Content-Based Language Instruction in a Tertiary Setting

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Abstract — This paper reports on an approach to the development of a large-scale content-based language instruction curriculum in an English medium, tertiary setting. It describes (a) the antecedents and theoretical basis for content-based language instruction, (b) how this relates to the background and rationale for the project under review, (c) the original curriculum framework for the project, and (d) the revised framework developed in the light of experience. Although certain prerequisites are necessary for the adoption in other contexts of a content-based approach such as the one reported, the main strength of the project is emphasised as its ability to reduce tension between learners, content-teachers, and language teachers, as illustrated by specific features of the programme. This paper reports on a large scale experimental content-based language curriculum which has been developed over the last decade at Sultan Qaboos University (SQU), Sultanate of Oman. Although there is considerable literature based on various aspects of this programme (Adams-Smith 1984; Bilton & Fahmy 1990; Fahmy & Bilton 1989a, 1989b, 1989c; Flowerdew 1990; Griffiths 1989; Stevens 1991), there is no single paper which provides an overview of the project. This paper sets out to describe the rationale, planning, implementation, evaluation, and revisions for the project as a whole. The paper is presented as a case study of how content-based language instruction can be applied in a situation where a more traditional ESP type programme would normally be employed.

Background to the Sultan Qaboos University Project

Formal education only started in Oman in 1970, having been discouraged by the present Sultan’s father and predecessor. Therefore, there developed a need for a university in Oman only when the first intake of school pupils began to graduate in 1986. The Sultan Qaboos University (SQU) Project was initiated in the early 1980s with a brief to have a university ready to receive these pupils. The SQU duly opened in September, 1986.

As with most other Gulf universities, it was decided that English should be the medium of instruction for all students majoring in the faculties of science, engineering, medicine and agriculture. Early reports emphasized the relatively low levels of English that could be expected of students entering SQU (Adams-Smith 1983, 1984; Al-Barwani 1983; Bint 1982; Holes 1985). Such predictions have subsequently been borne out in practice, a number of measures having been taken. As well as limited proficiency in English, it was anticipated, and

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1The first entry of students, for example, were administered an adapted version of the British Universities TEAP
has subsequently been confirmed in practice, that students would have limited basic study skills (Turvey 1988).

In order to alleviate the deficiencies in English and study skills referred to above, it was decided by the project committee that students should undergo a Science Foundation Course (SFC), which would consist largely of English, in addition to some basic science and mathematics. It was decided that the English course should be closely tied in with the science course:

... the scientific English ... should be closely tied in (in fact jointly planned) with the Science which is being concurrently taught on the Science Foundation Course—in other words it should "feed off" the Science Foundation Course (Holes 1985: 12)

The content of the English course should be based, quite simply, on the actual language used by the science teachers on the Foundation Course. (Holes 1985: 12)

Content-Based Language Instruction: Antecedents

The idea of integrating language and content in second language instruction has developed over a considerable period. Crandall (1987) and Spanos (1987) trace the development of content-based second language instruction to the language across the curriculum movement in first language education (Bullock Committee 1975).

In ESL, Widdowson (1968, 1978) was one of the first to suggest that language and content teaching might be totally integrated, and that English could be acquired through the medium of some other subject. "This not only helps ensure the link with reality and the pupil's own experience," Widdowson argued, "but also provides us with more certain means of teaching language as communication, as use rather than simply as usage" (1978: 16). Mohan (1986) has similarly stressed the potential of integrating language and content, pointing out that such a procedure has the advantage of not only helping students to learn a language, but also teaching them how to use the language to learn.

