Logical-Mathematical Tasks and the Communicative Approach in English Language Teaching

Walter DAVIES

Institute for Foreign Language Research and Education

Hiroshima University

In this article, I examine the possibilities for logical-mathematical tasks within a communicative approach in university English classes. I draw on many of the ideas produced by Prabhu (1985) in his book on the Bangalore project. In contrast to a focus on communicative competence, which is central to the communicative approach, the Bangalore project had the narrower focus of developing linguistic competence. While some of the positions taken in the project may now be contested, the type of teaching that was developed offers interesting possibilities within a communicative approach, particularly as the project stressed meaning over form as a means of developing linguistic competence. The article itself is a reflection on the use of a number of logical-mathematical tasks used with first-year students at Hiroshima University, and a consideration of how such tasks could be extended and more greatly integrated into a scheme of teaching. The research involves quantitative and qualitative data from students who undertook two problem-solving tasks, and this is combined with my own reflection, as their teacher, on what was achieved in undertaking the tasks in order to discuss their possibilities within the broad parameters of the communicative approach.

A piecemeal approach to pedagogy

My own position on the development of language teaching has been stated in a previous article (Davies, 2008), but it is important to re-state it here as it as a plea for methodological pluralism, aligning with a communicative approach to language teaching.

On the basis of a historical analysis of mainstream language teaching, there are periods where new methods and approaches appear. Consequently, the grammar-translation method is superseded by the structural-oral-situational method. This in turn is challenged and superseded by the communicative approach, so that there appears to be a clear line of development. While each of these periods has undoubtedly contained a range of teaching methods, the focus here is on a dominant model, a point made by Berlin (1999) in the field of political theory: "The history not only of thought, but of consciousness, opinion, action too, of morals, politics, aesthetics, is to a large degree a history of dominant models" (p. 2). However, in applied linguistics, once the overarching labels are removed and classroom procedures and techniques are analyzed the picture is far less clear, particularly in relation to structural-oral-situational teaching and the communicative approach; Thornbury (1998) argues that "apart from the absence of pattern practice drills, the addition of information-gap activities, and a greater tolerance of error, the current approach is virtually indistinguishable from its predecessors,

such as weak audiolingualism and situational language teaching" (p. 110). This worry about similarity goes to the heart of pedagogic innovation, and leads to the following question: Why should parts of classroom practice in the communicative approach not be indistinguishable from parts of its predecessors? It leads to the issue of piecemeal rather than wholesale innovation in language teaching. For example, Nunan (1988), in considering a learner-centred curriculum notes that "it will contain similar elements to those contained in traditional curriculum development" (p. 2).

The position taken in this article is that the communicative approach developed out of a critical analysis of structural-oral-situational (S-O-S) language teaching, but it was not, at least initially, a complete rejection of all the elements of that kind of teaching; applied linguists experimented with new theoretical ideas to develop a more comprehensive approach, so that some of the S-O-S techniques were absorbed, new techniques were developed and through an interaction between practice and theory, the communicative approach itself developed. It is an approach precisely because it allows for a plurality of techniques. Nunan (1989) goes further, stating "it is something of a misnomer to talk about the communicative approach as there is a family of approaches, each member of which claims to be communicative" (p. 12). Also, as I have argued previously (Davies, 2008), using Kozulin's (1999) summary of Vygotsky's criticisms of psychology, researchers often find solutions to specific problems, and these solutions then become overgeneralized into explanatory theories that draw everything into them, often breaking beyond the discipline in which they emerge and collapse under the weight of their own claims. This risk emerges in applied linguistics when syllabuses are organized on the basis of one category; in relation to the communicative approach, one of its central themes is communicative competence but this does not necessarily lead to a syllabus containing items of one type. Instead, the result is often a more complex syllabus which reflects the richer conceptions of language teaching and learning that emerge as they are examined in more detail.

A syllabus, defined in this article as a scheme for teachers, is likely to contain a set of sub-syllabuses that address this complexity. Syllabus organization emerges through a process of careful consideration of the categories, with no one sub-syllabus being completely dominant. On the basis of this, I wish to make a distinction between Task-Based Language Teaching and Task-Inclusive Language Teaching, which I consider below.

