Cognitive Style and Specific-Purpose Course Design
John Flowerdew

Abstract—Recent interest has been shown in ELT course design in emphasizing process rather than product. This has revived interest in research into the “good language learner,” the aim being to incorporate those learning strategies conducive to good language learning into the curriculum. Widdowson, relating these developments to ESP, has gone further and suggested that ESP course design could be based on the cognitive style of the specific purpose. In this paper, problems of a process approach to English courses for supposedly “convergent” academic disciplines (math, science, etc.) are discussed. The first problem is an apparent conflict between the convergent cognitive styles associated with math, science, and so on and the cognitive style and strategies of the “good language learner,” which mainly seem to be “divergent.” Second, learners of English from the convergent disciplines may need help in developing those divergent skills associated with good language learning. Third, although scientists may be better at convergent thinking, this does not imply that they have no ability or need for divergent strategies in the study of science. Fourth, sociocultural factors may have more influence on cognitive bias than does the study mode associated with the academic discipline of the specific purpose. In conclusion, it is argued that ESP course designers need to undertake task analyses of the intellectual abilities employed in the activities of the specific purpose of their learners, and then relate these to what is known about the intellectual abilities of the good language learner.

Product and Process and the “Good Language Learner”

In recent years, applied linguistics has been shifting the emphasis away from concentration on the rigid specification of the syllabus items in EFL/ESL curriculum design in favour of greater attention to the ways in which learning is to be achieved (Breen & Candlin, 1980; Brumfit, 1983; Widdowson, 1983). This redirection of attention from what items of language are to be learned in favour of how they are to be learned is commonly characterized as a move away from product in favour of process. Emphasis on how successful language learning is to take place has revived interest in earlier research into the nature of “the good language learner” (Naiman, Frohlich, & Stern, 1978; Rubin, 1975), the idea being that if we are aware of the strategies used by successful language learners, then we can encourage those learning strategies in all of our learners by incorporating them into our curricula.

Cognitive Style of Academic Discipline and English for Academic Purposes—Widdowson’s Argument

Widdowson (1981, 1983), discussing ESP curriculum development in particular, has taken the argument a stage further and has questioned whether there is in fact one cognitive style generally favourable to language learning. Instead of
taking the cognitive style associated with successful language learning as a starting point for course design and methodology, he suggests we take the cognitive style associated with the particular purpose for which the language is being learned.

Widdowson's argument in his 1981 paper is, briefly, as follows. He discusses certain cognitive styles and their relation to specific academic disciplines. He refers first to Pask and Scott's (1972) distinction between serialists and holists. They state that serialists adopt a step-by-step strategy for learning, remembering strings of cognitive structures; they are generally intolerant of irrelevant information. Holists, on the other hand, learn as a whole, and presumably are more tolerant of irrelevant information. Widdowson then draws a parallel between Pask and Scott's serialists and holists and another distinction that has been made, this time by Hudson (1967), between convergers and divergers. Hudson believes convergers tend to seek out one right answer to a problem; they do well on the types of intelligence tests that restrict the testee to a choice from a closed system. Divergers, on the other hand, prefer open-ended tasks, which involve "creative" responses.

It is widely held that serialist/convergent modes of thought are a feature of the exact sciences and that holist/divergent modes of thought belong with the more "imaginative" arts and social science subjects, a belief which is supported when Widdowson continues to report how Hudson found that convergers and divergers tend to cluster according to academic subject, convergers seeming to prefer mathematics, physical science, chemistry, and classics, with their emphasis on precise thought and exact answers to problems, while divergers seemingly prefer history, English literature, and modern languages, with their open-endedness and scope for imaginative development.

Proceeding from this, Widdowson (1981) suggests that "the possibility emerges that the methodologies of different disciplines can themselves be characterized in terms of cognitive styles, being formalizations of different ways of resolving problems and of conceptualizing reality" (p. 8). On this basis he suggests that

> it becomes feasible in principle to design programs of English for academic study to accord with the learners' cognitive bias, because the learners have already grouped themselves by the process of a kind of natural selection in their choice of subject specialization. Thus, a process oriented approach to the teaching of let us say, physical science students, would adopt predominantly serialist/convergent type procedures of presentation. A course for social scientists on the other hand, would adopt procedures of a predominantly holist/divergent kind. (Widdowson, 1981, p. 8)

Widdowson admits that his proposals are tentative and warns of the difficulties of relating cognitive styles and various methodologies, stating that "a good deal of research has yet to be done before different cognitive styles can be isolated and defined with confidence" (Widdowson, 1981, p. 8). In the rest of this paper I will consider this warning and dwell on some of the problems that arise in attempting to adopt a process-oriented approach in ESP with learners from the supposedly convergent disciplines.
Language Learning and Specific Purpose—Possibly Conflicting Cognitive Abilities

The first problem that arises relates to the abilities which, on the one hand, are associated with the learning of a foreign language and which, on the other hand, are associated with the specific purpose for which the language is being learned. Although Widdowson (1983) questions whether there is one cognitive style favourable to language learning, this seems to go against the evidence he himself presents. The work by Hudson (1967), for example, demonstrated that the majority of students going into modern languages were diversers. The following list summarizes the seven attributes of the good language learner mentioned by Rubin (1975), every one of which can be seen to be of a divergent nature, involving open-ended, creative activity (see also Naiman et al., 1978).