"Adjunct" models, as developed by Snow and Brinton (1988), where language and content teachers are teamed together and where language teachers derive their material from the content course, are a more recent application of Widdowson's and Mohan's ideas on language and content in a tertiary setting. "Immersion" models (Hauptman, Wesche, & Ready 1988; Swain 1984; Wesche 1985) and "sheltered content instruction" (Brinton, Snow, & Wesche 1989) are further variates of content-based instruction. One way of viewing
content-based instruction is as a logical extension of English for Specific Purposes. ESP, like the content-based approaches reviewed above, has as its goal, the development of communicative abilities within specific field, activity, and interpersonal domains. In addition, ESP, in common with content-based approaches, has traditionally exploited content texts (both written and oral) and activities as part of the language curriculum. A number of ESP programmes have been reported on where a fully content-based approach has been adopted (e.g., Dudley-Evans & Johns 1981; Horey 1984; Johns & Dudley-Evans 1980).

Content-Based Language Instruction: Theoretical Basis

Based on Brinton, Snow, and Wesche (1989), Spanos (1987: 229) lists a range of conditions which content-based language teaching should fulfil (see also Kessler & Quinn [1987] for a similar list):

- language teaching should be related to the eventual uses to which the learner will put the language
- the use of informational content tends to increase the motivation of the language learner
- effective teaching requires attention to prior knowledge, existing knowledge, the total academic environment, and the linguistic proficiency of the learner
- language teaching should focus on contextualized language use rather than on sentence level usage
- language learning is promoted by a focus on significant and relevant content from which learners can derive the cognitive structures that facilitate the acquisition of vocabulary and syntax as well as written and oral production

Support for content-based language instruction is to be found also in second language acquisition theory. Krashen (1982, 1985) and Long (1983) have argued that for successful second language acquisition to take place, the learner must be provided with "comprehensible input," i.e., language at or just above the learner's competence. In its emphasis on meaningful and comprehensible input, Krashen's model of second language acquisition fits in very well with content-based approaches to language teaching, where the role of the teacher is to make comprehensible to the learner the meanings contained in the content text.

"Creative construction" models of language acquisition, which see the linguistic code as evolving out of communicative interaction (Bruner 1983; Halliday 1975, 1978; Hatch 1978), also accord well with content-based instruction.

The underlying hypothesis of those who have argued for content-based approaches to language teaching is that language is acquired through the attempt to communicate, rather than by the conscious learning of rules and

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2In the case of the content-based approaches reviewed above, the field is usually academic; in ESP the field may be academic or vocational.
examples. The dichotomy of communication, on the one hand, and the learning of rules and examples, on the other, has been related by Chamot and O'Malley (1987) to a distinction made in cognitive psychology between declarative and procedural knowledge (Anderson 1981, 1983, 1985). Declarative knowledge corresponds to what is known about something (e.g., rules and examples), whilst procedural knowledge is the ability to actually do something (e.g., communication). Chamot and O'Malley (1987) apply this distinction in rationalizing an approach to content-based language instruction, referred to as "The Cognitive Academic Language Learning Approach" (CALLA). According to this approach, declarative and procedural knowledge are developed in two separate components: A content component represents declarative knowledge and includes concepts, facts, and skills related to the content subject, whilst a language development component represents procedural knowledge, which teaches students to use language fluently and creatively in their academic context.

Rationale of the Sultan Qaboos SFC

The rationale underlying the SQU integration of language and content on the part of those initially involved with the project was, by and large, pragmatic and was not based on any particular theory of second language acquisition (SLA). C. Holes, a consultant to the project and subsequently director of the language centre, for example (personal communication, 1985), was influenced by the practical experiments in team teaching conducted at Birmingham University, where English teachers and science teachers cooperated on courses at post-graduate level (Dudley-Evans & Johns 1981; Johns & Dudley-Evans 1980). For Holes (1985), one of the main advantages of the integration of language and science was the opportunity it provided for the language classes to go over what had taken place in the science lectures, i.e., to help the students to understand the science. Adams-Smith (1984: 206), coordinator of the language centre in its project days, before the university was opened, refers to the enormous motivational effect of integrating language and content, citing the experience of Peter Roe, director of the language centre at King Abdul Aziz University, Jeddah, Saudi-Arabia (Roe 1980).3