Task-Based or Task-Inclusive language teaching

Tasks are often considered in conjunction with the term Task-Based Language Teaching. In a previous article, (Davies, 2008) I considered the difference between practicing teachers use of the word "task" and the use of the word in articles on theory, settling for a broad teacher-oriented definition similar to Nunan's (1989), where it is one of the interlinked but autonomous stages in a class, identifiable as having a beginning and an end, and including instructions, material, and practice. As Richards and Rodgers (2004) note, Task-Based Language Teaching (TBLT) refers to an approach based on the use of tasks as the core unit of planning and instruction in language teaching. Nunan (2004) has summarized the different descriptions of tasks, and arrives at the following definition for a classroom task:

A pedagogical task is a piece of classroom work that involves learners in comprehending, manipulating producing or interacting in the target language while their attention is focused mobilizing their grammatical knowledge in order to express meaning rather than manipulate form. (p. 4)

In this article my focus is on a very specific type of task, which fits Nunan's description, that can be used in a repertoire of classroom activities to aid students in developing communicative competence. The term I use is a "logical-mathematical task" and the key issue is on the merits of logical-mathematical tasks within a communicative approach. In this sense, I consider teaching that is task-inclusive rather than Task-Based Language Teaching, which uses tasks as the organizing principle. Task Inclusive Language Teaching (TILT) is broader than Task-Based Language Teaching, which can be viewed as a sub-set of it.

LITERATURE REVIEW

One project that involved a great number of logical-mathematical tasks was the Bangalore project. The project is known by several terms: the Bangalore project; the Bangalore-Madras Project; the Procedural Syllabus Project; the Communicational Teaching Project. For ease of reference, I will refer to it as the Bangalore project or Bangalore method. While Richards and Rodgers (2004) cite Prabhu's task-based syllabus in their summary of the communicative approach, Prabhu (1985) makes it clear how the Bangalore project is distinct from the early stages of the communicative approach. While both the Bangalore project and the communicative approach developed in tension with the structural-oral-situational method, they remain distinct and this difference is explored below.

The S-O-S method

The Structural-Oral-Situational (S-O-S) method, also known as Situational Language Teaching, was originally an innovative method used in contrast to the then more traditional method of teaching, involving a translation and grammar-based way of learning:

The innovation consisted essentially, of the use of structurally and lexically graded syllabuses, situational presentation of all new teaching items, balanced attention to the four language skills… and a great deal of controlled practice using techniques such as the substitution table and choral repetition. This was in contrast to earlier procedures such as translation and explication of written texts, the reading aloud and memorization of texts, and a good deal of explicit grammar in the form of sentence analysis and parsing. (Prabhu, 1985, p. 10)

Key aspects of the new method were a planned progression in terms of grammar and vocabulary, the pre-selection of key items to be taught in each class, and form-focused activity in which the pre-selected items would be used again and again in the course of a lesson.

In the 1970s a number of criticisms were made of the S-O-S method. Critics observed that students who had been taught in this way were often unable to use the language learned outside the classroom, were not particularly grammatically accurate when they did, and often could not achieve an acceptable level of appropriacy in their language. Applied linguists started to focus on communicative competence as a goal rather than the narrower focus of grammatical competence.

The five domains of communicative competence
The idea of communicative competence is usually traced back to Hymes (1972), and has been explored by a number of researchers: Canale and Swain (1980) developed a model of communicative competence involving the four domains of grammatical competence, sociolinguistic competence, discourse competence and strategic competence. This in turn has been built on and re-worked into a five-domain model by Celce-Murcia, Dornyei and Thurrell (1997). It is their model that I use to compare the communicative approach with The Bangalore method, and is briefly summarized here:

