6.0.0 Introduction

This chapter reports a brief summary of the study. The specific headings under which the summary is reported are the need for the study, statement of the problem, the objective, underlying assumptions, scope and the limitations of the study, method and procedure, conclusions, and educational implications.

6.1.0 The Need for the Study

The task of identifying competent teachers is crucial to the educational system insofar as teaching contributes to the realisation of educational goals, and, in turn, total human welfare. With the increasing recognition of the benefits of education, the teacher's role is becoming more crucial and a great deal of attention is being paid to the problem of teacher accountability. The Education Commission (1964-66) also has emphasised the role the teachers play in the national development.

But the role and the standards expected of the teacher are diverse in nature and degree and are determined by a
variety of pressure groups that are often difficult to define. And, there is a dearth of knowledge about what constitutes competencies a teacher is expected to possess, what these competencies and how exactly he should be assessed for possessing these competencies. Therefore, the problem of teacher accountability cannot be tackled unless such knowledge is made available to all concerned with education.

Further, the teacher training institutions are at a loss to plan sound teacher education programmes in the absence of accurate information about the relationship between the teacher's competencies and their effectiveness in promoting pupil learning. Although many studies have been conducted to this end, the findings are inconsistent, noncoherent, or meagre to make any useful contribution to the theoretical basis of teacher education. More analytical and systematic research on teaching is needed to improve the standard of teacher education.

Of late, attention is being paid to the modification of the curriculum both at the secondary and the higher secondary stages in order to make education socially relevant and useful (Ministry of Education and Social Welfare, 1977; 1978). With the change in the curriculum, a change in the teacher role can be envisaged. But nothing concrete has been taken up with regard to the teacher and the teaching-learning process. Due emphasis has to be laid on this vital area of research, i.e., teaching, which decides the extent to which the educational
objectives are fulfilled. Therefore, researches are needed to scientifically analyse teaching in the light of the new role of the teacher.

In spite of the unprecedented demand for competent teachers, there is, as yet, no comprehensive theory of teaching. The reason probably is that problems besetting research on classroom teaching are varied, complex and overwhelming. But one cannot hope to put teaching on a sound footing unless concerted research efforts are made to specify conditions for maximum pupil outcome, contributing to the development of a theory of teaching.

Nevertheless, there have been a number of attempts to answer the question, "Who is a competent teacher?" (Barr 1948; Patrick, 1974; Anderson, 1974; Starr, 1975; Cockrell, 1976; Cross, 1976; and others). But these studies do not contribute anything substantial to the domain of teaching, in that they have some inherent fallacies in them (see Caption 2.1.0 for details). There are other studies which connect presage, process and product variables and employ suitable approaches and sophisticated statistical techniques, and contribute to competence research (Holloway, 1973; Wells, 1974; Kaul, 1974; Malhotra, 1975, Grewal, 1975; Dean, 1977; Joshi, 1977; and others). But these studies do not tell about competencies required for a particular grade, subject matter or both.
The knowledge of competencies typical to a grade, subject matter or both would enable the educationists and the practitioners to focus on the more crucial aspects of teaching. An attempt has been made in this study to identify desirable teaching competencies of a physics teacher of Standard IX in the context of certain presage, process and product variables.

6.2.0 Statement of the Problem

The problem underlying the study is stated as "Factorial Structure of Teaching Competencies among Secondary School Teachers".

6.2.1 Definitions of Key Terms

The operational definitions of the terms included in the title of the study are given below:

(i) **Factorial Structure**: This relates to the set(s) of teacher behaviours (called competencies) arrived at as a result of factor analysis of the data regarding the different variables.

(ii) **Teaching Competency**: It is the ability of a teacher manifested through a set of overt teacher classroom behaviours which is a resultant of the interaction between the presage and the product variables of teaching within a social setting.
(iii) **Secondary School Teachers**: This denotes only the teachers of Standard IX teaching physics through the medium of English in all types (government/private, aided/unaided, and boys/girls/mixed) of secondary schools in the city of Bangalore.

6.3.0 The Objective of the Study

The study aimed at achieving the following objective:

To identify a set of desirable teaching competencies of physics teachers of Standard IX.

6.4.0 Basic Assumptions Underlying the Study

The study is based on the following assumptions:

(i) Teaching competency is an ability of the teacher and it manifests through his classroom teaching behaviour.

(ii) The behaviour of the teacher in the classroom is the most direct evidence that one can appeal to in a search for teaching competencies.

(iii) This behaviour of the teacher is capable of being observed by a trained observer.

(iv) The different sections of Standard IX are homogeneous in respect of pupils' ability, their socio-economic status, the classroom environment, the physical equipment, etc.
6.5.0 The Scope of the Study

(i) The findings of the study are applicable to only the physics teachers of Standard IX of the secondary schools of an urban area like the city of Bangalore.

(ii) Since this study is the first of its kind, the findings may be treated as explorative rather than conclusive.

6.6.0 Limitations of the Study

(i) The topics in physics that were taught at the time of data collection are considered representative of the entire syllabus of physics of Standard IX.

(ii) Every teacher was observed only once for a period of 30 minutes in his class due to lack of resources. The behaviours that he exhibited in this period are taken to be representative of the universal of his teaching behaviours.

6.7.0 Method and Procedure

This study adopted two approaches to fulfil the objective of the study. First, the different presage, process and product variables of teaching were measured and factor analysed to arrive at the set(s) of desirable teaching competencies. Second, the views expressed by students about their physics teacher were content analysed and a profile of a competent
physics teacher was developed. The purpose of adopting the second approach was to validate the competencies identified through the first approach and make the results and their interpretation more meaningful and comprehensive.