1. He or she is a willing and accurate guesser; and is comfortable with uncertainty.
2. He or she has a strong drive to communicate, or to learn from communication; and may use circumlocutions, paraphrase, gestures, cognates, create new words.
3. He or she is willing to make mistakes and live with a certain amount of vagueness.
4. He or she tries to distinguish relevant from irrelevant clues.
5. He or she will seek out opportunities to use the language.
6. He or she is always processing information whether or not being called on to perform.
7. He or she goes beyond surface forms and considers social factors to get at meaning.

Convergent Thinkers Need Help in Developing Divergent Aspects of Language Learning

If effective language learning, therefore, is associated with divergent activity, it is difficult to see how a language course emphasizing convergent activity, as Widdowson suggests, say for physical scientists, can be successful. It might be more fruitful, it could well be argued, to try to develop in the convergers more divergent ways of thinking and learning. Widdowson, basing his conclusion on research by Pask and Scott (1972), seems to think that this is not possible:

Pask and Scott produce experimental evidence that indicates that there is a distinct difference in individual ability to deal with holist and serialist tasks. . . . If a teacher uses serialist methods he or she will inhibit the learning of holist pupils and vice versa. (Widdowson, 1981, p. 6)

While agreeing that an individual may have a greater ability in dealing with one or other of the types of task, this surely does not mean that the weaker of the abilities cannot be developed. Witkin, Moore, Goodenough, and Cox (1977), in fact, produce evidence to demonstrate that students can be taught to diversify their cognitive styles. The teacher using serialist methods with a holist pupil may not therefore exploit the holist ability, but may promote the weaker serialist
ability, by giving the pupil practice in its use. If, as the evidence from Hudson (1967), Rubin (1975), and Naiman et al. (1978) suggests, language learning is a more divergent than convergent activity, then we must accept the fact that the learner with a convergent bias will need help in developing his or her weaker divergent ability. Rubin and Thompson (1982) obviously think it is possible to develop learning styles. In their book How to be a More Successful Learner, they give direct advice to students on how to become better language learners. They suggest the following 14 strategies (again, note how divergent they are in style):

1. Find your own way (decide your own learning methods).
2. Organize.
3. Be creative.
4. Make opportunities for practice.
5. Learn to live with uncertainty.
6. Use mnemonics.
7. Learn from errors.
8. Use linguistic knowledge.
9. Get help from the context.
10. Make intelligent guesses.
11. Learn some word strings as wholes.
12. Adopt formalized routines.
13. Learn production techniques.
14. Use different styles of speech.

This approach, involving the development of weaker cognitive styles, would seem to be all the more desirable if ESP is to be seen to be part of the overall educational process, as opposed to simple training, something for which Wid-dowson (1983) himself has argued.

**Scientific Behaviour: How Convergent Is It?**

Although it may be the case that individuals have greater serialist/convergent or holistic/divergent abilities, this does not mean to say that they have no abilities on the other side of the equation. Thus, scientists may tend to be better at serialist/convergent types of thinking, but they will still have some abilities in the holistic/divergent types of thinking. Hudson (1967) himself argued that the best scientists have highly developed convergent and divergent abilities. Certainly an analysis of the types of activity required in the learning of science, a discipline supposedly favoured by convergent thinkers, highlights many activities requiring divergent thinking.

Research done by Hacker (1984) illustrates this point. In analyzing the classroom behaviours of primary and secondary students of science, he employs a taxonomy of the intellectual abilities that are commonly practised in the science classroom. A perusal of these 12 categories indicates that at least 4 of the abilities (Numbers 6, 9, 11, and 12) require thinking of a divergent kind (see Table 1). Hacker used his 12 categories of intellectual ability to undertake a statistical analysis of the incidence of the different behaviours in science lessons (his sample consisted of nearly 3,751 pupils and 144 teachers over 864 lessons). The results of this analysis show that there seems to be a development toward
TABLE 1
The Intellectual Ability Being Practised in the Science Classroom

| 1. Acquiring, recalling, or confirming facts |
| 2. Delineating scientific concepts, principles, or theoretical models |
| 3. Identifying problems |
| 4. Solving concrete problems |
| 5. Solving problems by applying scientific concepts, principles, or models |
| 6. Making or testing hypothesis or speculation |
| 7. Identifying or describing apparatus, equipment, or materials |
| 8. Describing or practising conventional experimental procedures |
| 9. Designing novel experimental procedures |
| 10. Making, describing, or recording observations |
| 11. Interpreting observed or recorded data |
| 12. Inferring from observed or recorded data |

more divergent activities as the curriculum progresses. Certainly by the time the upper secondary level is reached, the main emphasis in the classroom seems to be on activities requiring divergent modes of thought. It could well be that science education, like education in other domains, such as history or the social sciences, seeks to increasingly emphasize the more creative (divergent) modes of thought once the basic processes, such as remembering the raw facts, have been mastered (see Table 2).