If the original motivation was practical, a number of those who have conducted research on the SFC once it was in operation and of those who have been concerned with curriculum design for the course have been influenced by language acquisition theory. On the research side, a project was set up, for example, to investigate the ways science lecturers could modify their lecturing style in order to provide comprehensible input and encourage more interaction from the students (Fahmy & Bilton 1989a, 1989b; Griffiths 1989). Initiatives in

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3This is the view put forward by Johns and Dudley-Evans (1991), who see the term "content-based instruction" as an alternative U.S. term for ESP and who cite sheltered and adjunct approaches as ESP formats.
course design and materials development based on principles of SLA will be reported on below.

**The Original Curriculum Framework**

In describing the organizational framework of the SFC, it is necessary to distinguish two phases: the original framework and the modified framework, developed in the light of experience. In its original form the SFC curriculum had three main components: a science course, a science “support” English course and a general English course.

The science course and the science support English course were team-taught, the English focusing primarily on the lectures, but also on the assigned readings that accompanied the lectures. The English teachers observed the science lectures and video recordings were made for exploitation in the English class. Observation was considered necessary in recognition of Johns and Dudley-Evans’s (1980: 8) view that in team teaching, the language teacher “needs to be able to grasp the conceptual structure of the subject his students are studying if he is to understand fully how language is used to represent that structure.”

The follow-up English support classes used edited versions of the videos to help students clarify points in the lecture they did not fully understand, to give them an opportunity to talk about the topic of the lecture, and to go over significant linguistic features. The assigned readings were treated in a similar way.

The general English course was more traditionally structured, progressing independently of the science course. It took as its starting point the level of proficiency in English of students on entering SQU and built upon this in a step-by-step progression.

The important distinction between the English support course and the general English course was that the support course was aimed primarily at helping the students understand the science course on a day-to-day basis—its aims were short-term, while the general English course was concerned with developing proficiency in English over the long-term.

**Problems with the Original Framework**

As a result of evaluation, in the form of observation of language and content classes and student and staff questionnaires, a number of problems with the original framework came to light, as follows:

1. It was difficult to demarcate clearly the two English courses. For example, grammatical forms or rhetorical functions singled out for attention in the support course would at some point also be dealt with by the general course. Similarly, although the support course staff was ostensibly concerned mainly with helping students understand their lectures on a day-
to-day basis, it is reasonable to presume that overall listening proficiency—an objective of the general English course—was developed at the same time.

2. It was difficult to allocate the available time for English between the two courses. The support course staff was continually claiming it did not have enough time to help the students come to grips with the science and to exploit the linguistic potential of the content material, while the general English course staff was unwilling to give up time it felt necessary for the systematic approach to developing proficiency for which it had been given responsibility.

3. It was difficult to decide how general the “general” English course should be. Designed on the basis that students of science would find more use for words such as “shape,” “size,” “diameter,” “height,” “property,” etc., than they would for words such as “disco,” “beer,” “good-looking,” “charming,” etc., and that they would have more need for participating in seminars, reading science text books, or writing reports, than they would for ordering a drink in a bar, making a date with members of the opposite sex, booking a hotel room, etc., the general course was not general in the sense of dealing with everyday family and social life. Instead, it focused on general scientific/academic language and study skills which were likely to be of benefit to any student of science. The general course was only general, therefore, insofar as the language and skills taught were applicable to science in general and did not focus, as the “support” course did, on the science being actually taught in the content course. This situation led, on the one hand, to some confusion on the part of students and staff concerning the demarcation of the two courses, and on the other, to calls for a course which corresponded more closely to the generally accepted notion of what a “general” English course should look like.