Canale and Swain	Celce-Murcia, Dornyei and Thurrell
Grammatical Competence ⟶	Linguistic Competence
Sociolinguistic Competence ⟶	Sociocultural Competence
	Actional Competence
Discourse Competence ⟶	Discourse Competence
Strategic Competence ⟶	Strategic Competence
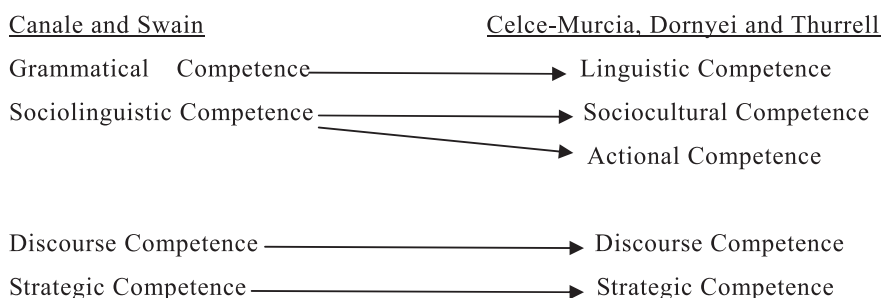
In the five-domain model linguistic competence comprises "the sentence patterns and types, the constituent structure, the morphological inflections, and the lexical resources, as well as the phonological and orthographic systems needed to realize communication as speech or writing" (Celce-Murcia, Dornyei and Thurrell, 1997, pp. 16-17). Sociocultural competence is concerned with the awareness of the culture in which the communication is taking place with reference to variables such as age, gender and status. Actional competence relates to the awareness of speaker intention and the ability to do things by using language. Discourse competence is concerned with the understanding of written and spoken "texts", and strategic competence is concerned with the ability to use various strategies to maintain communication where there are break-downs. In the communicative approach, teachers take these domains into account as they plan and teach courses to their students.

The Bangalore project and linguistic competence
The Bangalore project emerged at a time when the core ideas of communicative competence were leading applied linguists and teachers to develop the communicative approach. However,

Prabhu argues that many of the ideas being considered were taking place in response to particular teaching situations where learners already had a reasonable level of grammatical competence. Also, with the development of notional/functional syllabuses based on the work of Wilkins (1976) and further developed in Europe by Van Ek (1977), there was also a matching of notional/functional categories to linguistic forms, and classroom activity was not likely to be very different from S-O-S pedagogy in terms of the pre-selection and teaching of items.

A further source of criticism was derived from Chomsky's generative grammar, in which it was argued that the grammatical analyses of language only represented the surface structure of people's much more complex internal grammatical systems; "it was therefore unlikely that any planned progression in a grammatical syllabus could actually reflect or regulate the development of the internal grammatical system being aimed at" (Prabhu, 1985, p. 17).

As Prabhu makes clear, the Bangalore project's focus was primarily on the development of grammatical competence, but this was to be achieved through a focus on meaning: "The focus of the project was not… on 'communicative competence' but rather on grammatical competence itself, which was hypothesized to develop in the course of meaning-focused activity" (p. 1). This leads to its classification as "communicational" rather than "communicative." Both S-O-S teaching and the Bangalore project shared the same goal of grammatical (linguistic) competence.

In this article I argue that the Bangalore project is a method: As it developed, a classroom procedure emerged in conjunction with a focus on particular types of task. The classroom procedure was described as "pre-task and task", although this terminology is slightly misleading. Both the pre-task and task stages involve tasks, but the pre-task stage involves a task to be solved by a class as a whole and the task stage involves a similar task that students try to solve individually, using reasoning by analogy. The types of task used in the project fall into three categories: information-gap tasks, reasoning-gap tasks and opinion-gap tasks, and of the three the reasoning-gap task is dominant. Most reasoning gap activities revolve around logical-mathematical problems.

Logical-mathematical problems

Logical-mathematical problems can be found in a variety of sources and connect with psychological approaches to learning developed by psychologists such as Feuerstein and Kozulin (1998), based on the ideas of Vygotsky. In relation to language teaching, some of these have been summarized by Williams and Burden (1997). Many such problems can be found in mathematics and IQ tests. Regarding the last of these, the narrowness of IQ has been challenged by writers such as Gardner (1983) and Goleman (1995) and by the ideas of the psychologists mentioned above. However, in this article it is not the IQ tests themselves that are the focus of investigation, rather it is the problems themselves that can be used as tasks in developing communicative competence. While Gardner rejects the narrowness of IQ as a measure of intelligence, he does not reject logical-mathematical intelligence, but regards it as one of several key intelligences.

One example of a set of such problems can be found in published materials from Doff and Jones' (1997) upper-intermediate textbook in their <u>Language in Use</u> series. Three of the problems are given below in simplified form, and it is problems such as these that are at the centre of this research.

<u>1. The farmer and his dog</u>
A farmer and his dog are walking home together from their local town. When they are 20 kilometres from home, the dog starts running. It runs between the farmer and their house until the farmer reaches home. The farmer walks at 5 kilometres an hour, and the dog runs at 15 kilometres an hour. How far does the dog run?

