

Systematic Development of an Applied Phonetics Course

Barbara A. Petry

*Center for Instructional Development
Syracuse University
Syracuse, New York 13210*

and
Mary Louise Edwards

*Communicative Disorders Programs
Division of Special Education and
Rehabilitation
Syracuse University
Syracuse, New York 13210*

Abstract. The process of building bridges between theory and practice can be a difficult task, and instructional developers have only begun to attempt it. Specific ways in which instructional design theories can be applied within the context of an instructional development model are described in this article. The authors chronicle and analyze the development of a course in applied phonetics which is important both for its contribution to instruction in the field of phonetics and for the way in which it utilizes many different theories of instructional design in a real instructional setting. The authors also discuss how Elaboration Theory was applied, as well as other instructional strategies and evaluation techniques.

The goal of Instructional Development is to create effective and efficient instruction. This is often achieved through systematic application of appropriate instructional theories and strategies in order to solve defined instructional problems. However, the application of theory and research to practice may be difficult. While researchers in the field of instructional design and development have been working steadily to build a theory base for themselves, practitioners continue to pragmatically develop curricula, courses, and instructional materials. In many ways, the field has worked deductively to establish rationales for its activities. Linkages between the broad, inclusive theories which contain only minimal strategies

for implementation and the process of solving specific instructional problems have yet to be clearly established. This article provides one illustration of how such linkages can be established by chronicling and analyzing a specific instructional development project and identifying the various theories that were used as the project evolved.

Definition of the Instructional Problem

The Communicative Disorders Program (speech pathology and audiology) at Syracuse University offers an introductory course in applied phonetics. The course instructor desired to individualize the course in order to meet the needs of a diversity of students. Graduate and undergraduate students from both communicative disorders and linguistics typically enroll in the course, including some international students. The instructor believed that the resulting diversity of experience and goals could become a benefit if handled properly.

The phonetics course is essentially a lecture course that includes a laboratory component in which students learn how to phonetically transcribe speech. At the conclusion of the laboratory experience, students are expected to be able to recognize and transcribe all phonemes (the smallest units of speech) of normal adult English. They are also expected to be able to transcribe disordered speech and foreign dialects, using the symbols of the International Phonetic Alphabet. The materials previously used to teach the laboratory part of the course were not effective. In the past students felt that they were given too much content at once, asked to identify too many sounds in one word, and weren't given enough practice with identification of any one sound. It was, therefore, a major goal of the instructor to develop high quality audio tapes and accompanying written materials to teach transcription skills.

When the problems of student diversity and skill development were first identified, the instructor did not see them as being connected. However, in time it became evident that these problems were closely related and had to be addressed together throughout the course development process. The materials that were developed reflect the merging of these two problems.

The Instructional Development Model

In order to pursue a solution to the instructional problems, the instructor worked as part of a team with staff from the Center for Instructional Development (CID) at Syracuse university and a mentor, an experienced teacher with expertise in the content area. The task of the development team in this case was to design instruction which would meet three criteria. First, the transcription component had to fit into the overall structure of the course. Second, the instruction had to be appealing, useful, and understandable to a wide variety of students. Third, the instruction had to be structured in a manner that would provide ample opportunity for practice and success by students so they would achieve a high level of accuracy. Ninety-five percent accuracy was the criterion agreed upon, because phonetic transcription has to be highly accurate to be useful to a speech pathologist or linguist and yet 100% accuracy is unrealistic because of extraneous factors, such as fatigue and environmental noise.