4. Although students undoubtedly needed help in understanding their lectures, the initial emphasis on the use of video as a means of going over the lecture, to give the students a second chance at comprehension, was felt by many students to be boring. At the same time, from the English teachers’ point of view, exploitability of the lecture videos was highly variable, depending on a number of factors, as follows:

Subject Matter. Physics, for example, tended to offer little for linguistic exploitation, much of the lecture time being spent working through mathematical problems, whereas biology offered more long stretches of descriptive exposition, suitable for exploitation.

Individual Lecturer Style. Some lecturers provided better models than others. Variables here included clarity of logical organization, use of discourse markers to highlight organization of the lecture, speech rate, accent, speech modifications (use of “simple” syntax, use of synonyms, and paraphrase, use of comprehension checks, etc.)
Amount of "Dead" Time. Some lectures contain a lot of unexploitable "dead" time—time spent cleaning the board, waiting for students to write down notes, adjusting the overhead projector, waiting for late-comers to settle, assigning out-of-class assignments, doing in-class assignments, etc.

5. A certain amount of rivalry developed between teachers of the two English courses, which was unhealthy for staff relations and ultimately for the effectiveness of the programme.

The Revised Framework

Largely because of the problems outlined above, after two years of operation, the English components of the SFC were revised. Instead of having two English courses with distinct aims, it was decided to combine the aims of the two courses under one umbrella. For practical reasons, because of the large number of hours, it was still necessary to break the English down into components; however, this was done according to skill area and not according to short- and long-term aims.

With the original SFC curriculum framework, only the support course was integrated with the science. In the revised framework, however, all of the English was integrated. The change was, as already stated, partly a result of problems with the original arrangement. However, the new, more integrated framework also owed much to the experience gained over the first two years. As a result of this experience, a much better idea was gained, on the one hand, of the challenges presented to the students by the content course, and on the other, of the real overall language needs, lacks, and wants of the students (Hutchinson & Waters 1987).

Regarding the content course, three sources of information were exploited. First, through observation, access to curriculum documents, and discussion with content planners and teachers, a more accurate picture was developed of the various tasks required of the students. Second, transcripts of the recorded lectures, prescribed readings, and other written handouts were collated to produce a database of language equivalent to what a student would be exposed to in the content course. Word frequency and concordancing computer programs were developed to analyze this data. Third, observation of student behavior in lectures and laboratory practicals, questionnaires, and interviews provided a profile of student difficulties (lacks) in their content course.

Student needs, lacks and wants in their English course were ascertained through a combination of discussion, access to curriculum documentation, diagnostic testing, and formal questionnaires. Content staff, language staff, and students were all targeted in this data collection.

All of the above-mentioned data was fed into the design of the revised curriculum framework. Three components were created for the revised English part of the SFC: listening/speaking, reading, and writing. Each of these components combined short- and long-term aims, i.e., they aimed to help students understand their science course on a day-to-day basis, while at the same time attempting to develop overall proficiency in English.
Listening/Speaking

This component maintained the video-based methodology of the original course, i.e., parts of recordings of the lectures were used to provide the opportunity for students to go over the content material again, to develop overall listening skill, and to practise speaking on the topics of the science lectures. In addition, complete sets of the recorded lectures were made available to students for viewing in a self-access centre. A number of refinements were introduced in the use of video within the revised framework, as follows:

1. With the benefit of videos made and used in previous years, it was possible to exploit the lecture material much more carefully.
2. As a result of discussion with the science departments, special videos were made to provide instructions for laboratory practicals. These were presented and exploited in the English class, before the practical. They provided a truly authentic medium which, at one and the same time, improved performance in the content course (students were better prepared for their practical classes), and provided meaningful and relevant language input.
3. To provide further variety, commercial videos were introduced on topics related to the science course.

The listening/speaking component also introduced materials for teaching classroom language, in order to enable students to participate more fully in their content classes.

Although an important function of the video recordings of the content course was to help students with difficulties in comprehension (a short-term objective), a skills-based methodology was developed, using tasks graded in such a way as to exploit the recordings progressively and systematically, in order to fulfil longer-term listening and note-taking objectives.

