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ABSTRACT

An experimental course in English for non-English speaking post graduate research students is described here. The course was intended to enable the students to use English efficiently in exchanges related to their profession. The selection process, teaching methods, and the "exit test" are described and a discussion of the adequate and inadequate aspects of the course is given. The entry tests were in spoken English, grammar, and listening comprehension coupled with written production. During the course two teachers were involved, one generally presenting the material and the other facilitating group discussion. Films, slides, articles, closed-circuit television, language laboratory sessions, and personal tape recorders were used extensively along with teacher-directed private study. At the end of the course, the test of spoken English and the listening comprehension test, administered on entry, were given. A third test was added to measure oral fluency based on activities of the course. Evaluation of the course revealed a noticeable inadequacy in the ability of students to read a paper or present material from private notes. Although proficiency in listening comprehension, oral production, and limited written production all showed improvement, it was indicated that higher standards might be reached with the use of more course-specific materials. Several recommendations are provided in the light of this pilot experience. (AMH)

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Report on the postgraduate course in scientific English to students from the Faculté des Sciences, Université Libre de Bruxelles.

An experimental course in English for postgraduate research workers was introduced into the teaching programme of the Institut de Phonétique, Université Libre de Bruxelles, 1974-1975. It was primarily intended to enable research students from the Faculté des Sciences, most of whom were chemists, to participate actively and efficiently in exchanges related to their scientific preoccupations at an international level through the medium of English.

In the initial planning stages the intention was that the level of instruction should be relatively advanced. It was assumed that a certain receptive ability in listening and reading would have already been acquired by these students through their previous contact with the language at school, in scientific gatherings and from the reading of scientific papers. It was likewise assumed that some, even though hesitant, ability at oral and written production would be present, for the same reasons.

Based on these assumptions the course was planned to cover several main fields of linguistic activity consisting of an initial stage of group harmonisation followed by more specific job-related activities.

GROUP SELECTION.

In order to form a group with a level of ability sufficient to permit the successful completion of the intended programme, a battery of entry tests was presented, with the aim of measuring specific types and levels of knowledge. Since nothing was known of the population in question, elements from standardised tests, used with known populations of students, formed the different components, this to facilitate selection based on cross-comparison of results for each component. The test battery consisted of :

a) A test of spoken English,

b) A multiple choice grammar test,

c) A test of auditory comprehension coupled with written production.

a) The test of spoken English was administered in order to measure ability in the spontaneous, accurate oral production of basic structure patterns

in a natural context. It was included so as to give some information about student ability to react in a question and answer situation, considered basic to the proposed teaching programme. Inadequacy at this level would imply that a student was not in a position to work successfully at the intended programme of instruction.

b) The multiple-choice grammar test, measuring the ability to recognise structure of greater complexity, was felt to be justified by the requirement to be able to digest scientific literature relevant to research. Indequacy at this level would imply that the student was not sufficiently advanced to work from text-based materials included in the programme.

c) The test of auditory comprehension coupled with written production was intended to measure the extent to which students could assimilate information in a lecture or debate-type situation and at the same time accurately reproduce, in writing, the information gathered. Ability to make inferences was also tested by this component.

25 students underwent the test battery, with 15 being slected on the basis of results achieved. 2 further students who had followed earlier courses at the Institute were incorporated into the group, and finally a body of 13 students followed the course in its entirety.

Forming a relatively homogeneous group proved to be a difficult task, given the disparate nature of results at the different components of the test battery. This was in part to be expected. Receptive abilities in general are greater than productive ones, but the problem of group selection was made more difficult by the lack of correlation between the two abilities. On a purely ad hoc basis it was decided to eliminate only those students whose level of attainment on any one component was considered to be too low for any practical participation in classroom activities, the level being fixed by comparison with achievements of the known student population.

METHOD

On an experimental basis two teachers were closely involved in the planning and teaching of this course. The two teachers alternatively took on the rôle of providing the actual instruction or mixing with the group as animator. Occasionally, where the nature of the activity justified it, only

one teacher was present, as in the initial period of instruction designed to harmonise group level in preparation for later activities. During the later stages of the course one of the teachers would present materials which he had personally prepared, or which were related to his particular interests or competence, the other intervening during different stages of the lesson to provide additional information or to orientate group discussion.

