in the social construction of scientific knowledge* (Madison, WI, University of Wisconsin Press).

- PEREIRA, K. (1979) The language demands of school learning, in: *Language Development*, Open University course P232, block 6.
- SWALES, J. (1990) *Genre Analysis: English in academic and research settings* (Cambridge, Cambridge University Press).
- WIDDOWSON, H.G. (Ed.) (1980) *Reading and Thinking in English: discovering discourse* (Oxford, Oxford University Press).
- WINTER, E. (1978) A look at the role of certain words in information structure, in: K. P. JONES & V. HORSNELL (Eds) *Informatics 3* (London, ASLIB).
- WINTER, E. (1986) Clause relations as information structure: two basic structures in English, in: M. COULTHARD (Ed.) *Talking about Text*, ELR Discourses Monograph No. 13 (Birmingham, University of Birmingham).