The team followed the instructional development model of the Center for Instructional Development, shown in Figure 1. This model outlines a number of steps in Phase I that precede the actual design of any instruction for a course. This phase includes the creation of a preliminary component sequence, in which an idealized version of the course

PROCESS FOR INSTRUCTIONAL DEVELOPMENT

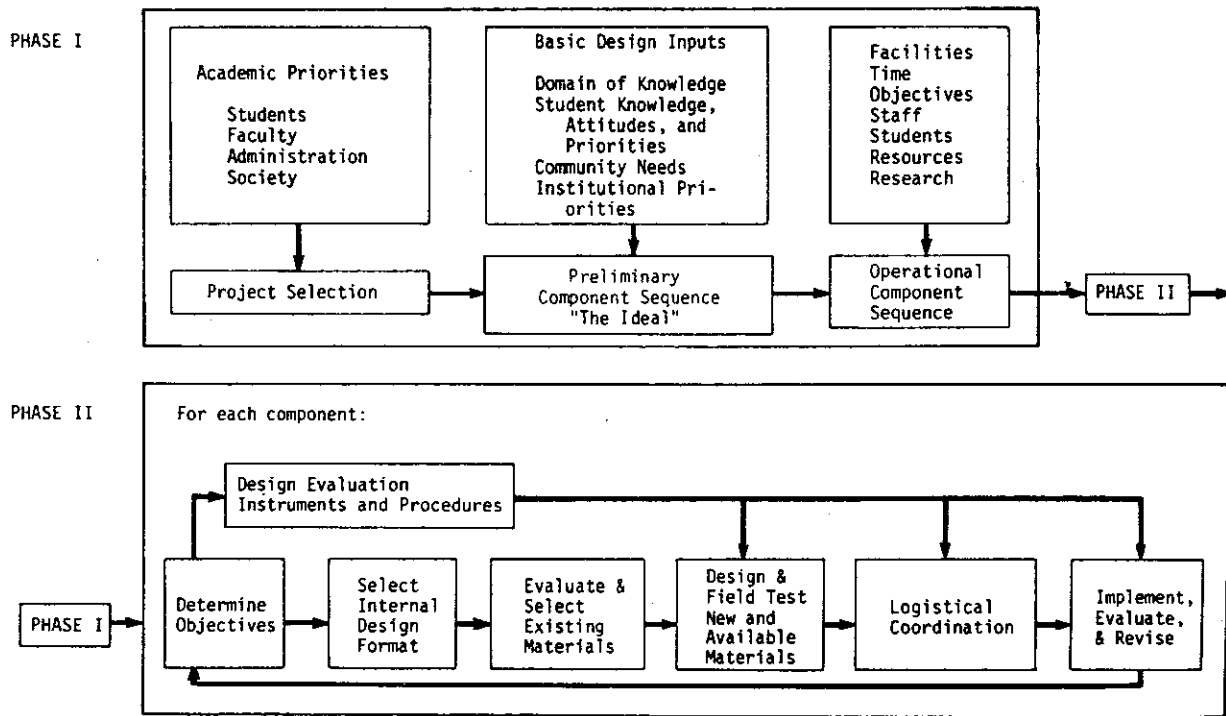


Figure 1. Process Used at Center for Instructional Development, Syracuse University.

is formulated. This idealized sequence is based on a careful analysis of the content area, students, and priorities. Then, an operational sequence is developed, which modifies the ideal by considering various realities (e.g., facilities, resources, staff, time, etc.). In Phase II of the model, component production is undertaken. That is, each segment of the course identified in the operational sequence is "fleshed out," objectives are determined, instructional strategies are chosen, and materials are designed and field tested. These steps were followed in the applied phonetics project. Specific steps that were especially important will be discussed further in this article.

Sequencing the Course

Creating an idealized version of what the entire course ought to look like allowed the instructional team to identify a more logical way of organizing the content of the course which would help students to more effectively learn

transcription skills. This reorganization was based on an extensive content analysis and identification of student needs and backgrounds. For example, acoustic phonetics was integrated into the discussion of specific classes of sounds rather than being a separate unit. The instructional sequence of the course that evolved is presented in Figure 2.

The redesigned course begins (Module 1) with an overview of the characteristics and physical properties of sound, and proceeds to the production of speech in general, and then to specific classes of sounds (listed in Module 3-Articulation). After students have learned all the individual speech sounds and corresponding symbols for transcription, they begin to use them to transcribe whole words, and they later learn rules which modify these sounds and show relationships among them (Modules 4 & 5 Sounds in Context and Phonology).

