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Perception of Contemporary Science Teachers of Secondary Schools toward the Effectiveness of In-Service Training

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Abstract:

This paper deals with the perception of contemporary science teachers of secondary schools toward the effectiveness of in-service training. Science education is an integral part of school curriculum up to secondary stage and therefore needs careful and judicious planning in every respect especially in teacher education curriculum. The various roles and tasks assigned to science teachers are curriculum developer and evaluator.

Key words: Perception, In-service, Teacher Training, Task analysis

Introduction:

"Good science is not how many answers you know, but how you behave when you don't know the answer."

"Good science teaching is not how many answers you know, but how you behave when the students don't know the answer."(Robert Cohen)

The entire education process is an effort an individual is capable of establishing between self, society and nature, appreciation and respect for others, while retaining a sense of individual pride.

Importance of science education

Science education aimed at developing well defined abilities in cognitive, affective, and psychomotor domains such as spirit of inquiry, creativity, objectivity, the courage to question and aesthetic sensibility. Various programmes in science education should be designed so as to enable the learner to acquire problem solving and decision making skills and to discover the relationship of science with health, agriculture, industry and other aspects of daily life. Science knowledge and skills should help an individual to question the existing beliefs, prejudices and practices and act as liberating force. They should also help children to search for truth, harmony and order in different aspects of life.

Science education should be for all because it is expected that pupils studying science for ten years will require observation and analytical skills for regulation: ability to use tools, apparatus and equipments appropriate to their immediate and future needs, ability to identify the factors operating in their system and understanding, their causal relationships, collecting, classifying, interpreting data and making reasonable inferences. The person will also understand the basic scientific concepts, laws and principles and will be able to apply them in solving the problems. The content of science reflects that science is containing human endeavour and that it is international in character and methods.

Science by its very nature provides sufficient scope for directly contributing to important core components and relative values like equality of sexes, protection of environment, and inculcation of scientific temper.

Role of Science Teacher

Science education is an integral part of school curriculum up to the secondary stage and therefore needs careful and judicious planning in every respect especially in teacher education

curriculum. The various roles and tasks assigned to science teachers are curriculum developer, evaluator, and transaction under below the two categories:

Pedagogical Task - (Relating to the teaching)
Non pedagogical Task

Objectives of these tasks are:

- To develop an understanding of the nature of science.
- To analyse contents in term of concepts, sub-concepts and relation between them.
- To construct suitable tools of evaluation, understanding, continuous and comprehensive evaluation, feedback and remediation.
- To establish ecology of science classroom to generate a healthy learning environment.
- To use appropriate educational technology and develop low cost teaching material.
- To understand comparative study of science curriculum develop by curriculum groups in India and abroad and to familiarise with global concerns in curriculum development.
- To analyse and evaluate science syllabus and science textbooks.
- To develop skills of organising out of school or extending curricular activities.
- The principal role of teacher will essentially be teaching and guidance of pupils' through-classroom instruction, tutorials, personal contacts, and other ways for building the character of students.

The science teacher should be able to:

- Inculcate the relationship of science with health agriculture, nutrition and other aspects of living.
- Use scientific knowledge in erasing false belief prejudices and practising prevailing in the society.

- Develop in the students the decision making and problem solving skills in daily life situations.

Institutions like DIET, IASE and CTE were developed for providing in-service education (which includes knowledge developments and changes in attitudes, skills, disposition and practise through interaction both in workshops setting in the schools. It consists not only of receiving knowledge from experts but promotion of experimental learning (incorporating as active learners and peer group based review of practise) to primary and secondary school teachers. Any curriculum efforts need to be supported with a well throughout and systematic programme of in-service education and school based teachers support.

A major indicator of quality of training is its relevance to teachers' need, but most of such programmes are not organised according to the actual needs of the teachers. In-service education nowadays has become an event rather than process.

In- service teacher training

A report of university grant commission appointed by Government of India contains the following passage:

> "It is extraordinary that our school teachers learn all of whatever subjects they teach before reaching the age of 25 and then all their further education is left to experience, which in most cases is another name for stagnation. We must realise that experience needs to be supplemented by experiment before reaching its fullness and that a teacher, to keep alive and afresh should become a learner from time to time. Constant outpouring needs constant in-taking; practise must be reinforced by theory and the old must be constantly tested by the new."

According to Kothari commission, "the need of in-service education is most urgent in the teaching profession because of the rapid advance in all fields of knowledge and continuing evaluation of pedagogical theory and practises."

Importance of in-service teacher education

- Educational extension will contribute to the quality improvement of education.
- The various changes occuring in many areas of human endeavour demands corresponding change in education and therefore in the educator. The frontier of human knowledge in various fields expends rapidly and hence changes in basic concepts and theories in various discipline necessitate corresponding changes in educational theory and practices. New pedagogical techniques and skills are also innovated. Social changes are also fairly rapid in the form of acceptance of new social values development of new social need and demands and so forth.
- In India school population and clientele keep continuously changing. All these developments, innovations and changes necessitate corresponding changes to bring about educational objectives, curricula, textual content, teaching methods, instructional material and so forth without delay so the education remains dynamic and responsive.
- In order to bring about changes in education corresponding to the changes in other related areas, in-service training is necessary to improve the competency of the teacher in term of his knowledge, skills, interests, aptitudes as an essential mean of improving education.