The presence of two teachers during most of the activities proved to be very revealing and was highly appreciated by the students. From the teachers' point of view it enabled many points to be commented upon that normally escape the attention of the person giving the lesson, e.g., incomprehension of subtleties by certain members of the group, indistinctly produced student answers, ambiguities, attempts by different students to provide different answers, etc. From the student point of view the opportunity to react to two very different styles of teaching, modes of delivery, rates of speech, idiosyncratic linguistic features, explanations of grammatical points, was widely felt to be beneficial. As a pedagogic exercise it enabled the observing teacher to note the efficiency of individual strategies, the success of materials, the planning of future lessons, in a more detailed manner than if such tasks had been left to the sole responsibility of the person directing the class.

After the initial period of group harmonisation (± 15 hours) most classroom activities were based on the technique of rôle simulation, different members of the group being requested to participate in activities encouraging oral production in situations akin to those they were felt likely to meet with professionally. Initially these activities were of a general, non-scientific nature, gradually leading to those bearing on future job needs. In the later stages students were requested, for example, to give demonstrations, prepare and present mini-lectures, synthesize abstracts, discuss scientific materials, reproduce information from lecture notes, etc. To a certain extent it was found that the planning of activities fitted in with the recommendations put forward by the Council of Europe Committee for Cultural Development on the Unit/Credit scheme in language learning. The global concept of language was broken down into sub-units in terms of communication situations in which research scientists are characteristically involved. These led to the specification of learning objectives involving a multi-media learning system designed to achieve objectives. (For further

information, cf. J.L.M. Trim, Teaching Foreign Languages to Adults, CILT Reports and Progress Papers, 11).

Film, slides, articles, and closed-circuit television, together with the language laboratory and private tape-recorders were all used as teaching aids. In this pilot project classroom activities were partly based on existing materials used with other student populations and partly on new materials. New materials were to som extent created in response to needs arising out of contact with the students, each of the two teachers involved producing those materials that coincided most closely with his personal specialisation. The amount of newly designed materials was inevitably restricted by the nature of the class activities in which students themselves provided their own stock from personal work. Greater emphasis was placed on the experimentation of new strategies and techniques, particularly with reference to the use of closed-circuit television and rôle simulation. In this way was revealed what new materials would be required in future courses, although students themselves often provided useful indications as to future needs by specifically requesting certain types of exercise or further practice in given activities. Language laboratory activities were rather limited, partly because of the nature of the teaching, partly because of limitations on time available (7 1/2 hours of a total of 45), and also because of the lack of sufficient materials that tied in closely with classroom activities.

Most work done in the laboratory was based on problems arising from experience in the classroom. This situation can be justified by the experimental nature of the course where assessment of linguistic deficiencies that could best be remedied through the use of the laboratory could be made after some initial contact with the students and their reaction to teaching techniques. The laboratory's main function was that of remedial gap-filler where structural problems arose. However, this does not imply that the entire programme was worked out on an ad-hoc day-to-day basis. Certain classroom activities had been designed to tie in closely with a subsequent reinforcement session in the laboratory. (For a detailed breakdown of materials used in the laboratory, cf. Appendix). One final reason why laboratory activities were somewhat reduced in scope is because students had been supplied with private tape-recorders for individual study at home.

Teacher-directed private study was considered to be an essential component of the course, chiefly because of the limited time available for student-teacher contact. Taped materials, sufficient for about one hour's pri-

vate study per week were regularly distributed. (This was considered by most students to be the maximum time they could devote to homework, given their research commitments.) The nature of the students' professional activities led them to read a substantial amount of material in English so that it was not felt necessary to provide homework based on reading. On the other hand, the restricted laboratory work and limited classroom contact already mentioned indicated that the most useful activity would be of an oral nature where this was compatible with private study. Consequently, most homework activities consisted of so-called "Active Listening" exercises, where dialogues are listened to and written answers provided to a series of questions related to what is heard. This activity was felt to be justified in that it improved listening comprehension while at the same time giving an opportunity for controlled written production. Homework thus tied in with one of the avowed aims of the course, namely to stimulate comprehension of lectures, discussions, seminars, etc., and to practise writing syntheses, abstracts, etc., through the production of simple, restricted written sentences. Other homework activity consisted of oral drills which did not require the presence of a teacher for control purposes but which were simply intended to provide further practice in problem areas already handled in the classroom or laboratory. This was particularly the case with the verbalisation of numbers and symbols, or with practice in correlating an auditory stimulus with printed text matter. For a complete breakdown of the methods, materials and aims of each activity, see the schematic table in the Appendix.