This sequence is similar to the notion of "zooming in" to a subject in a general to a detailed fashion as prescribed by the

Elaboration Theory (Reigeluth & Rodgers, 1980; Reigeluth, 1979; Reigeluth & Stein, 1983). The instruction begins with the "big picture," showing the major elements and their interrelationships, then gradually focuses in on the parts that are most important for the course. Students then "zoom out" to view the larger picture again, and also focus in for further elaboration.

From the beginning, the development team realized the need to tie together what students were learning in class and what they would do in the laboratory sessions where they would practice transcription. One of the problems with the original course had been a lack of direct correlation between class and laboratory sessions. We decided that it would be most effective if the laboratories were organized to closely correspond with and immediately follow the lectures. That is, the conceptual support for the transcription task could be most effectively presented in the lecture setting. The concepts could then be reviewed and practiced in the laboratory

SEQUENCE

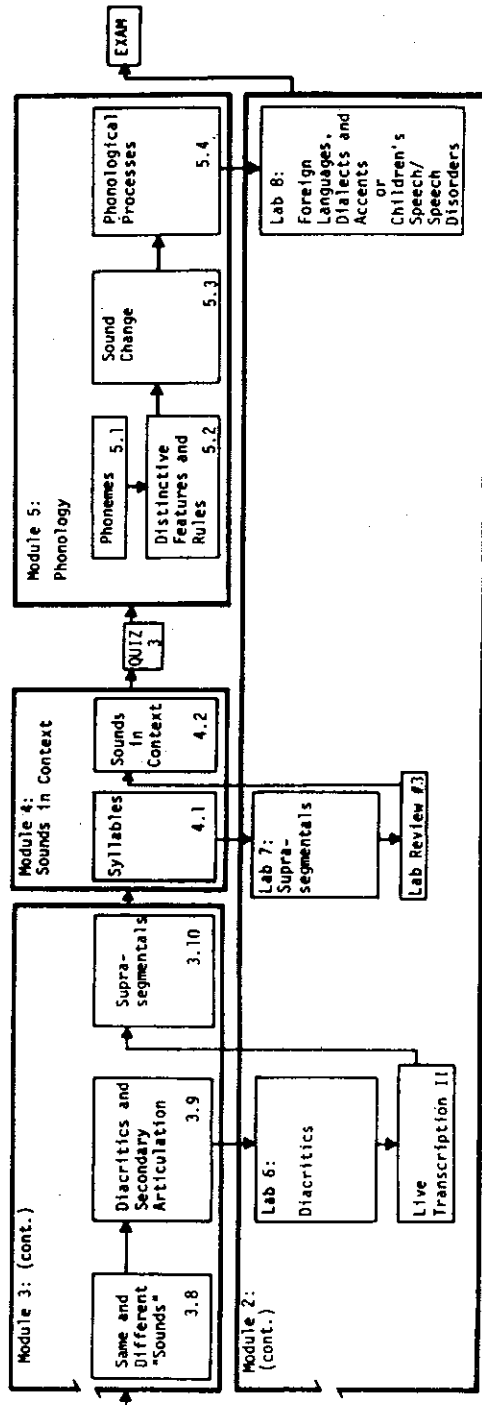
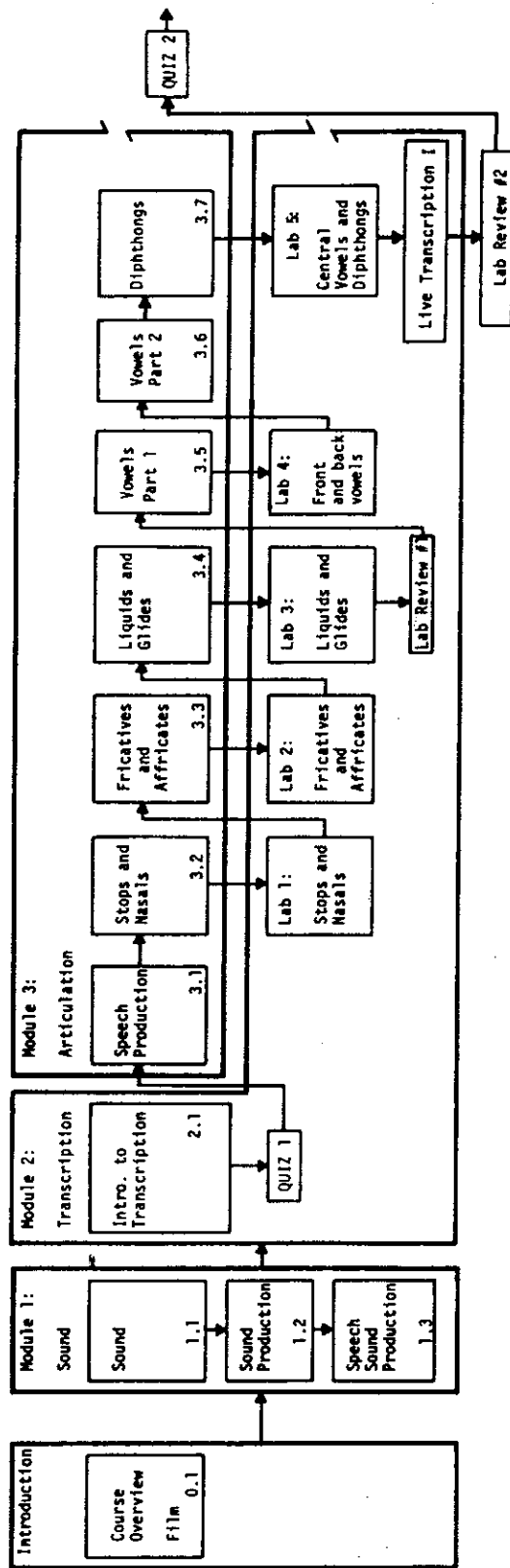


