2.1 Plan of Study

Plan and procedure employed in investigation determines its results. It is the character of the technique adopted by the researcher on which the degree of precision, objectivity, reliability and validity of results depend. (E.L. Tibbits, 1968) There are many convincing proof on the pages of research literature where investigation reached different conclusions merely by employment of a method different from the one decided upon in the study of problem. The selection of techniques and devices of an investigation is determined by the nature of the problem, objective of study, cost and time factors, availability of subjects and other resources at the disposal of the investigator. Sometime, it so happens that many devices can be deployed in studying a particular problem but the method which suits the purpose of the researcher gets recognition for use because of the preference of values and because of their express suitability (Ibid.). So it is highly relevant to discuss the methods and procedures employed in the study. It includes the design of the study, tools used, sample and data collection technique as envisaged in the plan. The objective of the present research was to study the spoken English of Iranian undergraduates. So the present study revolves around undergraduates to assess and enlist deviation in their pronunciation of English.

The present study will thus be a discipline survey type study. It involves undergraduates with Persian as L1 and English as L2. The plan is to study the spoken English of the students. In any piece of research it is impossible to study the whole population for which the problem is to be investigated. Every
research design therefore has to resort to sampling. A sample is a small group, which represents all the traits of population (Porkess, 1998). So it was decided that the present study would be conducted on a random sample of fifty students, out of which twenty-five students would be girls and twenty-five students boys. Every student was to be interviewed individually and in a group and her / his speech was to be recorded.

The study group will be University undergraduate from different streams i.e. BA/ B.Sc. Tehran being a focal and prestigious place of study, students from all parts of Iran prefer to study there. Thus it was felt that the group would be representative in nature. The plan of study is detailed below.

2.1.2 Methodology

"Before beginning of any language test, the purpose and its function must be established. The test should have validity, reliability and practicality" (David p. Harris, 1968, 2nd ed). That is to say, the test must be appropriate in terms of objectives, dependable in the evidence it provides and applicable to a particular situation.

In the present research work, the researcher aimed to diagnose the individual's specific strengths and weakness of individual students in the pronunciation in English. Though the tests consist of reliable subtests measuring different language skills, later, on the basis of the individual's performance and weaknesses, strength in various areas tested can be plotted. As mentioned in the Hypothesis the study will be conducted in two phases:

a) Diagnostic  b) Remedial

2.1.2.1 Diagnostic Stage:

i) Material for Recording

At the diagnostic stage in order to analyze the students' speech and identify their difficulties in pronunciation, the researcher needs to collect sample speech of students. This was done by studying the speech of 50 undergraduate students studying in and around Tehran. At this stage, word list using
the phoneme of English in word initial, medial and final position and, a dialogue and a group conversation were used.

a) Word list using phoneme of English in word initial, medial and final position

b) A conversation

c) A dialogue.

The list of words contained all vowels and consonants segments of the Received Pronunciation of English form the basis of our comparison in the analysis of our students' speech. In the selection of words, care was taken to see that most of the consonants occurred in all position. But for a few consonants, almost all the consonants occurred in all position. The list contained monosyllabic, disyllabic, and polysyllabic words. There were words with inflectional and derivational suffixes, that is, words ending in -s, -es, -ing, and in -al, -ial, -ion, -ise, -ic, -logy, -ity, -ically, -eer, -graphy. There were also words with prefixes such as be-, em-, ad-, a-, and so on.

A conversation was prepared in such a way that it contained words used as noun / adjective and as verb, to check if the speaker knew that the accentual pattern in those words depends upon their grammatical function. A short dialogue as included ability of the students to handle the intonation patterns in English.

The word list, conversation and the dialogue were simple and familiar to the students as these were taken from their text books. As the aim was to make the study comprehensive and uniform the chosen diagnostic tests were fairly undertaken.

ii) Choice of Speakers

For the purpose of collecting samples of our students' speech the researcher selected fifty speakers of who twenty-five girls and twenty-five boys. The speakers were from two streams – humanities and sciences i.e. BA/ B. Sc.
There purpose behind such a selection was to have a fairly well represented group of the student population belonging to different levels of the college academic program. Some of these speakers were permanent resident of Tehran while others had come from different parts of the country to study here and none of them had study in an English-medium school.

