

## **Effective Teaching Competency with Micro Teaching**

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### **INTRODUCTION**

Qualitative education plays an important role in technological advancement. When we talk about qualitative education, we think to competent teachers, who impart education. Therefore, to prepare competent teachers, teaching technology has developed pre-service and in- service teacher education programmes. Now, there is a demand for competent teachers at all levels of education and the teacher education programmes, claiming production of competent teachers must be judged by the degree to which it develops competencies, skills and activities needed for successful functioning of teachers.

The standard of education of a country largely depends on the quality and competence of the teachers of that country and this quality and competence of the teachers depends on the teacher education programme. Thus to make significant development of a nation, we have to look towards the teachers. The teacher needs to be conceived as a 'change agent' for which they may be well acquainted and informed about day to day development because efficiency of an educational system is primarily determined by the efficiency of teachers. The **Education Commission (1964-66)** have pointed out that, "off all the different factors which influence the quality of education and its contribution to national development, the quality, competence and character of teachers are undoubtedly the most significant."

To prepare an efficient teacher is a challenging task today. Previously, it was thought that teacher are born not made but now recent researches in this field proved that efficient and competent teachers can be produced by modifying their behavior. The purpose of the teacher education programmes is to prepare effective and competent teachers. The success of any educational reform depends on the quality of teacher, which in turn depends to a large extent on the quality of the teacher education programme.

The success of teacher education programme depends on developing a skill to identify different teaching objectives, attitude and patterns of teaching behavior among the college students, who have been preparing to enter the teaching profession. The success also depends on enabling the student teacher to perform certain teaching behavior patterns, string them together into strategies of classroom instruction and carry them out to compare different patterns of his own teaching behavior and different strategies of teaching in terms of its consequences.

Proper training to teacher is of great importance in improving the quality of education. The process of improvement in teacher education programme is in progress in our country, but these improvements are marginal in nature. It is now, generally realized that researches must be directed towards the improvement of present day teacher education programmes. The training of teachers demands our urgent attention. In a rapidly changing world, the old system of teacher training no longer seems to meet the requirements of our schools and the society. The problem is of quality and efficiency of our teachers. How can a teacher do a better job of

teaching is the main problem. The solution for the improvement of teaching in our schools is to turn out effective teachers from our teacher training institutions. The minimum requirement of any teacher training programme is that it should enable the trainee to acquire the basic skills and competence of a good teacher.

An effective teacher guides the learning activities of the children so that they may learn. A teacher as a professional develops certain skills to use his knowledge to organize, encourage and assist certain generally approved skills of learning. This involves a careful study of his own behavior in some systematic and objective manner, so that the teacher may gain deep insight into his own pattern of influence. There are various techniques to modify the teacher behavior, which are emphasized and implemented during teacher education programme for prospective and in-service teachers to make them competent and effective.

**The Education Commission (1964-1966)** have stated “Investment in teacher education can yield very rich dividends because the financial resources required are small when measured against the resulting improvements in the education of millions..... First rate teacher training institutions can thus play a crucial role in the development of education.”

**“National Policy on Education 1986** has stressed the need for a wider perspective in education and resource based learning strategies. It has broadened the scope of curriculum and enriched learning skills. This enhanced responsibility can be adequately performed only when teachers are equipped with requisite professional competencies. The teacher education programs, as they are, do not adequately develop the mastery of such competencies. It has, therefore, been emphasized that innovative approaches may be inducted into teacher training to sharpen the teaching competencies in both pre-service and in-service teachers.

At present in teacher training intuitions, the student teachers are trained through traditional approach of teaching and measurement of the extent to which the trainee acquires a skill in particular and general teaching competence is very vague and unscientific. Hence in order to make teacher education programme effective and to bring qualitative improvement, some other technique or approach should be adopted so that the opportunity for the development of various skills among teachers may be increased. Micro-teaching which is one of the recent innovations in teacher education may be an answer of our problem.

A good teacher is at first a good individual. He is also learned and trained individual. We are, however, convinced that the most important factors in the contemplated educational reconstruction is the teacher – his personal qualities, his educational qualifications, his professional training and the place that he occupies in the school as well as in community. The reputation of a school and its influence on the life of the community invariably depend on the kind of teachers working in i

### **Teaching Competency:**

According to some authors teaching competency includes knowledge, attitude, skill and other teacher characteristics (**Haskew, 1956, Wilson, 1973**).