Reading

Initial experience with the prescribed texts for the science course indicated that they were too demanding for SQU first year students. In cooperation with the science departments, therefore, language staff produced simplified versions of the original texts. These formed the basis for the reading course. Language and content were thus fully integrated in the reading component, with the materials in the English class taking the form of the texts prescribed to accompany the lecture course.

All revisions were done in collaboration between language and content staff. While language staff could bring to bear much expertise in simplifying the texts linguistically and in other ways, in order to make them more accessible, it was essential that there should be no distortion to the content; for this the collaboration of the content staff was essential. Although the texts were simplified linguistically, they were still “authentic” in that they were produced by scien-
tists to be used by their students. No formal guidelines were set out for text simplification, but the following techniques were applied to varying degrees (data obtained by means of a questionnaire administered to those involved in simplification):

Amount of Text. The textbooks initially used consisted of many pages (the biology book was of 694 pages, for example), only selected sections of which were necessary to the course. Within these sections, also, there was extraneous material not relevant to the SQU lecture course. The textbooks were reduced to short booklets of readings, each reading relating to a particular lecture topic, and with extraneous material edited out.

Layout. The physical density of the text in the textbooks initially used was perceived to be a major problem. Simplification, therefore, focussed on increasing the amount of “white space.” This was done by including diagrams, reducing paragraph length, inserting headings and sub-headings, using bold, underline, etc., for key terms and concepts.

Cultural Presuppositions and Relation to Background Knowledge. Culturally based allusions that students were likely to be unfamiliar with were removed or replaced with familiar ones. Where information required background knowledge likely to be unfamiliar, this was again removed or replaced.

Paragraph and Text Organization. Paragraphs were simplified to follow a very clear logical structure, based upon a topic sentence and with clear logical links between sentences. Logical connectors were used generously. Logical development from one paragraph to the next was ensured.

Language. Syntax was simplified to avoid compound and complex sentences, complex noun phrases, complex modality, and complex tenses. Some writers made use of published guides used for writing graded readers. Lexis was controlled where possible to correspond to that used in the lectures.

Glossaries. Glossaries were written both for technical and general vocabulary. The frequency and concordancing programs applied to the readings were used here.

Short- and long-term objectives were reconciled in the reading component by means of a similar skills-based approach to that applied in listening/speaking, i.e., the prescribed content readings were exploited both to fulfil the short-term objective of understanding the content and the long-term objective of developing fluency in overall reading comprehension. Thus, in comprehension, true/false, multiple choice and open-ended comprehension questions, for example, emphasized interpretation of content, whilst skimming and scanning, for example, promoted more general comprehension skills. In vocabulary, exercises on technical vocabulary focussed on content knowledge, while exercises on word formation promoted more general reading skills.

Because the language staff were involved in the simplification of the prescribed readings, it was also possible to introduce an element of grading into
the texts, greater complexity being allowed as the course (and students' reading ability) progressed.

Writing

In the original framework, writing had been focused upon mainly in the general English course, as not much writing was required in the content course. In the new framework, the writing component still focused on long-term needs, and was given responsibility for the systematic teaching of basic grammar, writing mechanics and rhetoric (something which students and staff had requested strongly in questionnaires and interviews). However, the course was integrated with the content course and thus focused also on short-term objectives.

The writing course was built upon a syllabus consisting of topics, tasks, discourse features, notions/functions, grammar and lexis. These were selected and sequenced as far as possible on the basis of what was going on in the science course.

For example, while students were learning about the "earthworm" in their biology course, the writing course presented a unit which culminated in a task involving a description of this species. While students were studying cell structure, the writing course presented them with a task involving a comparison of two types of cells.