THE EXIT TEST.

A battery of exit tests, designed to measure progress achieved, was administered at the end of the course. Two components were exactly the same as those administered on entry, namely the test of spoken English and the test of auditory comprehension coupled with written production. A third test was included in order to measure ability in oral fluency, based on activities similar to those done during the course.

The test of spoken English measured gains in structural accurary at the sentence level and was related to the overt teaching of structure patterns during the 45 hours.

The second test tied in closely with the homework and measured pro-

gress made in auditory comprehension and written production.

The third test was a more problematic choice since although it was felt necessary to measure one of the major course objectives, that is the ability to discourse on a scinetific topic, the very heterogeneous nature of activities in class made it difficult to find a technique, together with a thematic content, that was representative of a large part of the class activity and at the same time suiteble for cross-comparison of student performance. A solution was found which attempted to maximise the opportunity to give proof of proficiency in a large number of linguistic activities carried out during the course, while also restricting the topic of the examination. Students were given two graphs containing statistical information and requested to describe the graphs orally for two minutes after a preparation period of four minutes. Student efforts were recorded for later correction, all students taking the test at the same time in the laboratory. The test allowed for the verbalisation of numbers and symbols, the use of a restricted range of tenses, together with a limited range of a specialised vocabulary in a continuous flow of speech.

DISCUSSION

The nature of the pilot project, with its particular emphasis on teaching techniques and their implications for materials development leads to the discussion of different aspects of the course.

Practical teaching contact with the group immediately revealed that the several objectives it was hoped to achieve were too ambitious. The major reason was that the level of proficiency on entry to the course was lower than hoped for. Although most students had a fairly good receptive proficiency on entry, their level of productive ability was only modest. The heterogeneous nature of the group complicated this situation, some members being sufficiently proficient to require little more than a re-awakening of dormant linguistic knowledge, the majority however, requiring more fundamental structural practice in essential areas relevant to a specialised function of language use. The second factor to pertub the planned content of the course was that the battery of tests applied for selected students was not totally appropriate to the linguistic objectives set out in the initial programme. Nevertheless it was felt that the use of the battery was justified in that it allowed for measurement along a known scale.

Once it was realised that the level of ability was not as high as expected it became evident that the amount of time to be allocated to the course was inadequate. This had implications for the completion of the planned subcomponents of the course. For example, the period of homogenisation of group ability was found to be too short, although it is difficult to envisage how this can be lengthened in the present 45-hour arrangement without altering the fundamental nature of the course and turning it into a rapid revision course with a scientific orientation. Insufficient time was likewise available for achieving some of the more specific activities that had been planned. In spite of fairly lengthy periods devoted to the verbalisation of symbols and figures it was found that students still had difficulty in expressing themselves unambiguously and with confidence. This meant that the presentation of personal research work was not always carried out effectively. Insufficient time meant that not all students had an opportunity to present their own work, or to play some of the rôles felt necessary to their work (e.g., directing a discussion, chairing a meeting, summarising an intervention made by a colleague, etc.). Rôle-playing activities were successful and popular but were not conducted with sufficient frequency to guarantee ease of performance at international gatherings once the course was over.

A noticeable indequacy that came to light during the presentation of private research by students was the inability to read a paper or present material from private notes without causing a serious breakdown in intelligibility. Although students could answer questions spontaneously without much difficulty, reading aloud showed manifest interference from the written language. It was clear that this was one ability that required further practice since it represents a basic component in the presentation of a paper at a congress.

Although proficiency in auditory comprehension, oral production and written production of a restricted nature all showed clear signs of improvement it is felt that more suitable course-specific materials are needed to attain even higher standards. Students themselves expressed a desire for more non-scientific materials. However their professional requirements and the linguistic constraints which these imply would suggest the implementation of more course-specific scientific materials.