Some others perceive teaching competence as teacher behaviors that produce intended effects (**Medley and Metzel, 1973, Biddle, 1974**).

**Rama (1979)** defines teaching competency as, “the ability of a teacher manifested through a set of overt teacher classroom behaviors’ which is a resultant of the interaction between the presage and the product variables of teaching within a social setting”. Considering the definition of the term it may pointed out that teaching process is determined by knowledge, a set of abilities, attitudes and skills (presage variables) which in term determine pupil outcomes. Thus, the term “teaching” can be defined as a set of observable teacher behaviours that facilitate or bring about pupil learning and “teaching competency” means an effective performance of all the observable teacher behavior that bring about desirable pupil outcomes.

### 1.1 CONCEPT OF Teaching Competency

Teaching is an important part of educational process. Its special function is to impart knowledge, develop understanding and skills. Teaching is usually associated with 3R' i.e., Reading, Writing and Arithmetic imparting knowledge of school subjects. Education, on the other hand, has a wider connotation in terms of 7R's, i.e., Reading, Writing, Arithmetic (denoting school subjects) and Rights, Responsibilities, Relationships and Recreation (new requirement and ideals of democratic set up). In teaching, we limit our outlook omitting those more important means of education which are involved in the school as a systematically organized social Community, including its tone or general moral atmosphere, its government and discipline and that potent influence – the personality of the teacher.

Teaching is a relationship, which is established among three focal points in education – the teacher, the students and the subject matter. Teaching is the process by which the teacher brings the students and the subject matter together. The teacher and the taught are active, the former in teaching and the latter in learning.

Modern teaching is not a mechanical process. It is exacting and intricate as well. Teaching is not “telling and testing”. Teaching is a complex art of guiding students through variety of selected experiences towards the attainment of appropriate teaching-learning goals.

**Definitions of Teaching:** Teaching has been defined by different psychologists and educationists in different ways. Some of the viewpoints are as under:

**American Educational Research Association Commission (1962)** mentioned that teaching is a form of interpersonal influence aimed at changing the behavior potential of another person. According to **Morrison (1934)**, “Teaching is an intimate contact between a more mature personality and less mature one which is designed to further the education of the latter.” In view of **Flander**, “Teaching is an interacting process. Interaction means participation of both teacher and students and both are benefited by this. The interaction takes place for achieving desired objectives”.

In view of **Medley (1982)**, “Teaching involves a lot of language skills, pedagogic knowledge, information technology skills and subject knowledge”.

**Meaning of Competency:** The term “competency” or “competence” is frequently used when we talk about any profession or work that express one's quality of being competent, possessing adequate professional skills, knowledge, qualification or capacity. When we talk about the teacher or his profession, we come to understand that teaching constitutes one of the major tasks of a teacher “teaching competency”. Hence, “teaching competency”, in one way or the other, has been a debatable term. Both the terms were tried to be defined separately and also together in different ways by social scientists at different time.

**Teaching Competency:** The term “teaching” as defined by **Bhattacharya (1974)**, involves “perceiving the process analytically as constituting a host of activities”. Likewise the term “competency” defined by **Brown (1975)** and **Gage (1972)** if we take in the essence of teaching profession, refer to the criteria that determine teaching effectiveness. The reviews of research on teacher effectiveness point to the futility of efforts in identifying teacher-effectiveness criteria. But the recent upsurge in research provides conditions and optimism. **Rosenshine (1971)** state quite confidently that pupils outcomes, pupils achievement, student liking, etc. may be taken as the criteria of teacher-effectiveness (**Ebel, 1969: Rosenshine, 1971**). However, the term ‘teaching competence’ as defined by **Flanders and Simon (1969)** includes more than the mere teacher effectiveness and pupil outcomes. According to **Haskew (1956)** and **Wilson (1973)** it includes knowledge, skill and other teacher characteristics. **Medley and Mitzel (1973)** and **Biddle (1964)** perceive ‘teacher-competence’ as teacher behaviours that produce intended effects. **Rama (1979)** gives a comprehensive definition of the term teaching-



competency as the ability of a teacher manifested through a set of overt teacher classroom behavior. In other words, it is a set of observable teacher behaviors that bring about pupil learning.