<u>2. The Robbery</u>
A house has been robbed. The police have three suspects. Two of the suspects always lie and one always tells the truth. The three suspects say the following:

John: I was 10 km from the house when the robbery happened.
Kate: No, he (John) wasn't.
Charles: I'm innocent.

Which suspect committed the robbery?

<u>3.) Potatoes</u>
A farmer has three sacks of potatoes. One sack contains only red potatoes, one sack contains only white potatoes, and one sack has a mixture of red and white potatoes in it. Each sack has a label on it: "red", "white" and "mixed". All the sacks have the wrong labels on them. What is the minimum number of potatoes that the farmer needs to take from the sacks in order to correctly change the labels?

METHODOLOGY

The focus of this research is on tasks similar to the "farmer and his dog" described above. It is a piece of exploratory research to evaluate the possibility for using such tasks in university EFL classes. It involves both data drawn from students and teacher reflection. The data taken from students revolve around two questions:

1. How interesting are simple logical-mathematical tasks to students?
2. How useful do students find them in their study of English?

It was necessary to have both questions, as it is possible to give students an activity that is interesting for them but not useful for their English. In such cases, they may have a stimulating class that has no effect on their English development. It is also possible for students

to perform tasks that they do not find interesting but they consider useful for their English. The risk with these tasks is that students' boredom makes their learning ineffective. In this study, the optimal task is one that is both stimulating, increasing students' receptivity, and useful, aiding their language learning. Students are the best judge of what interests them, and while they can be mistaken in answering the question of usefulness, they often produce valuable insights on the usefulness of the tasks.

In this study, students were asked to answer the questions using a Likert scale and where possible, to comment on the problems. In terms of interest and usefulness, students were asked to choose from the following:

| Very interesting | Interesting | OK | Not so interesting | Not interesting |
| Very useful | Useful | OK | Not so useful | Not useful |

Numbers were not used on the questionnaire, as in the past it appeared that students sometimes were distracted by them and reversed the scale, recording low ratings for an activity when they wanted to give high ratings. In terms of collating the data, numbers were allocated: the higher the number the more interesting/useful it was to students.

Data were analyzed on the basis of both individuals and class averages. As teaching involves communal activity, averages give a rough indication of group perception of a task, but this masks individual responses. Class averages have been calculated, and the students have also been very loosely grouped into subject areas based on their faculties (Integrated Arts and Sciences is a very diverse faculty and has been given a category of its own), and their averages calculated. In addition, individual students' responses have been examined, particularly where students had given low scores, either for interest or for usefulness.

Qualitative data were used primarily to gain insight into how students' reacted to the tasks. While a large amount of this data gave little extra insight into the students' thoughts, with comments such as "they (the tasks) were interesting," other comments were short but astute analyses of the tasks. Teacher reflection is also important in considering the benefits of the tasks for students: While the question of interest could only be answered by students, the usefulness of the task might be better judged by the teacher in consideration of how they were undertaken and what they emphasized. Consequently, the results and discussion section involves my own consideration of what logical-mathematical tasks achieve and how they can fit into a communicative approach.

Participants

83 participants from four separate classes were involved in the study. They were all first-year students taking a mandatory English course at Hiroshima University. Three classes were day-time classes and one was an evening-course class.

Table 1 Participants

Class	Number	Faculty
1	23	Economics (17) Law (6)
2	20	Economics (9) Letters (4) Integrated Arts and Sciences (7)
3	20	Biology and Applied Biological Science
4	20	Science

Materials

Students were given a worksheet that contained the two problem-solving tasks below. The first problem was read aloud to them, and they were then asked to read the problem by themselves and solve it.　After five minutes, they were instructed to compare answers.　The solution was then presented to them and explained.　The second problem was then read to them and a similar procedure followed.

The tortoise and the hare

A tortoise and a hare decided to have a race over 10 km.　The hare ran at 5 km/h.　After 1 hour he stopped by a tree and slept.　The tortoise ran steadily at 2 km/h passing the sleeping hare.　After waking up, the hare once again ran at 5 km/h and chased after the tortoise, but he was still 2.5 km behind the tortoise when the tortoise finished the race.　For how long did the hare sleep?