The techniques involved in teaching were felt to be successful on the whole, though improvements can be made in the light of experience with the pilot project. The presence of two teachers proved to be the most interesting and successful element in the experiment, providing a variety of techniques, explanations, clarifications of grammatical rules, styles and registers which can be nothing but beneficial. From the student point of view activities were rendered more lively and varied, the presence of an animator encouraging participation. The classroom situation became more meaningful as teacher and animator alternated in interventions with the class by creating a very natural discussion situation. The animator often intervened when unexpected questions arose, providing support to the teacher or explaining points a second time in a different fashion, thereby acting as a reinforcement.
Individual help could more easily be afforded students with minor difficulties noted while the teacher was concentrating on problems concerning the whole group.

Attempts were made to vary classroom activities to the utmost by using a variety of pedagogic strategies supported by technical aids. The use of closed-circuit television was an innovation in language teaching in the Institute and because of lack of experience was only partly successful. Three students were filmed while they presented their private research to the rest of the group. Afterwards the sequence was replayed and discussed. In order to maximise interest and usefulness to the group as a whole, rather than to the three individuals concerned, future use of closed-circuit television should be organised in a way that allows each participant to appear for a short period before the cameras (about 5 minutes) to allow for general discussion at a later viewing. Television could also be used for a variety of other activities.

The insufficient time allocated to laboratory work can only be compensated for by a more rational use of taped materials. Inadequacies in the laboratory programme as used in the pilot project could partly be overcome by the construction of a new programme based on this first experience.

The extension of laboratory activities through the use of the private tape-recorder proved to be useful and helped to achieve one of the goals set out in the plan. Nevertheless, it is felt that this aspect of the course can be improved by catering more specifically for individual

needs and by providing a wider variety of private-study activities.

The questionnaire to measure student reaction to the course provided useful information. Rather surprisingly, students were extremely positive in their responses, whereas experience with other groups often reveals positive attitudes towards achievement coupled with negative self-assessment of progress made. This could possibly be accounded for by the greater maturity of the post-graduate students and the fact that they had attended the course voluntarily.

RECOMMENDATIONS

The following recommendations have been made in the light of experience with the pilot group.

It is recommended that :

1) The course be extended from 45 hours to 60 hours;
2) That 2 teachers continue to alternate in the rôle of teacher and animator;
3) That the period of group harmonisation be extended to 20 hours of basis structural groundwork in cases where there is little group harmony. If wide disparities exist between individuals in the group the two teachers could each take a part of the group;
4) That the laboratory programme tie in more coherently with class activities through a more rigidly planned use of existing materials and by the creation of further course-specific materials;
5) That a more varied programme of homework activities be designed, together with the use of supplementary materials from existing stocks to cater for individual needs;
6) That greater emphasis be placed on two vital aspects of the language needs of research scientists, viz., the verbalisation of symbols and figures together with the reading aloud of printed matter (both these activities could be further extended in the private homework);
7) That further experimentation be carried out with the use of closed-circuit television as a teaching support;
8) That a new set of tests be designed for use on completion of the course;
9) That a more detailed questionnaire be drawn up at the end of the forthcoming course in order to discover the effectiveness of the changes and improvements that are introduced.

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Annexe 3. Breakdown of teaching activities.

Time allotted	Nature of activity	Aims of activity	Laboratory work	Homework
2 h.	Simple discussion based on listen-repeat-react technique using popular scientific recorded text	To measure group ability at auditory comprehension and at simple responses to an auditory stimulus.		
2 h.	Verbalisation of written symbols and numbers together with use of the simple present tense by working through the Periodic Table of Elements	To practise elementary verbalisation of scientific data closely related to group research (chemistry); to practise the basic tense of definitions and the statement of "universal truths"	LU 1/2 (Pres.sim. + frequency advs particularly in 'universal truths"	AL 1/2 "The habitual Offender"
2 h.	Working from a text on linear measurements, further practice on the verbalisation of symbols and figures in conjunction with the use of the present simple	To practise the interpretation of facts & figures, including symbols specific to English (cwt.,oz.,lbs.); to practise regular and irregular forms of comparatives & superlatives in the present tense	LU 1/4 (Contrast pres. s.; pres. cont.)	AL 4/2 "Noise"
2 h.	Working from a printed sheet on the verbalisation of symbols of a less common type	To recognise differences between conventional English symbols and non-English counterparts, with variants; to practise definitions.	LU 1/8 (Verbs without -ing pres.) F 2/4 (Comp.& superlative	
2 h.	Reading aloud from a popular scientific text, noting particularly stereotyped constructions	To practise reading from a paper at a conference, verbalising symbols in context; to learn stereotyped phrases for inclusion in personal production at a later stage of the course.		AL 2/2 "Divorce"
2 h.	Observation of a film on Noise with note-taking; formal grammatical explanation of the passive and the distinction between the simple past and present perfect tenses	To practise note-taking from filmed material in preparation for note-taking at lectures; to prepare notes for writing abstracts		Written summary of film on Noise based on notes taken in class
2 h.	Reading aloud from a text on Food Preservation, reconstituting a diagram described in detail but missing from the text.	To practise reading aloud for lecture purposes and to conceptualise and reproduce a missing diagram from precise information given in the text	F 5(Determiners) F 6(Determiners)	PGRAD 1(Recording of text on "Food Preservation" for auditory comprehen