## **2.2 Concept of Micro-teaching:**

Teaching is a unique and complex activity. It is mysterious in its success and failures. A peep into research on teachers and teaching effectiveness conducted during the current century reveals that majority of the studies in this area were directed towards finding out characteristic of good and bad teachers. The dominant theme of these studies had been the search for good teachers, but the yield has not been high.

In the programmer of teacher training, 'Student Teaching' occupies a pivotal place. Unless the teacher can be effective in the class room, the knowledge of theory and other things is of no use. Unfortunately, this important aspect of teacher-training programme is not given due attention in most colleges of education. Unless the teacher can teach effectively in the class room, his training cannot be complete. There is a need to pay more attention to this aspect of teacher-training.

Several innovations have been designed to strengthen the programmers of student teaching. Micro-teaching is one of the recent ones. It is relatively a new departure in teacher training. It employs analytical approach to teaching and training (**Jangira, 1983, 1984**).

The term micro-teaching was first coined in 1963, but the concept has never been a static one. It continued to grow and change and developed both in focus and format. Microteaching is a laboratory technique of teacher training in which the complexities of normal class room teaching are simplified. It is described as a 'Scaled down teaching encounter in class size and class time' (**Allen and Ryan, 1969**). The scaling down been done in three directions: The duration of a microteaching session is only from five to fifteen minutes. The size of the class ranges from four to ten students. The whole process of 'Student Teaching' is broken up into a number of skills; and training in the skills of teaching is provided separately in micro- lesson sessions.

**Definitions of Microteaching:** **Allen (196)** defined micro-teaching as "Scaled-down teaching encounter in class size and class time."

**Bush (1966)** defined it a "A teacher-education technique which allows teachers to apply clearly defined teaching skills to carefully prepared lessons in a planned series of five to ten minutes encounters with a small group of real students, often with an opportunity to observe the results on Video-tape".  
**Cooper and Stround (1966)** defined it as "A scaled-down encounter in which the intern teaches for a short period of time, to a group of four students on some topic in his teaching subjects".

**Meir (1968)** defined the concept by saying that micro-teaching is a scaled-down sample of teaching. The term 'micro' not only denotes the reduction in lesson and Class size but also adds scientific commutation of precision, in the sense that microteaching, by having down the edge of observation to a fine cutting process – enables an objective quantitative and qualitative analysis of the recorded behaviors. Micro-teaching is essentially an opportunity for either pre-service or in-service teachers to develop and improve their pedagogical skills with a small group of pupils (3 to 7) by means of brief (3 to 7 minutes) single concept lessons which are recorded on Video-tape for reviewing, responding, refining and re- teaching.

**Allen and Eve (1968)** defined microteaching as "A system of controlled practice that makes it possible to concentrate on specific teaching behavior and to practice teaching under controlled conditions".  
**Allen and Ryan (1969)** described microteaching as "A teacher instructs four or five students for a short time and then talks it over with another adult. An experienced observer would emphasize the fact that the teacher concentrated on a specific training skill or technique and utilized several sources of feedback, such a supervisor, the students, the teacher's own reflections and the play-back of Video-tapes. The experienced observer would

also note that the teacher has an opportunity to repeat the entire process by re-teaching the lesson and again having his performance critiqued, and that in the second and subsequent cycles he teaches different

**McKnight (1971)** said “Microteaching is a scaled down but realistic class-room context which offers a helpful setting for a teacher (experienced or inexperienced) to acquire new teaching skills and to refine old ones. It does so by reducing the complexity and scope of such classroom components the number of pupils, and length of lesson, by providing trainees with information about their performance immediately after completion of their lesson”.

**Clift et al. (1976)** defined microteaching as “a teacher training procedure which reduces the teaching situation to simpler and more controlled encounter achieved by limiting the practice teaching to a specific skill and reducing teaching time and class size”.

**Passi (1976)** defined microteaching as “A training technique which requires student teachers to teach a single concept using specified teaching skill to a small number of pupils in a short duration time. The most important point in microteaching is that teaching is practiced in terms of definable, observable, measurable and controllable teaching skills”.

**Sharma (1981)** defined microteaching as “A specific teacher training technique through which trainee practices the various teaching skills in a specific situation with the help of feedback with a view to increase the student’s involvement. Specific situation means small time to practice (5 – 7 minutes), small number of pupils (5 – 7) and small-length of practicing material.