iii) The Recording

In order to have fairly widely based data the researcher had to go to four universities. The recordings were made either in the university or the residence of the informants or that of researcher himself as the situation demanded. Recordings of the speakers from different universities were made in the rooms of these universities. Sufficient care was taken see that the room had good acoustic conditions. However, in spite of the care taken to ensure good acoustic, certain disturbances such as ringing of bell, the clamor of students at the end of a class, and various traffic noises could not be avoided. The students were called in one at a time for the recording. In the beginning, the recordings were made in two sittings. But later, all the material was recorded in one sitting as desired by the informants. Each student was given the text material and was given time to read it to himself / herself. Then he/she was asked to read the text loud. The researcher made sure that the speakers did not feel self-conscious at the time of recording. If the researcher felt that any speaker was nervous, the recording was stopped and in formal conversation with the speaker was incorporated to put him at ease. Recording was resumed only when the researcher was assumed that the speaker was no longer nervous or conscious. The entire specimen's samples were reoccurred on the Hi-Fi audio systems.

iv) The Analysis

As the recording proceeded, the speeches were simultaneously phonetically transcribed which was later conformed by referring to the recording. Then the detailed phonetic transcription of the recorded speech was undertaken. A list of vowels and consonants was prepared after studying the
speech of each speaker. The deviation in various positions, initial, media, and final in which these sound occurred were noted. As stated earlier, the IPA symbols were used.

The length and quality of the vowel sounds and their variants in accented and unaccented positions were noted. Then, on the basis of this information a phonemic inventory of the consonant and vowels systems of each speaker was prepared. An attempt was, then, made to trace the majority pattern in the speech of the students concerned. Thus, on the basis of a detailed analysis of the recorded material the researcher arrived at a general pattern in respect of the vowels and consonants for all speakers.

Accents were marked on the di-syllabic and poly-syllabic words. The textual passages used for recording samples of connected speech were marked for tone group divisions, the tonic accent and the tones used. Certain other features such as the absence of aspiration of voiceless plosives, the specific realizations of plural markers, past tense markers, the absence or presence of /r/ the insertion and omission of vowel sounds and so on, were also noted and entered in the list.

The following list and charts were made:

a) A list of word in accented and unaccented position for each speaker.

b) A list of consonants in all position used by each speaker.

c) A consolidated list of vowels, representing the majority pattern.

d) A consolidated list of consonants, representing the majority pattern.

e) A detailed lists of divergences from R.P. with regard to (a) vowels, and (b) consonants (c) certain other features.

v) The Speakers

Details concerning each speaker were noted in the following manner:

i) Serial number

ii) Name of the Speaker

iii) Place of birth

iv) Age

v) Sex

vi) Education
vii) Listening to The Recordings and Their Transcription

The recorded material was played back and carefully transcribed by the researcher. The researcher would listen to the recording only for half an hour at a time in the early hours of the morning and at night. This enabled him to transcribe the data without any disturbance and with due concentration. Sufficient gaps were allowed while transcribe so as to avoid being influenced by earlier recorded material.

Phonetic transcriptions of the speeches of all the fifty speakers were at first made. The recorded materials were taken to the phonetic laboratory, fed into the tape-repeater and played back for verification of the transcription. The transcriptions were made with help of the I.P.A. (International Phonetic Alphabet) symbols, supplemented with diacritic marks where necessary. The speech of every speaker was listened to very carefully and analyzed.

2.1.3 The Procedure of Analysis

The first part of this dissertation being mainly the phonological analysis of English spoken by the Iranian undergraduate students, we start with a description of speech and discuss the framework of analysis adopted for the present study. We then go on to describe the procedure adopted in the analysis of the data.

2.1.3.1 A Phonetic and Phonological Study

A phonetic study tells us how the sounds of a language are made and what their acoustic properties are and also provides an inventory and description of the phonetic segments occurring in that language. A phonological study tells us how these sounds are used to convey meaning. It deals with the phonetic structure of the phonetic segments in a language and the function of these segments.

The study of the phonology of a language comprises of an examination of the form and function of the phonological elements that operate in that language. That is, it involves a description of general phonetic nature of these elements and their functions in the phonological structure of that language.
2.1.3.2 Models of Phonological Analysis

The following are four major approaches to phonological analysis available to a researcher for conducting a remedial programme. Before deciding upon which one to adopt, it was considered important to go into their comparative merits and weaknesses.

i) Phonemic Analysis

ii) Prosodic Analysis

iii) Distinctive-Feature Analysis

iv) Generative Phonology

i) Phonemic Analysis

Most phonological analyses are based on the notion of the phoneme and an important aspect of phonological analysis is the discovery of phonemes—the minimal distinctive sound units of the language to be examined.

The phoneme theory is based on the principle that there are in each language a limited number of elemental type of speech sounds, called phonemes, peculiar to that language; that all languages are referable to its set of phonemes; that only its own phonemes are at all significant in the given language (Swadesh, 1934:117).