Figure 2. Instructional Sequence of the Applied Phonetics Course.

sessions, which would in turn reinforce the need for the information given in the lectures.

Application of Elaboration Theory

When we originally defined the instructional problem, we believed that we needed to create different forms of instruction for each type of student enrolled in the course. As we looked more closely, however, it became apparent that all the students needed to learn the same process of transcription and that most of them were relatively unskilled in that area, regardless of their background. We kept the idea of individualizing the instruction, but made the unit of individualization each student, rather than a group (e.g., the linguistic students, or the undergraduates.).

This led us to take a closer look at what is actually involved in phonetic transcription, that is, using phonetic symbols to capture sounds on paper. Inherent in this process is, first, the recognition of individual sounds. We wanted to begin instruction at the most basic level, the identification of specific phonemes. The instructor's mentor, a linguist who teaches some transcription in her courses in the English Department, was particularly helpful when we designed the laboratory sessions. She knew from experience how to break down the transcription task into its simplest form. Her suggestions very closely resembled the "simplifying assumptions" prescribed for teaching a procedure in the Elaboration Theory (Reigeluth & Rodgers, 1980).

We first performed a task analysis on the process of phonetic transcription in order to determine all of the steps and skills involved. We then made a series of simplifying assumptions by identifying parameters that could be manipulated to increase or decrease the difficulty of the task. These parameters are shown in Figure 3.

Next we arranged the exercises in an easy-to-difficult sequence. That is, the students begin with the easiest case of identifying the phoneme. The student hears the word, and decides whether or not the word contains one of the sounds being focussed on in that unit. The task becomes progressively more difficult as students proceed through the instruction. In the final exercise, the student only hears the word, does not know the position of the phoneme(s) in question,

Parameters	Conditions which increase difficulty
sensory modalities	a. both hearing and seeing the word b. only hearing the word c. seeing an anatomical representation of the production of the sound
position of sound within the word	a. known b. unknown
number of sounds in the word	a. one sound to transcribe in a word b. multiple sounds to transcribe in a word
identification vs. selection	a. yes/no-is it there or isn't it? b. choose one of several alternatives
real vs. nonsense words	a. familiar words b. unfamiliar sequences of phonemes