#### **Prepositions of Micro-teaching:**

The basic prepositions underlying microteaching are as follows:

1. It is a real teaching.
2. It simplifies the classroom teaching in terms of class size, time, content etc.
3. It focuses on training for the accomplishment of specific tasks.
4. It allows for the increased control of practice. In practice setting of microteaching, various factors like time, students, methods of feedback and supervision etc. can be manipulated.
5. It greatly expands the normal knowledge of result of feedback dimension in teaching. Immediately after teaching a micro-lesson, the trainee gets a feedback about his performance and several sources of feedback may be used.

#### **Principles of Micro-teaching:**

On the basis of the learning theories, the following principles underlie the concept of microteaching

1. Capabilities of the learner must be considered when a decision of what to teach is made. In pursuance of this principle, a trainee is given the opportunity to select a lesson content in an area of his greatest competence so that he may feel at ease with the subject matter.
2. The learner must be motivated intrinsically. In line with this principle, intrinsic motivation in the context of microteaching is created through cognitive and effective discrepancy between his ideas, self concept as a teacher and his real teaching.
3. Goals are to be realistically set. In keeping with this principle in the microteaching setting, attempt is made to modify only modifiable behavior which trainee wants to change.
4. Only one element of modifiable behavior is to be worked on at a time. In pursuance of this principle, in any microteaching session a trainee practices one skill at a time and moves to the next only after he has achieved mastery over it.

5. Active participation by the student is necessary in order to modify his behavior substantially. In accordance with this principle, in any micro-teaching situation a trainee engages actively in practicing a skill in which he wants to be perfect.
6. Knowledge and information about one's performance helps the learner. Transfer of learning will be better if the learner gets the feedback related to his performance. In view of this principle, if any microteaching session a trainee is provided knowledge and information about his performance by supervisor with or without the help of videotape or an audio tape.
7. Transfer is maximized due to immediate feedback which informs the trainees of their defective practices before they become habitual. According to this principle, in microteaching setting a trainee is provided immediate feedback regarding his performance, thereby eliminating any chance of wrong practice.8. Spaced distributive recalls are advantageous as learning and maintenance of a skill are best accomplished through spaced practice over a period of time. In keeping with this principle, in microteaching, students are provided experience in various skills over a considerable length of time.

**Process of Micro-teaching:** The microteaching programme generally consisted of two phases namely, orientation phase and practice phase.

**1. Orientation phase:** The purpose of this phase is to bring a clear understanding of the microteaching technique, teaching skill, process of feedback, observation of the lesson, preparation of lesson plan, aid other elements of micro-teaching. This phase forms a base to practice particular teaching skill.

**2. Practice phase:** The practice phase is the main phase of the micro-teaching programmed. In this phase, trainees practice the required teaching skill. The trainee does so by following the six steps mentioned below. The completion of these steps means one microteaching cycle. This cycle may continue till the trainee mastered the given skill. Each step of the microteaching cycle is given below

1. The trainee plans a short lesson which he can use the skill which he wants to practice.
2. Trainee teaches the lesson to small group of pupils which is videotaped or audiotape or observed by supervisor and/or peer(s).
3. Feedback is provided to the student teacher by videotape or audiotape recorder or who observes, and analyses his lesson with the help of supervisor. The supervisor attempts to make so enforcing comments about instances of effective use of the skill and draws the student's attention to other situations where the skill could have been exercised.
4. In the light of feedback and supervisor's comments, the student teacher re-plans the lesson in order to use the skill more effectively.
5. The revised lesson is re-taught to different but comparable group of pupils.
6. Feedback is again provided (re-feedback) on the re-teach lesson which is analyzed with the help of the supervisor.
7. he 'teach-re-teach' cycle may be repeated till adequate level of skill-acquisition takes place.

**Importance of Microteaching:** The importance of microteaching has been discussed under the following heads

- 1. It is a safe practice:** Practice is essential for many learning activities. Practice is the normal class-room whether by a student teacher or by experienced teacher brings with it certain constraints. It is felt that students are to be skillfully taught, not practiced on. Practice may take place within a larger block of time. It must be integrated into the flow of longer lesson. Most important factor taking in our classroom teaching is the limited opportunity for the student teacher to receive feedback for his performance.
- 2. A focused instrument:** Teaching is a complex activity. It can be analyzed into component skills or behaviors. The microteaching environment enables a student teacher to focus attention on and practice on specific skill at a time until he acquires competence in it. Provision of feedback accelerates this



process. After acquiring competence in a number of skills in this way, the student teacher takes to microteaching.

