

TEACHING INTRODUCTORY LINGUISTICS THROUGH UNIT MASTERY*

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1. Background

The Linguistics Department at the University of Hawaii at Manoa is primarily a graduate department; undergraduates may major in linguistics only through the Liberal Studies program which provides specially designed majors for students. We do, however, offer an introductory linguistics course (Linguistics 102 - Introduction to the Study of Language) which attracts a great many students (primarily because it fulfills a core requirement of the college). All full-time faculty members and a few instructors teach at least one semester of 102 each year, which means that there are typically 12 to 15 sections offered each semester. In the late 1970s we found the demand for 102 growing, but at the same time we were not entirely satisfied with how well we were teaching the various sections of the course. One experiment was a large team-taught section with the course content split up into modules and evaluations by separate multiple-choice tests over each module. That worked moderately well, but, still casting around for a better way to teach a large number of students effectively, we learned of the unit mastery method first developed here at the University of Hawaii by John G. Carlson and Karl Minke of the Psychology Department. We decided to give it a try. It worked very well.

The idea behind this experiment was that if the class lectures were written up, the assignments for the entire semester given in advance, and practice exercises provided, students could study independently and take tests over the material when they were ready to. By eliminating lectures and conducting a testing center instead, we were able to accommodate many more students (a maximum of 350 per semester in one unit mastery section).

The department has maintained the other ten or so traditional sections of Linguistics 102 in order that students have a choice, but the unit mastery section has always been fully subscribed first. Below we explain why that is so, present the innovative aspects of the course, both in terms of its unit mastery nature and its content, and describe the advantages and disadvantages of teaching introductory linguistics this way.

2. How the Course is Conducted

2.1 What the Students Do

There are three textbooks for the unit mastery section of Linguistics 102: Chadwick 1967, Langacker 1973, and Lee 1983. The last of these is the *Manual for Linguistics 102*, and it contains what would be the lectures in a traditional class. Each chapter begins with reading assignments in the other two texts and the goals of the unit; throughout each chapter are practice exercises similar to those that appear on the unit tests, and answers are given at the end of the chapter. We were influenced here by looking at some behaviorist-oriented teaching materials. Whatever one may think about behaviorism as a theory or philosophy, behaviorists have had some good

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ideas about teaching - - they insist on being clear about what students have to do. Consequently, we try to be as clear as we possibly can about what students will be able to do after completing the unit (as opposed to what they will "know"), and what they will do in order to reach these goals.

The course is divided into fourteen units, and final grades are determined by how many units are completed: an A requires fourteen units; a B, twelve units; a C, ten units; a D, eight units. Each test consists of ten questions and a passing grade is eight. This is called a unit mastery course because the unit tests must be taken and passed in order; i.e., the material in one unit must be mastered before the student can proceed to the next unit. To a large extent the material is cumulative, and later units depend upon earlier ones. Part of the theory behind this course design is that students are rewarded for learning by the opportunity to learn new things, and so, we hope, they will come to value such opportunities more.

The testing center is open three hours on Mondays, Wednesdays, and Fridays, and an hour and a half on Tuesdays and Thursdays. Students may come to the testing center to take a test whenever they like during those hours; although some wait until they feel they are ready, others try a test early just to see what it is like. It may take as little as fifteen minutes for a student to take a test or it may take as long as two hours; the average time is forty-five minutes. The test is then graded by one of the instructors, and, if the student has passed, the test for the next unit may be taken. There is no penalty for failing a test, and tests may be retaken as often in the semester as there is time for, with the one restriction that a failed unit test cannot be retaken on the same day. This restriction is solely to encourage students to study the material. Students are allowed to take notes on their graded tests and ask questions about mistakes they have made, so the testing process works well as a learning experience. Whatever test-taking anxiety students experience soon disappears as the students get used to taking tests and realize that there is (almost) always another chance. (At the end of the semester, procrastinators do become a bit frustrated.)

2.2 What the Instructors Do

The professor in charge of the unit mastery section is assigned a number of teaching assistants whose duties include grading tests in the testing center, explaining answers and in general providing tutorial service. The tests are graded using an answer key, and individual judgment is necessary on the problem parts of the test only where students do the problem partially right. The teaching assistants also share in the administrative tasks of keeping track of grades and test inventory.