Figure 3. Parameters which can be manipulated to modify the difficulty of instructional task.

and must use correct symbols to transcribe several sounds in the word. In the final exercise, some of the words are real and some are nonsense words, designed specifically to illustrate the particular group of sounds being focussed upon. Approximately seven exercises of increasing difficulty were created for each group of sounds. An easy-to-difficult sequence of this type is prescribed in various instructional theories (see review in Merrill, 1978), and it was confirmed by the experience of the mentor.

Production of Instructional Components

When we came to the production phase of the model (Phase II in Figure 1), we implemented many different instructional strategies which were selected to best serve our goal of making the instruction interesting and effective.

The laboratories were designed so that students could work on their own time and at their own speed. Clear objectives were stated at the beginning of each instructional unit so that students would know exactly what was expected of them. Instruction was ordered in an easy-to-difficult sequence. A variety of visual and aural representations were provided to help students learn the skills. For one of the more difficult laboratories, a special diagnostic exercise was created so that students would be able to analyze their own performance and, based on the results, do

remedial work on exactly the sounds that are most difficult for them. All these strategies were used to give the learner control over the instruction and to help the student achieve mastery of the skills.

A "self-test" was provided at the beginning of each laboratory to allow students to gauge what they already knew about the subject. The test is seen only by the student and assists him or her in selecting further instruction. Some students took the self-test, and then skipped on to the more difficult exercises; others did all the exercises provided. This is similar to the type of formative evaluation that is so important in mastery learning (Airasian, 1970).

The final product of our efforts included a student manual which contains information about class meetings, resources for the course, information on the structure of the course, a course calendar, and other course information. A workbook and accompanying audio tapes were also created. Students purchase the workbook at the beginning of the semester, and during the appropriate weeks, they go to the audio area of the library where the accompanying tapes are placed on reserve. Students have a week to complete the exercises for each laboratory. They hand the final test for each laboratory to the instructor at the next class session. Answers for all of the exercises except the final test are included in the workbook so that students can check themselves to see if they have reached the required level of mastery.

Evaluation of the Course

The CID model prescribes the use of appropriate evaluation instruments and procedures throughout the component production stage. Evaluation figured quite heavily in the development of this particular course. Before we began the development process, we conducted an evaluation of students who were enrolled in the phonetics course at that time. In the revised course, a short evaluation form for each lab was included in the student workbook. The student filled out a form immediately after each laboratory session, providing information about the clarity of the materials, the pacing, and other factors. The instructor also kept a log and made written comments after each class session. At the end of the semester a more comprehensive evaluation was conducted.

We compared the results of the final evaluation of the revised course with the evaluation of the original course. These evaluations were not identical because different questions were asked and the focus of each was quite different. However, it was useful to make some comparisons.

Students in the original course and in the revised course achieved high levels of performance (90.2 percent and 91.4 percent correct transcriptions respectively.) While the overall scores did not differ significantly, the revised course requires students to complete tasks which are both more difficult and more representative of the content domain than the tasks required in the unrevised course. For example, students in the revised course are now asked to transcribe sounds from nonsense words which provides for practice transcribing unfamiliar words. This very closely approximates the task students will have to perform when they are asked to transcribe foreign languages or the language of individuals with speech disorders. In addition, students in the revised course are given twice as many practice exercises for the transcription task. The logical organization of these exercises allows students to learn small bits of information at a time and to practice putting the pieces together for themselves. Because of the comprehensive nature of these exercises, we are convinced that students, upon completion of the revised course, have better transcription skills than students who completed the unrevised course.