3. **A vehicle for continuous training:** Microteaching is a useful vehicle for providing continuous training to serving teachers. Most of the teachers who reach their professional plateau do not want to improve their skill of teaching. This is also true of the teachers who enjoy high reputation for their skill of teaching. The main reason for such a tendency is that they do not find a way to experiment with new skills of teaching and thereby improve upon them. Microteaching helps in overcoming such lacuna. It provides setting for experimentation. Again with the introduction of new curriculum, teachers are required to acquire new skills of teaching. Microteaching helps them in acquiring such skills.
4. **Modeling instructional skills:** The microteaching setting demonstrations of good teaching given by teachers can be recorded on videotape or observed by supervisor. Such a recording or observation analyzed to identify component skills comprising teaching which is a complex activity. Similarly, sub-behaviors underlying each skill can also be identified. This knowledge so obtained helps in building models of various component teaching skills. These models are presented before the trainees so that they may make their behaviors' according to the models of the skills by practicing in the microteaching setting.
5. **A new approach to supervision:** The approach to supervision under microteaching is non-evaluative. In the microteaching setting a supervisor acts as a guide or an adviser. He helps the trainee teacher or the practicing teacher to improve his skill of teaching. Before the commencement of practice, both the teacher and supervisor are clear about the objective to be achieved or skill to be demonstrated. They are also clear about the mode and instrument of assessment to be used. Such a procedure provides common frame of reference for the supervisor and the trainee for a dialogue. The suggestions given by the supervisor are incorporated in the new lesson or ret each practice.
6. **A new research too:** There are many variables which may affect the teaching-learning process. Such variables are the size of class, quality of the student, the length of the period, the motivation of the students etc. Microteaching helps the researcher to exercise control over such variables and thereby enables him to see the effect of independent variables over the dependent variables. Microteaching is also suitable for pilot studies. Before embarking on large experiments same problem can be worked out in micro-teaching setting.

**TERMS USED: Feedback:** The provision of feedback is one of the main components of microteaching procedure. After the practice of a particular skill, the student teacher wants to know about his performance, weak points and suggestions for further improvement of that skill. Thus the process of proving the information regarding the teaching performance of a teacher for improving upon his teaching behavior in subsequent micro-teaching session and/or actual class performance is known as feedback.

Feedback is the process whereby the individual gains information concerning the correctness of his previous responses so that he can adjust his behavior to compensate for errors. It involves a complex interaction between motives, goals and information regarding progress, toward these goals, a more inclusive expression than knowledge of results which it is tending to replace.

Feedback is information concerning the correctness of previous responses but the correctness of previous responses can also be informed through reinforces.

**Teaching Skills:** A teaching skill is defined as a set of teacher behaviors' which are especially effective in bringing about desired changes in pupils. There are various skills that can be usefully developed among student teachers.

**Allen and Ryan (1969)** had identified the following fourteen general teaching skills that can be applied at many levels, for teaching different subjects.

1. Stimulus variation
2. Set induction
3. Set induction
4. Closure
5. Reinforcement of student participation
6. Fluency in asking questions
7. Probing questions
8. Higher order questions
9. Divergent questions
10. Recognizing attending behavior
11. Illustrating and use of examples
12. Lecturing
13. Planned repetition
14. Completeness of communication

**Passi (1976)** in his book 'Becoming Better Teacher- Microteaching Approach' has discussed the following general teaching skills.

1. Writing Instructional objectives
2. Introducing a lesson
3. Fluency in questioning
4. Probing questioning
5. Explaining
6. Illustration with examples
7. Stimulus variation
8. Reinforcement
9. Silence and non-verbal cues
10. Increasing pupil participation
11. Using black-board
12. Achieving closure
13. Recognizing attending behavior

But now the trend has changed. The researchers have started identifying the skills needed for teaching a particular subject and grade. In this context, **Rama (1978)** has identified fourteen skills for teaching Physics at secondary level.