The mole and the rabbit

A mole and a rabbit decided to have a competition to see who could dig the longest tunnel in a day.　They both started at 9:00.　The mole was slow but steady and he dug at a constant rate of 1 metre every 2 hours all day without stopping for a break.　The rabbit dug very quickly until 12:00 at a rate of 1 metre per hour.　However, he then felt very hungry, so he ran quickly to a farm that was 5 kilometres away and spent 30 minutes eating carrots.　Then, he ran back to his tunnel and continued to dig but at half his morning rate.　At 5:00 both animals stopped digging.　The rabbit ran at his usual speed of 4 kilometres per hour.　Which animal won the competition?

RESULTS AND DISCUSSION

One focal point of this research is on how interesting students find the activities.　The research has been strongly influenced by the Bangalore project, which was oriented towards a much younger age group, and the mathematics involved in the two problems under study is very easy for numerate university students. Like the Bangalore method, students were involved in studying two tasks.　However, the first task was not solved by the class as a whole. Instead they solved it individually and the solution was then explained, using the following key equation:

Time = Distance /Speed

The reason for doing this was to make sure all students were aware of how the problem could be solved; the next problem was more complicated, but was still based on manipulating the equation above. Given that most of my students were involved in fields that required either high or very high levels of numeracy, there was a key question of whether they would regard the problems as trivial. In fact, the class averages indicate that the level of interest was very high, particularly with science or science related groups of students (Classes 3 and 4).

Also, if the 26 Economics students are taken as a group (Table. 3), their average level of interest is 4.27. This includes one participant from the evening course who rated the activities as very low both in interest and usefulness, and may be an anomaly, as a very small minority of evening course students have great difficulty with English. If this student's data are removed, then the average level of interest increases to 4.36. In contrast, the six law students, have an average level of interest of 3.83.

Table 2: Interest by Class

Class	Averages
1	4.1
2	4.15
3	4.35
4	4.25

Table 3: Interest by Area

Area	Average
Science	4.3
Economics	4.27 / 4.36
Law	3.83
IAS	4.3
Letters	4

In terms of usefulness, average scores are lower. When the scores are divided into disciplines, those who found the problems more useful were students from the faculties of Letters (4 students) and Integrated Arts and Sciences (7 students). However, the number of these students is very small compared to the science group and the economics group.

Table 4: Usefulness by Class

Class	Averages
1	3.8
2	4.1
3	3.9
4	3.95

Table 5: Usefulness by Area

Area	Average
Science	3.91
Economics	3.84 / 3.96
Law	3.5
IAS	4.5
Letters	4.25

In terms of individual student comments, the data have been analyzed in two ways: Where students have given low scores to the problems in terms of interest or usefulness and provided a comment, these have been examined. Also, the data have been analyzed where students have offered an insight into what they thought of the problems beyond expressing that they

were interesting or not interesting, useful or not useful.

In terms of low interest, only four students (5%) graded the tasks as not so interesting or not interesting. One student of economics, mentioned above, graded the problems as not so interesting and not useful, giving no comment as to why. The three other students all gave low scores for interest, but scores of 4 or 5 for usefulness; one student whose faculty was Letters and one whose faculty was Integrated Arts and Sciences noted their dislike or inability in mathematics:

I hate mathematics. But, I think I need these questions for improving my skill.

I'm soooo poor at math. I'm very tired and I was miserable. I couldn't understand these problems (If these problems were written in Japanese I couldn't understand). I wish I could be good at math.

One other student was from the faculty of Chemistry, and ranked the problems as not so interesting, but useful, observing that English was important for his/her faculty.

Four students (5%) gave the problems low rankings in terms of usefulness. One economics student has already been described above. Two other economics students considered the problems to be not so useful. Only one of the economics students gave a detailed comment:

English is difficult. If the problems were in Japanese, I would solve the problems in one minute. The problems are very easy. But the problem is so fun! My brain was full of activity. If I have a chance to solve other problems, I want to do the words question. Then I think I can know the new words.

While the final part of this comment is slightly ambiguous, the student found the activity "not so useful" for precisely the reasons I had constructed the problem: The purpose of the tasks was to comprehend the sentences as fully as possible and to be able to check understanding through the medium of mathematics.   His/her final comment can be interpreted as a desire for problems that involved some kind of vocabulary learning, a point that is discussed below.