In biology, a number of notions/functions were recurrent; these included description of structure, components, colour, shape, size, function, and location. During chemistry, on the other hand, notional functional areas included instructions, reports, relations of cause and effect, and method and purpose. Notions and functions were sequenced to fit in with the tasks for which they were needed. For example, in the description of the earthworm task, the notions of components, size, shape and function were required. Components, size and shape having been presented in previous units, the unit leading up to the earthworm task placed special emphasis on introducing and practising the new notion of function and its associated language, at the same time as recycling the previously studied notions of components, size and shape.

Grammatical and lexical selection was based on the main items needed in the realization of the notions and functions, which, in turn, were needed in the realization of the tasks. The database, accessed by means of the frequency and concordancing programs, allowed selection of the lexical and grammatical items most frequently associated in the content course with the various notions and functions.

Appendix A shows how information derived from the database by means of the frequency and concordancing programs was incorporated in some of the materials focusing on function. An "input" section of the unit is presented in the form of a biology quiz (Appendix A.1.). The quiz is composed of concor-

*This material was written by James Scott, of the Language Centre.
danced statements from the database, some of them judiciously edited to make
them false. In doing the quiz, students are thus presented with a set of au-
thentic statements from their biology course incorporating some of the impor-
tant verbs for describing function. In addition, the statements exhibit two
different grammatical patterns used with these verbs: the formulaic, “The
function of x is to y; and the present simple tense, “x does y.” The rest of the
unit develops these lexical and grammatical areas, focussing more overtly on
the verbs for describing function (Appendix A.2.) and the two grammatical
patterns (Appendix A.3.).

The use of the database as a means of deriving items for the syllabus and for
direct incorporation into the course material ensured that the language fo-
cussed on in the writing course correlated highly with the language that stu-
dents were encountering in their content course. A great advantage of this
approach was that, because the database was relatively small, knowledge of a
relatively small number of linguistic tokens (declarative knowledge in Chamot
& O’Malley’s [1987] terms) could be used by the students in the development
of their higher level communicative skills (procedural knowledge) in writing.6

In addition to the use of the database in syllabus and materials design,
another area where writing was integrated with content was in the collabora-
tive creation by language and content staff of writing tasks to be used in the
content course. Given the limited proficiency of students in writing, the con-
tent course initially required little written work from SFC students. There was
thus the danger of a Catch 22 situation developing, in which scientists did not
require writing because students were unable to supply it and English teachers
did not teach writing because scientists did not require it from their students.
The damage would only become apparent when scientists started to demand
sophisticated writing, as they indeed did in later years of study. In order to
bridge this gap between the longer-term needs for writing and actual profi-
ciency of SFC students, language and content staff cooperated in creating a set
of writing tasks for the content course, which were at an appropriate level of
difficulty such that students, with help from their English teachers, could per-
form them adequately. These took the form of short answers to questions on
laboratory practicals.

Appendix B shows the questions, target language, and model answers for
the first chemistry laboratory practical (Experiments 1 and 2).6 As Appendix B
shows, this particular questionnaire exploited work done in the English course
on use of conditionals, the passive and/or impersonal “you,” and modal verbs.

As well as cooperating in devising the questionnaires, language and chem-
istry staff cooperated in the administration of the questionnaires to students.

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5This emphasis on procedural knowledge within the controlled framework of the limited language of the content
course was a feature not just of the writing component, of course, but also of the other two components. As
already described, in listening/speaking, the focus was largely on the language of the lectures. In reading, again,
as already described, the materials were derived from the content course.

6This questionnaire was prepared by James Scott, of the Language Centre, and Richard Burnham, of the
Chemistry Department.
The following procedure was adopted here. First, the students did the questions in draft during and/or after the laboratory practical. The drafts were then brought to the English class where the questions were discussed in plenary session, the English teacher pointing out what language was likely to be required, although carefully avoiding providing answers regarding content (a sometimes difficult task, it must be admitted). Student drafts were then checked by the English teacher, language (but not content) problems being identified. The students then rewrote a final draft for submission to the Chemistry Department for evaluation of content.