Student attitudes about the revised

course are considerably more favorable than attitudes reported by students in the unrevised course. The instructor felt that one of the most distressing things about the evaluation of the original course was that 52.6% of students said the course was uninteresting. Students commented that the tapes were frustrating and that the exercises became "too difficult too fast." Improving student interest in the course was a high priority for the development team because transcription is as essential to a speech pathologist or linguist as fielding grounders is to a shortstop. If young players' first exposures to developing this skill is not positive, chances are they will not develop the skill and not become the players they could be. In the same way, students who have a positive first exposure to developing transcription skills will be more likely to continue to perfect their skills. Therefore, the development team was pleased when the evaluation of the revised course showed that student interest levels had risen dramatically. In fact, 100% of the students said that they found the course to be "interesting" or "very interesting." Students commented that they like the laboratory tapes, and felt they were "well coordinated and designed." Some students even requested that the tapes be left in the library for another semester so they could continue to practice. These results were quite gratifying to all involved.

Reflections on the Development Process

One of the most helpful procedures we followed during the development process was the creation of a preliminary, "ideal" sequence of content for the course. By thinking of what we wanted the course to be like and what we wanted students to know and be able to do in "the best of all possible worlds" we were able to consider really creative solutions to instructional problems, freed from constraints of time, money, resources, etc. As we revised the course, the ideal had to be tempered somewhat because of such constraints, but they did not limit our thinking at the outset.

Involving a senior faculty member from the instructor's discipline is not a regular feature of the CID model, but was a particularly useful element of the process described here. This project was originally undertaken by the instructor as part of a Post Doctoral Teaching

Award from the Lilly Endowment, and it specified that a mentor be a part of the development process. The mentor, in this case, is an outstanding teacher whose experience in teaching transcription helped us a great deal with the task analysis. She brought another, though closely related, perspective to the development team. She also provided specific instructional strategies that worked especially well for this subject from her own experience. Her suggestions, input, and support were invaluable.

The task analysis which formed the basis of the laboratory instruction (Figure 3) was the key to the success of the course. It allowed students to move through the instruction in incremental steps that they could easily achieve. The feelings of satisfaction and accomplishment from successful completion of the laboratories increased students' enjoyment of the course and motivated their interests. Without the task analysis, the design of the labs would have been less logical and confusing for students, as it had been in the past.

Although each step of the instructional development process was very useful, the amount of time that had to be committed to the project was substantial. In this case, what started out to be a seemingly small, manageable project became a major investment of time and energy for the instructor and other team members. However, what the instructor learned about instructional design and development from her "baptism by fire" in this project will be applicable to future revisions of her other courses.

This examination of an instructional development project shows how instructional design principles and theories can be applied to instruction in phonetics. In addition to documenting the creation of something new and exciting for the teaching of applied phonetics, it shows how theories of instruction can be applied to real situations in the instructional development process.

References

- Airasian, P. W. (1971). The role of evaluation in mastery learning. In J. H. Block (Ed.), *Mastery Learning* (pp. 77-88). New York: Holt, Reinhart and Winston.
- Diamond, R.M. (1976). Syracuse University: A systematic approach to curriculum and faculty development. In Berquist & Shoemaker (Eds.), *New Directions for Higher Education: A Comprehensive Approach to instructional development* (pp. 95-104). Jossey-Bass Inc.

- Diamond, R.M., Eickmann, P.E., Kelley, E.F., Holloway, R.E., Vickery, T.R., & Pascarella, E.T. (1975). Instructional Development for Individualized Learning in higher education. Englewood Cliffs, NJ: Educational Technology Publications.
- Merrill, P.F. (1978). Hierarchical and information processing task analysis: A comparison. *Journal of Instructional Development*, 1, 35-40.
- Reigeluth, C.M. (1979). In search of a better way to organize instruction: The Elaboration Theory of Instructional Development, 2, 8-15.
- Reigeluth, C.M. & Rodgers, C. (1980). The elaboration theory of instruction: Prescriptions for task analysis and design. *NSPI Journal*, 19, 16-26.
- Reigeluth, C.M. & Stein, F.S. (1983). The elaboration theory of instruction. In C.M. Reigeluth (Ed.), *Instructional design theories and models: An overview of their current status*. Hillsdale, NJ: Erlbaum Associates.