During the period when Seussure's thought was making an impact on linguistics, various phoneme theories developed. Considerable discussion took place on the status of the phoneme as an analytical term, on the status of the philosophical disputes between (a) realists (b) conceptualists and (c) nominalists.

According to the realist view espoused by Daniel Jones and others, the phoneme has an actual existence as an abstract sound on a structural entity in the linguistic system to which it belongs.

From the conceptualist point of view, favored by Trubeltzkoy for a time the phoneme is a mental entity.

The nominalist attitude, in contrast to both the above viewpoints is that, the phoneme, like any other elements of scientific analysis, is no other than an
appropriate term or operational fiction with which to handle the sounds of a language (Robins, 1970:189-190). According to Daniel Jones (1962:10) “a phoneme is a family of sounds in a given language which are related in character and are used in such a way that no one member ever occurs in a word in the same phonetic contest as any other member.” According to him the major task of a phonologist is to determine the phonomicity of the various phonetic sounds available in a particular language.

The phonemes are the smallest linguistic unites in the sense that the replacement of one phoneme by another can bring about a change of meaning e.g. in the word pin there are three phonemes / p /, / l /, / n /. Replacement of either of these phonemes will bring about a change in the meaning of the word as /pln / → /tln/, /pln / → /pæn /, / pln / → /ptl /. Each phoneme may have slightly different phonetic realizations, called allophones, in different environment, e.g. Phonemes / p /, / t / and / k / are aspirated when they occur in the initial position of an accented syllable. Thus / pb /, / tb / and / kb / are the allophones of the phonemes /p/, /t/ and /k/ respectively.

“Phonemes are the basic elements which, when put into sequences, make larger semantic entities, namely, morphemes, words and sentences in a language”. (Denial Jones, 1962) The phonemes of a language can be established by discovering minimal pairs, that is, pairs of words that are different in one sounds segment. e.g.

a) pill, bill, ill, kill, chill, sill, hill, mill ...

b) sit, seat, set, sat, sought, soot ...

Thus we arrive at contrastive units / p,b,k,tʃ,s,h,m / consonants phonemes, / iː, e, æ, ɔ, u / the vowel phonemes. This procedure enables us to establish the inventories of vowel and consonants phonemes of a language.

The main uses of this theory espoused by Jones are given below:

a) The formulation of the phonemic structure of a language is one of the aids to acquiring a good pronunciation by the learner of that language. With that of phonetic transcription he learners how to articulate foreign
sounds, and it also helps to compare his native language with a foreign language.

b) Phonemes are the basis of everything that is required for language learning, that is, using right words, putting words into various forms and using them appropriately.

c) This theory has an important use, as the analysis of a language into its constituent phonemes furnishes us with the means of writing it.

ii) Prosodic Analysis

Prosodic analysis is concerned with phonological features that extend beyond a phonemic unit in a structure. Features like aspiration, nasalisation, palatalisation, labialisation, retroflexion, and so on, often relate to sequences of more than one phonematic unit. Stress, rhythm and intonation are some other examples of prosodic features. J.R. Firth is the chief propounder of this theory. He put forth the theory of prosodic analysis in 1948.

The phonemicist sets up an inventory of phonemes and assigns all the relevant phonic material to them. Stress, rhythm, pitch and length are treated as supra segmental. The prosodist, on the other hand, describes his data in terms of ‘phonematic units’ (consonant and vowel elements of a structure) and ‘prosodies’ (i.e., phonic material other than segments).

According to Robins (1970:191) phoneme theories have concentrated on “minimal contrast in identical environment, emphasizing the paradigmatic aspect of phonological relationship”. The aim of prosodic analysis in phonology is not that of transcription of unilinear representation of languages. It takes account not only of paradigmatic relations and contrasts but also of “the equally important syntagmatic relations and functions that are operative in speech” (Ibid: 191).

Thus in prosodic analysis, a structure will be stated as a syntagmatic entity comprising phonematic units and one or more prosodies belonging to the structure as a whole. The prosodic analysis of the ejectives p, t, and k, will be...
that voiceless plosive sounds are glottalized. Glottalization is a prosodic feature. Thus the prosodic approach does not invalidate the phonemic approach. Lyons (1972: 275-76), however, admits that neither of these two approaches is “completely satisfactory as a general theory of phonological structure.”

iii) Distinctive Feature Analysis

“Distinctive features are the minimal elements of which phonetic, lexical and phonological transcriptions are composed by combination and concatenation” (Chomsky and Halle, 1968: 64).