The material in the unit mastery section tends to be somewhat more technical than that of most of the other 102 sections and is oriented toward problem-solving (60% of all test questions involves some kind of linguistic analysis). Each unit tests consists of five multiple choice questions over the reading material and five mini-problems. Since the teaching assistants have to be able to explain some relatively sophisticated exercises (especially in the later units), we require that they all be reasonably advanced graduate students.

The main duties of the professor in charge of the section are to train teaching assistants, revise tests, and participate in the grading and tutoring duties along with the teaching assistants. It is necessary to revise tests because we allow students to take notes on their tests, and, naturally enough, they share these with their friends. We started out with sixty different versions of each unit test and have expanded that number for some units. (The number is sixty so that we can have four different versions each day for three weeks; the semester is fifteen weeks long, so we recycle twice.) We hope that we have enough different test versions to discourage students from studying one another's notes on the test questions to the exclusion of hitting the books, or, at least, if they just can't stand looking at a text and would rather memorize the

answers to hundreds of test questions, they'll learn something in spite of themselves. It's hard to memorize a large number of sentence tree diagrams, for example, if you don't have at least a foggy idea of the principles involved.

3. Course Content

3.1 General Overview

The underlying theme of this course is regularity in language and how it is discovered. We attempt to convey this in a variety of ways.

The course can be seen as divided into three, interconnected parts; in the first part (Units 1-3) students are introduced to the basic concepts of linguistics, including paradigms, analogy, sound systems, and dialects. The second part of the course (Units 3-7) is based on Chadwick's book and leads the student through the process of decipherment. On the way it introduces writing systems, phonological and spelling rules (including how to apply them), rule ordering, how paradigms were used in the decipherment of Linear B, and argumentation for and against linguistic theories. A set of test questions that we're rather proud of requires students to do a decipherment, on a very small scale, of course. But they do have to retrace Ventris's steps, or they can't possibly get it right.

The last part of the course resembles a more traditional approach to introductory linguistics; the morphological and syntactic aspects of constructing grammars is covered in Units 8-11; Units 12 and 13 complete the treatment of phonetics and phonology begun in the earlier units; and Unit 14 presents historical linguistics, again using ideas and information first suggested in Units 1-7 and elaborating upon them.

3.2 Unit 1 - Paradigms

Unit 1 is devoted to paradigms; its goals are that the students should 'i. know what paradigms are and be able to arrange words and sounds into paradigms, ii. be introduced to the early history of linguistics' (Lee 1983:3). Paradigms are introduced and illustrated using an excerpt of an article on ancient Sumerian and Akkadian (Jacobsen 1974:41-9) in which the Latin First Declension is provided as an example and the Babylonian languages are shown to form similar grammatical paradigms. (In this article Jacobsen also briefly discusses the origins of linguistics in Greece, India, and Mesopotamia.) Practice exercises on the Sumerian and Akkadian paradigms are supplemented with case paradigms from Classical Greek.

Next, 16 of the most illustrative of Panini's sutras on the Sanskrit sound system are given, and students are asked to use the information to construct paradigms of sets of Sanskrit sounds. Practice exercises and answers are again supplied. The test over this unit includes factual material from Langacker's Chapter 1 and the constructing of, and filling in missing forms of, case paradigms from inflecting languages such as Latin, Greek, Russian, and Sanskrit; Sanskrit sounds are also given to be put into paradigms.

3.3 Unit 2 - Analogy

Unit 2 introduces the notion of analogy and shows how it is used in linguistic analysis and acquaints the student with 'what was discovered in the 19th century about the relationships of the Indo-European languages' (Lee 1983:19). An excerpt from Rask's work on the origin of

Icelandic (Rask 1818/1967:29-37) provides the student with correspondences among the obstruents in Greek, Latin, and Icelandic. Practice exercises and problems on the tests require students to use analogy to determine which consonant will occur in given forms of one of the languages based on the corresponding forms in one of the other languages.