In another study, by Cooper (1974), lower secondary science classroom activities in Nigeria (Hacker’s work was done in Australia) were examined with the specific aim of incorporating mental strategies common to scientific ways of operating and the language roles integral to these strategies into language learning materials. In this case, the science activities were predominantly divergent. To cite but a few of the more strikingly divergent activities, they included raising questions, making generalizations on the basis of acquired information or intuition, making predictions on the basis of generalisations, drawing inferences, experimenting, interpreting data, and applying concepts to new and old experience.

Science Education: How Universal Is It?

Another factor that must be considered in any attempt to take into account cognitive style in English for science and technology courses is the cultural background of the learners. A number of studies suggest that sociocultural factors are important in determining the development of cognitive style (Cohen, 1969; Das, 1973; Ramirez and Price-Williams, 1974; Witkin et al., 1977). In addition, Dhaif (1985) has argued that it may well be that the learning strategies that the learner brings to an ESP course are more deeply rooted in his or her cultural and general educational background than in the discipline of the specific purpose. In certain societies, furthermore, it may be the case that science, so often characterized as a universal discipline, has been affected by local cultural factors. In the Middle East, for example, where the influence of Koranic teaching is very strong, certain institutions, while paying lip service to the scientific method and all that entails, in reality continue to foster what Dudley-Evans and Swales (1980, p. 93) refer to as “pre-Western” educational traditions. If we add to this the fact that in many societies (Egypt and a number of the Gulf states, for
TABLE 2
A Hierarchy of Intellectual Development in Science

<table>
<thead>
<tr>
<th>Group</th>
<th>Schooling Level</th>
<th>Intellectual Abilities Emphasized in Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lower primary</td>
<td>Basic syntactic skills; making measurements and observations, interpreting observations, and combining these interpretations in an inferential manner. Practising elementary experimental procedures, formulating simple hypotheses about scientific phenomena, and devising univariate experiments to test these hypotheses.</td>
</tr>
<tr>
<td>2</td>
<td>Middle primary</td>
<td>Consolidation of syntactic abilities and application of these skills to practical problem-solving activities. Increasing emphasis on the informational aspects of science.</td>
</tr>
<tr>
<td>3</td>
<td>Upper primary</td>
<td>Extension of the field of application of syntactic skills to verifying and confirming scientific information. Considerable emphasis on the assimilation of factual information; acquiring, recalling, and confirming facts; identifying and describing scientific substances, materials, and equipment.</td>
</tr>
<tr>
<td>4</td>
<td>Lower secondary</td>
<td>Consolidation and extension of a scientific informational base as prelude to higher-order substantive development. Genesis of concept development.</td>
</tr>
<tr>
<td>5</td>
<td>Lower secondary/Upper secondary</td>
<td>Development of progressively more abstract theoretical constructs. Emphasis on data summarizing characteristics of these constructs and their application to problem-solving activities. Interpretation of recorded observational data.</td>
</tr>
<tr>
<td>6</td>
<td>Upper secondary</td>
<td>Emphasis on hypothesis-generating characteristics of theoretical constructs. Formulation of hypotheses about significant scientific problems and design of controlled, multivariate, empirical tests. Continuing emphasis on powerful data-summarizing capacities of higher-order theoretical constructs and their applications to problem-solving activities.</td>
</tr>
</tbody>
</table>

example) students are streamed right from secondary school into science and the arts on the basis of their overall ability in all subjects—science taking the best students and the arts the rest—and not because they necessarily have any special aptitude for science, then it is clear that it would be dangerous to characterize students of science as having any sort of universal cognitive bias.

Conclusion

The points made in this paper have highlighted a number of factors that need to be taken into account in developing a process approach to ESP course design. To recapitulate, many of the activities of successful language learning are divergent, a state of affairs that must be taken into account in any course design. Second, and following from this, it may be that learners with a convergent bias need help in developing more divergent learning styles. Third, although ESP
students may have a more highly developed convergent or divergent ability related to their specific language learning purpose, this does not mean to say that they are either without or have no need for abilities on the other side of the equation. Finally, given the diverse sociocultural backgrounds of learners of ESP and the influence these may have had on their cognitive styles, it would be dangerous to make generalizations about the preferred cognitive styles of particular groups of ESP students on the basis of their academic discipline.