In the traditional system of phonetics, sound segments were treated as indivisible or atomic entities. However, in the formulation of phonological rules it was found that sound segments could be described as complexes of properties or features known as distinctive features. Phonemicists regarded the phoneme as the minimum distinctive or contrastive unit of a sound capable of bringing about a change in the meaning. The distinctive feature approach claims that it is not the phoneme but a much smaller number of distinctive phonetic features that brings about all meaningful distinctions in language. The main advantage of distinctive features is that they provide a convenient way of referring to class or group of sounds. Phonological rules apply to such classes of sounds, which can be identified by referring to one or more of the features they share in common. Distinctive features are binary, having only one of two values, plus or minus. The listener faces a two-choice situation when a message is conveyed to him, e.g. /k/ is /-voice/, /g/ is /+voice/. The advantage of this system is that one can show explicitly how members of pairs such as voiced-voiceless, consonantal-nonconsonantal, nasal-oral are related to each other. It shows that pairings such as voiceless-nasal are not compatible. The distinctive feature theory has the following advantages:

a) it enables us to make appropriate predictions about sets of sound which from natural classes,
b) it characterizes what we know intuitively about language by accounting for important phonological processes; and

c) it allows us to make significant generalizations by enabling us to state rules more economically.

In this framework, the phonologists go deeper for analysis, although they have not rejected the notion of the phoneme. The main objective of the distinctive feature theory is to capture language universal features.

iv) Generative Phonology

The system of generative phonology has been developed and applied to English by Chomsky and Halle in *The Sound Pattern of English* (1968). It follows from Chomsky's theory of generative grammar as a system of rules consisting of the syntactic, semantic and phonological components. Generative phonology uses distinctive features as the basic 'building blocks of sequences of discrete segments'. Generative phonology is based on the concept of underlying phonological representations and a set of rules, which convert them into their phonetic, i.e., surface representation.

2.1.3.3 Model of Analysis Adopted for the Present Study.

The system of analysis adopted in this study was phonemic analyses. The minimal distinctive sounds are segmental phonemes. Several supra-segmental units of prosodic analysis like aspiration, palatalisation, retroflexion, and nasalisation are analyzed as belonging to segments rather than to higher units. Pitch and stress are analyzed as properties of unit higher than segments, i.e. supra-segmental units. This form of analysis (Phonemic Analysis) provides us with a means of describing the phonemes and their phonetic environment in a language. It enables us to describe language and thus provides us with a guide to learning a foreign language D.Jones (1962:220). The main objectives of phonemic transcription are:

a) To put on record the phonetic make-up of language and
b) To facilitate the acquisition of a good pronunciation of a foreign language, by showing the learner appropriate use of sounds in any given word or sentence.

Thus this model is the most suitable one for our analysis in discovering the errors and divergences in L2 learning. It serves our purpose for suggesting a remedial course, which is geared towards improving such errors in pronunciation.

2.1.4 Remedial Stage

As the time available with these students at this level is limited, so an intensive remedial course can answer the their problem. Remedial course as visualised at at this stage has the following feature.

A. (a) Duration - 60 hrs.

(b) Session Break-up - 20 hrs. vowels

24hrs. consonants

(c) Testing - 16 hrs.

i) Diagnostic - 2 hrs.

ii) Sub-tests - (a) 3 test for vowels

(One hr. duration) (b) 6 test for consonants
iii) Comprehensive test
(a) 1 test for vowels (One hr. duration)
(b) 1 test for consonants

iv) Terminal Examination
\[
\begin{align*}
\text{words articulation} \\
(a) & \quad 1 \text{ hr.} \\
\text{sentence articulation} \\
(b) & \quad 1 \text{ hr. pair work / dialogues} \\
(c) & \quad 1 \text{ hr. individual speech}
\end{align*}
\]

B. Methodology (Each session of one hr. duration)

i) Time Management
- Ear Training for auditory discrimination - 10 mats.
- Group response - 5 mats.
- Individual articulation - 15 mats.
- Pair work (Dialogues) - 10 mats.
- Class performance - 20mts.

ii) Group Management
- 5 group of 10 each

iii) Material
- Words list containing, monosyllabic, disyllabic and polysyllabic words.
- Words with inflectional and derivational suffixes.
- Words with prefixes.
- A conversation.
- A short dialogue.
2.1.5 STATISTICAL ANALYSIS

2.1.5.1 Analysis of Variance (T-TEST PAIRED TWO SAMPLE FOR MEANS)

The Paired Two Sample T-test producer compares the means of two variables for a single group. It computes the differences between values of the two variables for each case and tests whether the average differs from 0.