Another excerpt is used to exemplify what a plausible-sounding but wrong theory of language is; this excerpt is Muller's (1871:407-24) famous description and refutation of the 'Bow-wow' and 'Pooh-pooh' explanations of the common roots of Indo-European languages. To help students understand Muller's article, a brief description of Grimm's law is also presented.

3.4 Unit 3 - Dialects

Unit 3 provides students with some of the basic terminology of linguistics, including 'phonology', 'morphology', 'syntax', 'semantics', 'lexicography', 'historical linguistics', and the distinction between descriptive and prescriptive linguistics. The material in the previous units is described using the new terminology and students practice categorizing various dialect differences (as presented in the Langacker text) according to the terminology.

Building on the phonetics introduced in Unit 1, the notion of phonetic orthography is made explicit and more symbols are introduced. Students are given practice at translating phonetic transcription into standard English orthography.

3.5 Unit 4 - Writing Systems

This unit discusses the three main types of writing systems and gives a history of the English alphabet. It describes the basic spelling rules of English and requires students to apply the rules by giving the pronunciation of various nonsense words with particular English spellings.

This unit also begins the subsection of the course based on the Chadwick text and provides some background, in terms of the information from the previous unit on dialect geography, of the relevant Greek dialects. The spelling conventions of the Cypriot syllabary are discussed in terms of the spelling rules necessary to transform a syllabic representation into a phonetic representation. Rule ordering is introduced here, and on the tests, students have to apply rules and determine the proper order of application.

3.6 Unit 5 - Formal Analysis

This unit shows how important formal analysis is in a situation (such as that of Linear B) where neither the meanings nor the sounds represented by the writing system are known. The processes of determining inflectional paradigms based on the recurrence of syllabic signs and the arranging of the syllabic signs into paradigms are explained. Finally, it is shown how when a few of the signs can be assigned sound values, the pronunciation of the other syllabic signs can be deduced.

There is also a discussion in this unit about the non-arbitrariness of theories and the criticisms that were advanced toward various theories of Linear B. Chadwick's account is full of ironies--many times wrong ideas led to good results and right ideas did not. We hope to convey to students something of what theory-making is really like, and the text here is really wonderful for creating multiple choice 'distractors', since the most plausible sounding answers are often wrong. Thus we can force students to a very close reading of Chadwick's description of how it

really happened. The tests on this unit also require students to construct paradigms of invented syllabic scripts and decipher them.

3.7 Units 6 and 7 - Descriptive Phonology

These units are combined because a great many new ideas are introduced, and no easy way was found to separate them into two units. The stated goals of this unit are that students will 'i. be able to relate phonological and phonetic representations by means of phonological rules, ii. be able to relate phonetic representations and Linear B orthographic representations by means of spelling rules, iii. know about arguments for and against Ventris' decipherment [of Linear B]' (Lee 1983:80).

This unit is one of the most difficult for the students; here, for the first time, they have to formulate their own rules to account for differences between phonological and phonetic form. They also have to distinguish between spelling rules and phonological rules for the Linear B forms and perform conversions to both phonetic forms and Linear B spelling forms. The tests for this and some other units bear down hard on the difference between pronunciation and conventional spelling and on the idea that the former is central to linguistic analysis.

3.8 Unit 8 - Morphology

This unit returns to the Langacker text and concentrates on dividing words into morphemes, classifying words, and constructing trees for word structures (Lee 1983:88). Lexical and grammatical morphemes are distinguished, and the traditional parts of speech are introduced, using English examples.

On the unit test, students are asked multiple choice questions about morphological categories and, in the exercise questions, are required to divide words into morphemes (indicating which are lexical and which are grammatical) and draw tree diagrams of complex words.

3.9 Unit 9 - Grammars

In this unit students are taught how to construct grammars to account for the tree structures they drew for words in Unit 8. The idea of underlying and superficial forms, first introduced in Unit 6-7, is reinforced here, as is the notion of rules and derivation. It is here that the notion of impossible sequences is introduced and the idea of generative grammar as a fully explicit set of rules that produces only the forms that occur in a language is made clear.