The different variables included in the study are as follows: four presage variables, 86 teacher classroom behaviours under the process variable and one product variable. The details of these variables are presented in Table 6.1.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Presage Variables</th>
<th>Process Variable</th>
<th>Product Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Teacher's intelligence</td>
<td></td>
<td>Students' liking for their teacher</td>
</tr>
<tr>
<td>2.</td>
<td>Teacher's attitude towards teaching</td>
<td>86 behaviours exhibited by the teacher in the classroom</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Teacher's interest in teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Teacher's self perception of his classroom behaviour</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The study was conducted at two stages, namely, the pilot study and the final study. The pilot study enabled standardisation of the tools constructed by the investigator and also provided guidelines for conducting the final study.
6.7.1 The Sample

A live classroom was the unit of sample. The population of the study consisted of all teachers of Standard IX teaching physics through the medium of English and their students engaged in the teaching-learning process in all secondary schools of the city of Bangalore.

The sample for the pilot study consisted of 23 teachers of grades VIII, IX and X, teaching the subjects of English, science, mathematics and social studies through the medium of English in five secondary schools of the city of Baroda, and their 241 students. A rationale for restricting the sample of the final study to physics teachers of Standard IX in the secondary schools of the city of Bangalore is provided in Captions 3.1.1 and 3.3.0.

For the final study, the sample comprised 130 teachers of Standard IX teaching physics through the medium of English in 79 secondary schools of the city of Bangalore. As regards the sample of students, 2305 students were randomly chosen to respond to the Student Liking Scale; 100 students were selected and interviewed on a semi-structured Interview Schedule to gather data regarding their views about their physics teacher.

6.7.2 The Tools

In all, seven tools were used to collect data regarding the different presage, process and product variables. The
tools employed, the variables studied and the respective sample are presented in Table 6.2.

TABLE 6.2


<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tool</th>
<th>Variable</th>
<th>Sample</th>
<th>Total number of variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Standard Progressive Matrices, Sets A, B, C, D and E</td>
<td>Presage</td>
<td>Teachers</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Teacher Attitude Scale</td>
<td>Presage</td>
<td>Teachers</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Interest Inventory for Teachers</td>
<td>Presage</td>
<td>Teachers</td>
<td>M4 1</td>
</tr>
<tr>
<td>4.</td>
<td>Teacher's Self Rating Scale</td>
<td>Presage</td>
<td>Teachers</td>
<td>14</td>
</tr>
<tr>
<td>5.</td>
<td>Observation Schedule</td>
<td>Process</td>
<td>Teaching learning situation</td>
<td>86</td>
</tr>
<tr>
<td>6.</td>
<td>Students Liking Scale</td>
<td>Product</td>
<td>Students</td>
<td>14</td>
</tr>
<tr>
<td>7.</td>
<td>Interview Schedule</td>
<td>Product</td>
<td>Students</td>
<td></td>
</tr>
</tbody>
</table>

Total       ...       ...       117

6.8.0 Conclusions

Data collected were factor analysed by the method of principal component analysis. This resulted in fourteen factors which accounted for 68.30 percent of total variance. In order to attain parsimony and meaningfulness of results,
these factors were rotated through the varimax method. They were named as follows: (i) General Teaching Competency, (ii) Competency of Teacher Concern for Students, (iii) Competency of Using Audio-Visual Aids, (iv) Competency of Professional Perception, (v) Competency of Giving Assignment, (vi) Competency of Illustrating with Examples, (vii) Competency of Pacing while Introducing, (viii) Competency of Logical Exposition, (ix) Competency of Classroom Management, (x) Competency of the Use of Questions, (xi) Competency of Initiating Pupil Participation, (xii) Competency of the Use of Blackboard, (xiii) Competency of Recognising Attending Behaviour, and (xiv) Competency of Achieving Closure.

The opinions expressed by the students in response to an interview and an open-ended question on the Student Liking Scale were content analysed and a 'Profile of a Competent Physics Teacher' was developed. The different aspects discussed in the profile are as follows: teacher's competency of (i) creating interest and curiosity in students, (ii) asking many as well as difficult questions, (iii) clear explanation, (iv) teaching in an interesting way to keep the students attentive, (v) adjustment of the pace of teaching (vi) showing things and experiments related to teaching, (vii) giving interesting examples, (viii) good use of blackboard, (ix) appreciation of student answers, (x) summarising the lesson, (xi) maintaining orderliness in the classroom, (xii) giving challenging assignment, (xiii) humour, (xiv) correct pronunciation.
ation and good accent, (xv) impartiality, (xvi) knowledge of subject matter, (xvii) punctuality, (xviii) giving notes, and (xiv) repetition of the lesson when necessary.

It was found that the fourteen competencies that emerged as a result of factor analysis related very closely with those expected of teachers by their students. Thus, the factorial structure of teaching competencies was validated by the profile of the teacher portrayed by the students. Further, the teaching skills and their respective components which formed the basis of the Observation Schedule were validated through this study. It was found that the extracted factors, by and large, accounted for the same variables as the components conceptualised under each of the skills. Thus, the three theoretical model hypothesised by Passi (1976) and De Sales (1976) was empirically demonstrated to a considerable extent in this study.

6.9.0 Educational Implications

The conclusions of this study have implications related to teacher training institutions, school systems and research on teaching.