In his 1981 paper, Widdowson suggests a possible way forward for ESP course design. After noting on the one hand the need for greater research into cognitive abilities and on the other the unlikelihood in the future—when the research has been done—of being able to maintain definite distinctions between serialists/holists and convergers/divergers, he concludes:

In these circumstances the best one can do, I think, is to design EAP programmes by direct reference to the methodologies of the subjects concerned, on the grounds that these must of their nature incorporate the cognitive styles associated with their particular area of inquiry.

This strategy has both advantages and disadvantages in relation to the points made in this paper. On the positive side, it avoids the difficult problem of specifying accurately the cognitive styles of learners in the various disciplines. In addition, in relating course design to the methodology of the specific purpose, it highlights the value of work like that of Hacker (1984) and Cooper (1974) in analyzing the learning styles required in various scientific activities. Bearing in mind the possible influence of social factors on learning styles, however, the language course should ideally be designed with reference to the local conditions of the learners. On the negative side, the important factor that is not taken into account is the cognitive style of the language learning itself.

In the final section of this paper, therefore, I should like to suggest an alternative way forward for course designers to that proposed by Widdowson. What is required, it would seem, is a two-stage procedure. In the first of these two stages, the course designer would take work like that of Hacker or Cooper, or, especially if he or she is in a non-Western environment, conduct his or her own task analysis of the intellectual abilities employed in the activities of the academic discipline for which the course is designed. It may be possible to find a public statement—a syllabus or set of learning objectives—from which this information can be derived. This was the case with the work of Cooper, cited earlier, where use was made of curriculum newsletters and syllabuses of the Science Teachers Association of Nigeria. It is more likely, though, that the course designer will have to conduct his or her own task analysis. One possible way of doing this is by means of the questionnaire or oral interview, addressed to teachers and/or students. Alternatively, a procedure of direct classroom observation can be adopted, an approach which has the advantage of neither depending on the intuitions nor being subject to the personal bias of those being questioned. With this second approach we are coming close to Munby's (1978) conception of needs analysis, with its emphasis on "the systematic quantitative description of the content of the communication," but instead of analyzing the communicative event with a view to breaking it down into its linguistic content in terms of micro-language skills and functions, we are here concerned with defining those (not necessarily
linguistic) intellectual abilities which are being practised. The type of procedure we are suggesting is closer, in fact, to Schmidt's (1981) "case study" approach. As described by Schmidt, this approach involves "direct observation of the student in the classroom and study situation to gain insight into the student's own method of learning" (1981, p. 201). However, although Schmidt is interested in cognitive style, as we are here, she is concerned with identifying learning problems as they specifically relate to language, and her target of analysis is one individual student. We, on the other hand, are concerned with the overall cognitive abilities required by the learners, and as such, our target of analysis will not be limited to one individual student, but will be the tasks and related intellectual abilities engaged upon in the overall classroom interaction. With this end in view, an appropriate method of observation might be to use Hacker's list of cognitive abilities (Figure 1), or something like it, as a checklist from which to build up a quantitative analysis of the intellectual abilities being practised in the classroom. The analyst, in observing the classroom interaction, would record each instance of a particular cognitive ability as it is required by the learning tasks being engaged upon. In this way, over a period of time, a profile of the cognitive styles required by the academic discipline in a particular local setting would be built up.

Having built up a profile of the cognitive style of the academic discipline, it will then be the job of the course designer to relate this analysis to what is known about the intellectual abilities of the "good language learner." This would be the second stage of the two-stage procedure referred to earlier. Knowledge about the intellectual abilities of the good language learner is now quite well documented (see Hartnett, 1985, and Oxford-Carpenter, 1985, for extensive bibliographies), so this part of our course design input should be less problematic. Once the two sets of intellectual abilities have been established and related one to the other, then they should be able to contribute to the design of courses which, it is to be hoped, will be more appropriate to the needs of our learners.

(Received June 1986)

REFERENCES


**John Flowerdew** is Coordinator of Courses at the Sultan Qaboos University Project, Oman. Before taking up his present post, he taught EST in the Language Centre at the University of Kuwait. He has also taught in Venezuela and Libya. In addition, he has taught in British Council ESP Teacher Training Summer Schools. He has an M.Ed. (TEFL) from the University of Wales. His main areas of interest are curriculum development, materials writing, and discourse analysis. He has published in *English for Specific Purposes* (OSU) and in *World Language English*.

**John Flowerdew**

*Language Centre*
*Sultan Qaboos University Project*
*P.O. Box 6281*
*Ruwai, Muscat*
*Sultanate of Oman*