In addition to being tested on the material in Langacker, students have to produce mini-grammars to produce given tree structures (for words) and, given a mini-grammar, determine what structures it generates. They are further required to integrate morphological rules (which describe the composition of words) with phonological rules (which adjust pronunciation).

3.10 Unit 10 - Phrase Structure

In this unit students learn to 'i. classify phrases, ii. give tree representations for sentences, iii. write and interpret phrase structure rules' (Lee 1983:115). It extends the notions of tree structures and grammatical rules introduced in the previous unit to the domain of sentences. Students are required to draw the trees for simple and complex English sentences and to construct grammars for simple sentences.

3.11 Unit 11 - Transformations

Transformations are introduced here as a way to cope with the irregularity of natural language; in the two previous units, students discovered that the grammars they wrote generated unacceptable forms as well as acceptable ones. In this unit, Langacker's 'conceptual' form is shown to be analogous to the notion of underlying phonological form introduced in Units 6-7, and transformations, like phonological rules, are used to derive surface forms (which may contain irregularities). The discovery of underlying regularity is, we take it, a central goal of transformational analysis, though this is seldom made very explicit in pedagogical texts.

On the tests for this unit students have to be able to distinguish between regular and irregular syntactic strings and to give examples of ungrammatical sentences generated by the grammars responsible for the irregular strings. They also have to apply transformations (in the appropriate order) to underlying forms (which they have to determine) to arrive at the (given) surface form.

3.12 Unit 12 - Articulatory Phonetics

Based on Langacker's description of articulatory phonetics, this unit uses the notion of paradigm to classify the sounds of English and introduces feature notation and marking conventions. The test for this unit consists of questions on phonetic terminology and requires students to classify sounds, convert feature representations into phonetic representations (and vice versa), and determine whether or not a set of sounds is regular (that is, whether the sounds can be placed in a rectangular articulatory matrix with all places filled).

3.13 Unit 13 - Phonological Rules

Phonological rules are introduced as a means to account for paradigmatic irregularity that arises due to ease of articulation. Rules of assimilation, deletion, and insertion are discussed in this light and other common types of rules are also introduced. Students learn to apply rules to forms (in the proper order), determine what the underlying phonological form of an English word is and provide its derivation, and perform phonological analyses of forms from other languages. Of course they don't know enough phonetics to do very well at such analysis, and most of their analyses are merely formal. Some of the better students get an inkling about assimilation and learn to look for it.

On the tests for this unit we use data from many languages of the world, thereby exposing students to a variety of phonological systems.

3.14 Unit 14 - Language Change

This unit continues the discussion of regularity and irregularity and shows how language change can produce either one on any level (i.e. phonological, morphological, syntactic, or semantic). We try to lead students by making them work through many examples in which a change toward regularity of one sort typically leads to irregularity of another sort. Students are tested on this by being given an example of an historical change and being asked to identify what type of change it is and whether the direction of change is toward regularity or irregularity.

Students also learn about language families and how they change over time. They learn to reconstruct proto-languages and formulate the sound changes that have resulted in the daughter language forms. This is another place where we introduce data from many language families on the tests.

4. Advantages and Disadvantages

4.1 The Student's Perspective

From the student's point of view, unit mastery has several advantages, probably the most important of which is that virtually every student that works hard enough can receive an A. In fact, we tend to award 66% A's, 18% B's, 5% C's, 2% D's, 7% F's, and 2% Incompletes and Withdrawals. Not only that, but they know precisely what they have to do to get the grade they want; it gives them the feeling of being in control. Another advantage is that students can take tests when they want to (within the established testing center hours), so they can regulate their own schedules to avoid some of the pressures that build up around midterm. A related advantage is that bright, industrious students who start early in the semester can finish all 14 units well before the end of the semester and devote the rest of their time to other courses. (It usually takes two tries to pass a unit test; some students pass the first time while others take as many as 10 tries for a difficult unit).

There are also other advantages for the students; on course evaluations they have told us that they appreciate the individualized help they receive from the instructors and the friendly (non-competitive) atmosphere surrounding test-taking and grading. Since much of the course material is of a technical nature, we tend to attract engineering and computer science students who seem to enjoy problem-solving and get very involved in linguistic analysis.