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Time allotted	Nature of activity	Aims of activity	Laboratory Work	Homework
4 h.	3 members of a panel have to come to a decision connected with work based on a limited nb. of facts. In the light of arguments put forward by the panel the class takes a decision	To practise controlled discussion in a work group requiring the presentation of facts, persuasion, argument & counter-argument; intended to lead up to panel discussion on private research		FUN 14 (Verbalising symbols) Written ex on s.past., pres. perf.contrast. Ex. on dets.&rel.prons.
6 h.	Formal instruction in the language of graphs; building up different graphs	To practise verbalisation of symbols & figures; to practise lecturing while building up graph on the board and describing components as the lecture develops	F 14 (Much; many, a lot of)	AL 3/2 "Exams" Written ex.on tense usage "The Hovercraft", AL 5/2 "Women's Lib!)
2 h.	Linking up with the language of graphs, formal instruction in comparatives, superlatives and coextensives	To practise further verbalisation of figures	F 2/3(Coextensives) LU 5/4,LU 5/6 (Verb +prep)	PGRAD 2 (Passives) AL 6/2 "Race & Prejudice"
2 h.	Formal presentation of letter-writing gambits	To practise scientific correspondence (e.g.requesting information, collaboration, off-prints, with justifications)		Letter-writing based on classwork Written ex.on lab. report in the passive.
2 h.	Presentation of a mini-lecture on a topic unfamiliar to the group; highlighting the recurrent presentation of information through varied syntax; emphasis on theory	To practise comprehension of unfamiliar material in a lecture;note-taking and discussion for proof of comprehension leading to presentation of mini-lectures on student's personal research	LU 22/1 (Comparative of adjs & advs)	AL 7/2 "Status Symbols"
2 h.	Round-table group discussion on applied research	To practise group discussion simulating colloquium situations leading to presentation of student's personal research	LU 22/2, LU 22/3 (Lang.of graphs)	AL 8/2 "Advertising"
2 h.	Presentation of facts, figures and formulae in lecture form for later reconstitution by the group	To practise note-taking in lectures, measuring the ability to gather precise, discrete elements of orally presented scientific matter for later reconstitution	F 4/4 (So + adj. such+noun	PGRAD 3 (Note-taking)

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Time allotted	Nature of activity	Aims of activity	Laboratory work	Homework
2 h.	Discussion on the philosophy of science from a text based on KUHN	To practise sustained discussion, argument, defence of opinions, etc., using a provocative text helped along by "loaded" questioning	RE 9/1 (Phone gambits)	AL 9/2 "The Permissive Society"
4 h.	Presentation of 3 mini-lectures by students together with a guided visit to laboratory	To practise lecturing in English based on knowledge gained from course but adapted to individual needs. Success of lecture measured by the group's ability to discuss. These lectures were filmed for later analysis by the group	LU 21/3 (let's suppose, suppose that)	AL 10/2 "Language and Logic"
2 h.	Discussion based on reading of a theoretical scientific paper with highly condensed information	To practise reading aloud, interpretation and amplification of condensed meaning, to synthesize orally and to discuss	Fluency ex. based on describing expt.) LU 14/1 (Elision)	
3 h.	Return of individual written work, explanation of varied grammatical points, clarification of individual problems	To wind up the course		
Total = 45 h.				

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