The limited writing tasks represented by the laboratory questionnaires were an effective means of ensuring that students had an authentic purpose for the language they learned in their main course English. This had important motivational, as well as practical, value for the students. In addition, collaboration between English teachers and scientists in administering the questionnaires ensured that the scientists received work written in English of a sufficient standard to allow realistic grading for content. Furthermore, and perhaps most importantly in the long term, the questionnaires provided a realistic stepping stone in the direction of the more sophisticated writing which would later be demanded of students, such as full-blown laboratory reports, examination answers, term papers, etc.

Conclusion

This paper has reported on a large scale content-based language instruction programme in a Middle Eastern university. It has described how the programme, although based on solid theoretical principles, grew out of a practical concern to find the best way to initiate beginning university students into English-medium science studies. The paper has outlined some of the specific problems with the original curriculum and how it has been revised in light of these problems. Only time will tell the extent to which these revisions have been successful.

Before concluding, some words of warning regarding prerequisites for the success of a programme such as the SFC are appropriate. The first prerequisite is the full support of the institutional administration. When cooperation is required between a language centre and other faculties or departments, the language centre must feel that its voice is accepted as equally powerful as that of the other concerned parties; otherwise, it will be difficult to bring in some of the radical arrangements for cooperation between language centre and content departments. The SFC was fortunate in that the language centre at SQU had faculty status, and was thus represented on all important committees where decisions concerning its operation might be made.

A second prerequisite for the success of a content-based programme such as the SFC is the full cooperation of the content staff. Although some of those on the language side were nervous about obtaining this cooperation, the language centre was generally perceived by the scientists as a positive force for the
success of their own programmes, and so cooperation was usually forthcoming. However, content staff need to be made aware that the success of a content-based programme may mean adjustment not only to the English curriculum, but also to the science; this is an area that needs to be treated delicately. Furthermore, where content staff are non-native speakers of English, any misapprehensions they might have concerning language staff “judging” their English must be forestalled.

A third prerequisite, it goes without saying, for such an innovative approach to language teaching is a highly qualified and motivated language staff. Not all language centre staff, it must be admitted, were motivated to teach on the SFC. Fortunately, there were other courses which staff could choose to teach other than the SFC.

A fourth prerequisite is the establishment of an understanding by the learners of the role that is expected of them. Students participating in a content-based course have difficulty in disentangling the language and content objectives and consequently may experience unease in identifying an appropriate role for themselves as learners. It is important, therefore, to educate learners from the outset concerning the objectives of the course and what is expected of them.

Having presented these warnings, and to end on a positive note, what are the main strengths of the SFC at SQU? They can be related to what Swales (1985: 138), in a discussion of an early example of content-based instruction (Johns & Dudley-Evans 1980), claims is the ability of this medium to resolve what he refers to as the “tension” between learners, content teachers, and language teachers. Three particular ways in which this tension is alleviated have been highlighted in this paper. The first is through the intensive observation of the content classes, a procedure which allows continual modification of the language curriculum to approximate more closely to the needs of the learners and content teachers. The second way is through collaboration between language and content teachers, a procedure which has resulted in the modification of not only the English curriculum, but also the content curriculum, as exemplified by the creation of “genuine” texts and learning tasks for both language and content classes. The third way possible tension has been reduced is through the use of a database of language used in the content classes, as a basis for fostering the acquisition of higher level communicative abilities (procedural knowledge) within the limited code available in the content classes. In highlighting throughout this paper the integration of language and content instruction and the resulting reduction in tension between learners, content teachers and language teachers, it is hoped that this account of the SFC may, in spite of the warnings expressed above, offer insights for curriculum developers in other contexts.

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REFERENCES


Appendix A
Sample Materials Focussing on Describing “Function”

Appendix A.1. ‘Input Section’

SECTION ONE: INPUT

BIOLOGY QUIZ

These statements describe the functions of some of the components of plant and animal cells, but they are not all correct. Test your knowledge of this semester’s Biology, by deciding whether each one is true or false.