One disadvantage of the course is that since we do not try to control when students take tests, there are times when it is very busy in the testing center, and we don't have enough time to give each student as much attention as we would like. This isn't generally a problem for students who begin to take tests early, but may be for procrastinators. Another problem that has turned out to be very difficult to solve is inconsistency in grading tests among the teaching assistants; the inconsistency is not great, but students notice it, and it has proved very difficult to eradicate for reasons spelled out below in 4.2

4.2 The Teaching Assistant's Perspective

An unexpected benefit of this way of teaching introductory linguistics has accrued to the teaching assistants. Partly due to the fact that most of our graduate students are foreign (generally Asian) and are therefore using a second language, most of them are not ready to teach a section of 102 on their own; however, it is a very good experience for graduate students to teach undergraduates. The unit mastery section solves this problem by hiring assistants to grade and explain on a one-to-one basis, which is considerably easier than lecturing to full classes. And the assistants whose English is not quite up to explaining complicated issues can perform background tasks until they are ready to do grading and tutoring. (It should be noted that we have a good deal of foreign undergraduates here at the University of Hawaii as well, and there have been a few times when one of our Korean teaching assistants resorted to explaining a concept in Korean to a Korean undergraduate.)

There is an even more important advantage to our graduate students who assist in 102 unit mastery. In the process of explaining the fundamental principles underlying the exercises they

are forced to think them through in a way in which few of the other graduate students do. This has proven very beneficial to these students, as has been demonstrated by their performance on the department's Ph.D. preliminary exams.

One problem does arise, however. Because we employ quite a few assistants (10 to 15 on a quarter-time basis), it is very difficult both to give the assistants a reasonable degree of independence and at the same time to keep the grading of tests absolutely consistent. This arises because at least half of each test involves problem-solving, and typically, students get a portion of the solution right and are given partial credit. The teaching assistants have to use some judgment, and there is consequently variation that the students sometimes complain about. Aside from setting exact measures for each problem and each potential partial answer (which would be an unrealistic chore), there seems to be no answer to this drawback of the course.

4.3 The Professor's Perspective

One of the major reasons that those of us who alternate in teaching this section do so is that we have a fairly firm idea about what the most important aspects of modern linguistics are and find that repeating them in lectures from year to year becomes boring. Another reason is that here in Hawaii there is a large Asian American population which values respect and silence, having the consequence that it is extremely difficult to create lively debates or interaction in a class of 20-35. Teachers of other sections of 102 who are concerned with student input get around the problem by breaking the class up into smaller discussion groups. That is another solution to the problem. The unit mastery/independent study approach also solves the problem; one of the most rewarding aspects of this course is the congenial and lively interaction that develops between individual students and teachers. Failing a test can be a great motivating factor; students become intensely interested, ask questions, and (because they don't 'get to' go on to another unit) they tend to listen carefully to the answers and explanations.

The negative side of this kind of course is that it takes a tremendous amount of work to start it up: writing the Manual and constructing 60 different tests for each of the units. And, it requires upkeep; tests need to be revised on a regular basis and that means constantly finding new data with which to construct the mini-problems for the exercise questions. We are also locked into the original texts chosen, since the Manual and all the unit tests depend heavily on them. This is not a serious negative, since our attitudes about what the essentials of linguistics are are fairly conservative, but it does mean we do not include some popular topics like animal language, language acquisition, sociolinguistics, pidgins and creoles, or Government and Binding theory.

5. Concluding Remarks

Despite its drawbacks, the unit mastery approach that we have used has been worthwhile. Everyone involved enjoys the work and students seem to learn as much as in any introductory linguistics course (although we've never tried to test that). There is good rapport between instructors and students, and students tend to work hard (or not show up at all) and be genuinely interested in what they are doing.

The general method of teaching unit mastery is separable from the particular texts and approach described here, but it is important that there be a healthy dose of actually 'doing linguistic analysis' (other departments on this campus have used unit mastery with only multiple choice or true/false type questions and have been rightly accused of encouraging nothing but memorization).

We like this approach to teaching introductory linguistics. It works well for the students and for us and our graduate assistants as well.

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