In this test, all the subjects are measured at the beginning of the study, given a treatment, and measured again. Thus each subject has two measures, often called before and after measured and alternative design for which this test is used is a matched pairs, paired samples or dependent samples. Here, each record in the data file contains the response for the subjects and also for his or her matched control subjects. Here for each variable: mean, sample size, standard deviation and standard error of the mean has to prepared and for each pair of variables correlation, average difference in means, T-test, and confidence interval has to prepared too.

Here in the present study we consider a situation in which we have two related or what usually called paired samples and wish to perform a test on the difference between their two means. Here we have two sets data: Pre-test results and Post-Test results from the same subjects, i.e. 50 students from in and around Tehran and record the rating level of their errors in an attempt to see whether one rating system leads to generally lower assessments than other. In this study there are 50 sets of numbers (two) numbers for each person), and would expect these two sets of number (variables) to be correlated. We need to
take this correlation into account in planning the T-Test. These two sets of
scores can be transformed into one set of scores, i.e., set of difference.

\[ X_1 - X_2 = D \]

They can be thought of as degree of improvement between one
measurement session and the next—presumably as a result of intervention. If in
fact the intervention program had no effect (i.e., if null hypotheses \( H_0 \) is true)
the average scores would not change from session to session.

2.1.5.2 Mean

The arithmetic average of a set of values in a distribution is referred to
as mean. The mean of set of scores is obtained by adding up all the scores
and then dividing this sum by the total number of observations. The formula for
the computation of mean is:

\[
\text{Mean} = \frac{\text{Some of all values}}{\text{Total number of values}}
\]

or technically as Frank & Altoen (1995) put it as “the arithmetic mean of \( N \)
observation is the sum of the observations divided by \( N \)” in the following
formula:

\[
\frac{\sum x}{N}
\]

2.1.5.3 Standard Deviation (SD)

The most useful “measure of variability which involves all the numbers
in a set, not the two of them, for the variables with an interval or ratio level of
measurement is the Standard Deviation. It is immensely related to the variance,
which is regarded as mother measure of variability. It is defined in SPSS
(1993) as “measure of dispersion around the mean, equal to the square root of
the variance. The standard deviation is measure in the same units as the
variance itself”. To obtain SD, mean of the distribution should be calculated,
then mean should be subtracted from each score \((x_i - x)\), next each one of the scores should be squared to get rid of the negative sign \((x_i-x)^2\), then all the squares of these scores should be added up \(\sum (x_i - x)^2\), the next step is to divide the total by the number of scores, yielding a result which is called Variance; the last step is to take the square root of the variance, yielding the standard deviation. In algebraic expression they can be written as:

\[
\text{Var}(x) = \sigma^2 = \frac{\sum (x_i - x)^2}{N}
\]

And

\[
\text{SD} = \frac{\sum (x_i - x)^2}{N-1}
\]

As Butler, p.36 (1985) suggests we will obtain a biased estimate of SD in we divide by \(N\) as in the SD formula, but if we divide by \(N-1\) we will obtain an unbiased estimate.

2.1.5.4 Variance

It is defined in SPSS (1993) as "a measure of dispersion around the mean, equal to the sum of square deviations from the mean divided by the one less than the number of cases. The variance is measured in units that are the square of those of the variable itself".

2.1.5.5 Two-tailed t-test

"The t-test is a parametric test which is used to test whether the difference between the means of two sets of scores is statistically significant" (Foster, 1993, p.259) "the independent t-test is used to compare the means of two groups of subjects i.e. when different individuals were allocated to group 1 and group2". In a two-tailed test, one does not specify, beforehand, which group would have the higher mean (SPSS, 1993).
2.1.5.6 Raw Score

An original measurement or observed value. A value before some form of manipulation has been done (SPSS, 1993).

2.1.5.7 Variables

A characteristics or condition that changes or has different values for different individuals (SPSS, 1993).

2.1.5.8 Independent & Dependent Variables

Dependent variable is a variable that is observed while Independent variable is a variable that is controlled or manipulated by the experimenter. In experiments an independent variable is changed or altered while changes in a dependent variable are observed (SPSS, 1993).

2.1.5.9 Null Hypothesis

The null hypothesis in an experiment is the statement that: the independent variable has no effect on the dependent variable at all in the population. In correlational study the null hypothesis would normally be that two variables are not associated or correlated, with one another in the population. Here what happens in the samples is not what we are really interested. The null hypothesis is often referred to as $H_0$ (SPSS, 1993).

2.1.5.10 Score

The number of mistakes made by the students is referred to as score, i.e. score of five means five mistakes.