1. The function of the chromosomes is to carry hereditary material in the form of DNA.
2. One function of lysosomes is to transport oxygen around the body.
3. Another function of lysosomes is to destroy worn-out organelles within the cell.
4. Strands of plasmodesmata help material to move between cells.
5. Centrioles help the cell to form new cilia and flagella.
6. Chloroplasts absorb light energy and convert it to chemical energy by the process of photosynthesis.
7. The function of the Golgi body is to produce food for the nucleus.
8. Enzymes control and organize the reactions in an individual cell.
9. The function of chlorophyll is to help in the process of active transport.
10. The cellulose wall of the plant cell produces energy in the form of ATP.
11. The general function of rough ER is to transport the proteins which have been synthesized by the ribosomes.
12. Microvilli help the cell to move.

Appendix A.2. Vocabulary Section Focussing on Verbs Describing Function

SECTION 2: VOCABULARY

All the statements in the Biology quiz in Section 1 describe the function of something. This is a list of some of the most common verbs in your Biology course which you can use to describe functions.
Read the list. Which ones don’t you know? Ask a friend or look in the dictionary. Can you write the Arabic meanings next to each one? After studying the list, try the self-test on page xx.

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<th>absorb</th>
<th>feed</th>
<th>prevent</th>
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<td>store</td>
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<td>pull</td>
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<td>keep</td>
<td>pump</td>
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<tr>
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<td>let</td>
<td>push</td>
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<td>convert</td>
<td>make</td>
<td>reduce</td>
<td>transfer</td>
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<tr>
<td>destroy</td>
<td>move</td>
<td>release</td>
<td>transport</td>
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</tbody>
</table>

Appendix A.3. Grammar Section Focussing on Grammatical Patterns for Expressing Function

Look at some of the statements from exercise xx on page xx again:
1. The function of the chromosomes is to carry hereditary material in the form of DNA.
2. Another function of lysosomes is to destroy worn-out organelles within the cell.
3. Strands of plasmodesmata help material to move between cells.
4. Centrioles help the cell to form new cilia and flagella.
5. Chloroplasts absorb light energy and convert it to chemical energy by the process of photosynthesis.
6. The general function of rough ER is to transport the proteins which have been synthesized by the ribosomes.

All these sentences describe the FUNCTION of something, but they use two different grammatical structures to do so. Look at the sentences carefully. Can you see the two structures?

Divide the six sentences into two groups according to their grammatical structure. Write the sentence numbers here:

**FIRST GROUP**

**SECOND GROUP**

All the sentence in one of your groups should contain a verb in the present simple tense.
All the sentences in the other group should contain the words: "The function of . . . is to . . ."

These are two ways to describe the functions of things. We shall practise them one by one.

Appendix B

Questions, Target Language and Model Answers for Laboratory Practical 1

FOUNDATION SCIENCE COURSE: CHEMISTRY
LABORATORY MANUAL

Answer these questions on a separate sheet of ruled paper.

**QUESTIONS ON EXPERIMENT 1**

1. If you spill some strong acid on your skin, what should you do immediately?
   **CONDITIONAL, MODAL VERB, IMPERSONAL ‘YOU’ OR PASSIVE**
   You should wash the acid off with plenty of cold water.
2. If some solid is spilled on the bench, should it be returned to the reagent bottle? Explain your answer.
   **CONDITIONAL, MODAL, PASSIVE, USE OF ‘BECAUSE’ OR ‘OTHERWISE’**
   No, because it will be contaminated and it will contaminate the whole bottle if it is returned.
3. What must you do when you have finished an experiment?
You must clean your apparatus and return items to the locker that belong there. You must leave your bench clean and tidy.

QUESTIONS ON EXPERIMENT 2

1. Convert 0.358 g to milligrams (mg).

2. Chemicals must never be weighted directly on the balance pan. What may happen if you weigh chemicals directly on the balance pan?

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