**These are as follows :**

1. General Teaching competency
2. Class-room management
3. The use of questions
4. Initiating pupil participation
5. The use of black-board
6. Recognizing attending behavior
7. Achieving closure
8. Logical exposition
9. Teacher concern for students
10. Using Audio-visual aids
11. Professional perception
12. Giving assignment
13. Illustrating with examples
14. Pacing while introducing

**Passi and Sharma (1981)** have identified nineteen teaching skills for teaching language at secondary level. These skills are

1. Giving assignment
  2. Loud reading
  3. Asking questions
  4. Introducing a lesson
  5. Managing class-room
  6. Clarification
  7. Secondary loud reading
  8. Using black-board
  9. Using reinforcement
  10. Pacing
  11. Avoiding repetition
  12. Consolidating the lesson
  13. Dealing with pupils' responses
  14. Improving pupil's behavior
  15. Using secondary reinforcement
  16. Audibility
  17. Recognizing pupils' attending behavior
  18. Presenting verbal mode
  19. Shifting sensory channel.
- There are two types of teaching skills : 1. General Teaching skills 2. Specific teaching skills

General teaching skills help in the teaching of different subjects whereas specific teaching skills help to teach a particular subject keeping in the mind, the importance of specific teaching skills, and the trend has been started to identify the skills for a particular subject at a particular grade. NCERT (1981) has taken a project to identify the skills required for teaching primary level.

According to the importance and need in the opinion of researcher the following skills are of great importance.

1. Introducing a lesson
2. Fluency and probing in questioning
3. Explaining with the writing of black-board
4. Illustration with examples
5. Stimulus variation
6. Silence and non-verbal cues
7. Reinforcement
8. Achieving closure
9. Recognizing attending behavior.

In the present study, teaching is perceived, as a set of teaching skills where in a teaching skill is a set of teaching behaviours that facilitate or bring about a specific instructional objective. In other words, teaching



competency involves effective use of various teaching skills. Hence for the purpose of this study ‘teaching-competency’ would mean: “Effective performance of all observable teacher behaviours that bring about desired prospective teacher outcomes.”

## REFERENCES

1. **Passi, B. K. and Lalitha, M. S. (1994).** Manual for General Teaching Competency Scale (GTCS). Agra: National Psychological Corporation.
2. **Bawa, M. S. (1984).** “Effectiveness of Microteaching with Planned integrated training following summative model and microteaching without planned integration training on the general teaching competence of teacher trainees,” Ph.D. University of Delhi.
3. **Naseema, C. (1994):** Teaching competence of secondary school physical science teachers in relation to satisfaction of teaching physical education. Ph.D. Education, University of Calicut.
4. **Acheson. K. (1964).** ‘The effect of feedback from television recording and three types of supervisory treatment on selected teacher behaviour’. Unpublished doctoral dissertation. Stanford University.
5. **Anderson, T. E. (1983).** “A Study of the degree to which certain teacher behaviours generalize from a simulated classroom to real classroom.” D.A.I. Vol. 43, No.7.
6. **Best, J. W. and Kahn, J. V. (1986).** Research in Education (5<sup>th</sup> ed.). New Jersey: Prentice Hall.
7. **Paintal, Iris, (1980).** Micro-teaching -A Hand Book for Teachers, Oxford University Press, New Delhi, 1980.
8. **Allen. D. W. (1968).** Microteaching : A description. Stanford University, 1968
9. **Passi, B. K. (1976).** Becoming Better Teacher : Micro Teaching Approach, Sahitya Mudranalya, Ahmedabad, 1976.
10. **Passi, B. K. and Lalitha, M. S. (1977).** Microteaching in Indian Context. Deptt. of Education, Indore university, Indore
11. **Passi, B. K. and Shah, M. M. (1976).** Microteaching in Teacher Education, CASE Monograph No. 3, Baroda
12. **Singh, L. C. and Shama, R. D. (1987):.** Microteaching Theory and Practice, Deptt. of Teacher Education, NCERT, New Delhi
13. **Lakshminarayan, U. and Babu, G.V.S. (2003).** Indicators of teaching competence of teachers in DPEP and Non-DPEP schools. Indian Educational Abstract, 40 (1), January 2004.
14. **Sharma, R. A. :** Technology of Teaching, International Publishing House, Meerut.