In relation to the other students, there were observations that were similar to the comment above, but in which the tasks were evaluated in a much more positive way. The following is an example:

If these problems are Japanese problems, these are very easy. But English problems are more fun than Japanese. I enjoyed and had enthusiasm for this question.

One student observed that although the mathematics was very easy, he/she had made a mistake regarding the information contained in one of the problems, and that it was very important to fully understand then to solve them. Another student, who had enjoyed the problems and

thought them very useful, noted that they were more mathematics oriented than English oriented, noting "I hope you will not only prepare math problems but also some other kind of questions." One further comment, made by an economics student was as follows:

> These are a new way to study for me. So, I'm interested and can study with enjoyment. I like this better than a public class.

While this comment is a little ambiguous, it may be that the student preferred the solitude of the problem-solving activity, where students were given time to work on the problems by themselves, and also, because there was a definite solution to each problem, if their answers were wrong, they were able to check through to find out where they had made a mistake once the answer was known.

Logical-Mathematical Tasks in a Communicative Approach

As I noted in the literature review, the purpose of this article is to consider logical-mathematical tasks in the context of a communicative approach that takes communicative competence as its central framework. Given that the students in this research generally enjoyed and found value in undertaking the tasks, from a pedagogic perspective what did the tasks achieve?

I have argued that the Bangalore project is not part of the communicative approach because its emphasis is mainly on developing the grammatical aspect of linguistic competence, which is only one of several key competences that make up communicative competence. In the problem-solving tasks that the students undertook in this research, the focus was mainly on linguistic competence with a minor aspect of discourse competence. The emphasis certainly did not lie with sociocultural competence (The fable of the tortoise and the hare is as well known in Japan as it is in any English-speaking country), actional competence, and had very little to do with strategic competence. One of the key aspects to solving the problems was an almost complete understanding of the text, and so students need to understand the links between the sentences (discourse competence) and understand the grammar and vocabulary (linguistic competence). Once this has been achieved, the problem can be solved through simple mathematics.

One of the insights raised by a student in the comments noted above is that the two tasks used were essentially involved mathematics and are logical-mathematical in nature. In relation to the Doff and Jones' tasks summarized in the literature review, two of the tasks, "The Robbery" and "The Potatoes" require logical thought but not mathematics and the use of "If...then sentences." It is also possible to introduce new vocabulary; in the appendix, the problem of "the explorer" includes geographical features that could be pre-taught. As the problems are essentially short stretches of discourse of a very specific type, they can involve a wide range of vocabulary and grammar.

CONCLUSION

In this research, I set out to examine the possibilities for short logical-mathematical tasks within a communicative approach for use with university students. The results indicate that students can both enjoy such tasks and find them useful. Due to their nature the problems can be used to develop or consolidate grammar while remaining primarily focused on meaning.

Also, because the problems have a single solution, they can help build students' confidence, particularly for students who are numerate but lack confidence in English, illustrated by the following comment: *I'm very happy to understand that my English is not so bad.* It is also important to note that some students do not like such problems, and may prefer more traditional approaches to developing their grammatical understanding.

In terms of interest, the results should be treated with some caution on the basis of the novelty of such tasks. With increased use, they may become less interesting to students. However, 13 of the students specifically requested more problems in their comments, with another five implying they wanted to do the tasks again.

In this study, the focus of the research has been on how students respond to logical-mathematical problems. Consequently the students undertook the tasks as an autonomous section in a ninety-minute teaching period. A major area for further research is to explore how to incorporate such tasks into cohesive units of material that address the other domains of communicative competence, and to design a range of tasks that address different items within the domain of linguistic competence.

REFERENCES

Berlin, I. (1999). *The Roots of Romanticism*. London: Chatto & Windus.

Canale, M. & Swain, M. (1980) Theoretical bases of communicative approaches to second language teaching and testing. *Applied Linguistics,* 1, 1-47.

Celce-Murcia, M., Dornyei, Z. & Thurrell, S. (1995). Communicative competence: a pedagogically motivated model with content specifications. *IAL*, 6/2, 5-36.

Davies, W. (2008). Creating a course that offers students choices in the classroom. *Hiroshima Studies in Language and Learning*, 10, 107-120.

Doff, A. & Jones, C. (1997) *Language in Use Upper Intermediate*. Cambridge: Cambridge University Presss.

Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

Goleman, D. (1995). Emotional Intelligence. New York: Bantam.

Hymes, D. (1972). On communicative competence. In J.B. Pride & J. Holmes (eds.), *Sociolinguistics* (pp. 269-293) Harmondsworth: Penguin

Kozulin A. (1999). Vygotsky in context. In Vygotsky, L. *Thought and Language* (Trans. A. Kozulin). Cambridge, Mass.: MIT Press.

Kozulin, A. (1998) *Psychological Tools*. Cambridge, Mass.: Harvard University Press.

Nunan, D. (1988) *The Learner-Centred Curriculum*. Cambridge: Cambridge University Press.

Nunan, D. (1989). *Designing Tasks for the Communicative Classroom.* Cambridge: Cambridge University Press

Nunan, D. (2004). *Task-Based Language Teaching.* Cambridge: Cambridge University Press.

Prabhu, N. S. (1985). *Second Language Pedagogy.* Oxford: Oxford University Press.

Richards, J. & Rodgers, T. (2004). *Approaches and Methods in Language Teaching.* Cambridge: Cambridge University Press.

Thornbury, S. (2001). The unbearable lightness of EFL. *ELTJ*, 55/4, 391-392.

Van Ek, J. A. (with contributions by Alexander, L.G.). (1977). *The Threshold Level for Modern Language Learning in Schools.* London: Longman.

Wilkins, D. A. (1976). *Notional Syllabuses.* Oxford: Oxford University Press.

Williams, M. & Burden, R. (1997) *Psychology for Language Teacher*s. Cambridge: Cambridge University Press.

Appendix

The Explorer

An explorer wanted to travel north, and he started walking at a steady rate of 6 km/h. He walked north for 2 hours until he came to a cliff, so he turned directly to his right and walked for another hour until he found a valley directly to his left. He walked up the valley for 2 hours.

In front of him there was a marsh and he spent 1 hour walking across the marsh at half his normal walking speed. He then reached dry ground and walked at his normal speed for another 2 hours until he came to a river, so he turned left and walked for another 2 hours until he came to a thick forest. He turned left again, and was now so tired that he walked at half his normal speed for another two hours. Finally, he stopped and made camp for the night. How far north was the explorer at the end of the day?

Key language: cliff, valley, marsh, forest, half

The Hikers

A group of 18 hikers decided to walk to the top of a hill. They started walking at 9:00 in the morning. At 10:00 they met another group of hikers that was one third of their size, and the two groups merged. At 12:00 they all stopped for lunch at a local restaurant, and half of the hikers decided to catch a bus home. The remaining hikers continued walking, but it started raining and a quarter of them went back to the restaurant because they did not have jackets. The remaining hikers reached the top of the hill in the middle of the afternoon. How many hikers reached the top of the hill?

Key language: third, half, quarter, merge, remaining

要　約

英語教育における論理数学的タスクとコミュニカティブ・アプローチ

デービス・ウォルター
広島大学外国語教育研究センター

　本論文の目的は，大学英語授業でのコミュニケーション志向のアプローチにおいて「論理数学的課題(logical-mathematical tasks)」を用いることの可能性を検討することである。このことを議論するにあたっては，その多くの理論的背景を Prabhu(1985) の「バンガロー・プロジェクト（Bangalore Project）の内容に依拠した。コミュニカティブ・アプローチにおける「コミュニケーション能力」観とは対照的に，バンガロー・プロジェクトは所謂「言語的能力（語彙，文法，語法など）」を伸長させるという，より狭い学力観を持っている。本稿では，勤務校の大学一年生を対象に用いた，いくつかの数学的課題の使用とその有効性について報告する。具体的には，参加した学生は4つのグループに分かれて，英語での二つの数学的課題に取り組んだ。授業の終わりに，取り組んだ課題への興味や有用性に関する五件法を用いての回答と，自由記述により感想を求めるアンケート調査を行った。調査結果から，使用した二つの課題に対して，学生は強い興味を持ったことが窺える。また，コミュニカティブ・アプローチを用いた授業においては，このような数学的な課題は主として「言語的能力」を伸長するのに役立ち，「談話能力」伸長にも限定的な貢献の可能性が示唆された。