Hence, in-service teacher education helps the teachers to prepare themselves to face the changes of the day to day life, it provides them the ability for new thinking and makes them able to use their ideas continuously. The role of secondary teachers is changing so fast that no amount of teacher education can probably cope with the expectation of the society. There is a need to equip the in-service teacher with the requisite additional knowledge, personality, attributes, skills, etc.

The performance of the secondary science teacher depends on the competency possessed by him to perform his respected task perfectly.

Meaning and definition of key terms used

- *Task*: task is the work that a teacher has to perform. It is the responsibility assigned to teachers for the outcome for which here service has been contracted.
- *In-Service teachers training*: It refers to the education a teacher received after he has started the teaching profession and after he has had his education in teachers' college.
- *National Curriculum Framework*: National framework for curriculum is a mean of evolving a national system of education capable of responding to India's diversity of geographically and cultural milieus by ensuring a common core of values along with academic components. It is also a means of modernizing the system of education.
- *Task Analysis*: One of the most important training innovations during the industrial revolution in the early part of this century was the development of task analysis in Europe and North America. Task analysis protocols allowed authority to observe highly skilled workers and to describe the precise activities that were required to perform the variety of jobs that were required for manufacturing (Gael 1988). Once a job and its component tasks had been analyzed and recorded, inexperienced workers could be more quickly trained to perform necessary jobs. Prior to task analysis, job training was accomplished almost exclusively by observational learning on- the- job ("sit by Nelly") and formal apprenticeships. Both these methods required a great deal of time and produced variable results for a couple of reasons.

- *The role model* did not always know what behaviours to highlight for the learner, for reasons discussed later. Some very critical steps or decisions occur very rarely and so are inefficient to observe in real –time.
- *Task analysis methods*: They developed early this century and they have been so successful that some forms of them are still being used today in most training design systems. Task analysis laid the foundation for the development of training objectives (Mager 1984). In addition to training, Task analysis often forms the basis for job description schemes (Fine 1988), hiring criteria and the performance appraisal systems adopted by larger business organizations and governments (Cooke 1992a; Gael 1988).

Task analysis may be one of the most successful training inventions in the past century. Yet, there seem to be at least two recent developments that have made traditional task analysis systems inadequate to support the current demands in changing organizational environment of Europe and North America: a primarily behavioural focus and advances in research on cognitive processes and structures.

Need of the study

The dimensions of national framework for school curriculum are derived from related aim of education with a social conscience, focusing on learners who are actively engaged with constituting rather than only receiving knowledge through their individual and collective endeavour. Such a curricular vision needs to be supported and sustained with systematic reforms of structure and education institution. Important among these are the system for preparing teachers and supporting their professional practice through various means, one of the critical area that requires attention is identified as in- service training of teachers.

Methodology

Design of the Study

The design of the study was:

- Development of task profile of secondary school science teacher.
- Need assessment questionnaire.
- Perceptual scale.
- Analysis of NCF-2005 documents.
- Rating scale for science teacher.

The impact was studied in 2 phases.

In phase one- task profile for secondary school science teacher was developed by researcher. The researcher developed a rating scale for science teacher of secondary school for the development of task profile of secondary school science teacher.

In phase two- Need assessment questionnaire cum perception scale was developed by investigator for science teacher to identify the need and difficulties of science teacher in performing the given tasks.

Sample of the Study

Population

- Science teacher educators
- Science teachers from Governmental Schools and Private schools

The present study was conducted in 2 phases

Phase 1 – the sample was comprised of:

- 30 science teachers for developing task profile of secondary school science teacher.

Phase 2 – the sample was comprised of:

- 20 science teachers - from Government schools / K Vs / Government aided schools.
- The rest of 10 teachers from public schools were selected from different districts of Delhi.

Objectives of the study

- To analyse the task profile of secondary school science teacher in the light of NCF-2005.
- To identify the needs and difficulties of science teacher for performing their task.
- To identify the effectiveness of in-service training.

Review of related literature

A study of the effect of ICT program (SNDT B.ED. syllabus) on the performance of student teachers with respect to content analysis, task analysis and teaching behaviour was designed. This program was aimed at empowering student teachers to be agile thinkers, excellent net workers, lifelong learners and. At this stage student-teachers were expected to inquire and think critically about their assumption related to the teaching learning process. Student-teachers were encouraged to find theoretical bases of their decision about teaching.

Student teachers were helped to play various roles that is learners of different age groups, subject experts teaching experts etc. by organizing simulated classroom experiences.

At this stage they were expected to evolve their own strategies of teaching practice and were ready to judge if it has pedagogical soundness. Efforts were made to make them familiar with productive pedagogies listed by many experts. All eighty student teachers of the class were assisted to make use of and create 'science of learning' for designing instructions at different levels of practice. They were helped to develop portfolios and create documents, then learning at various stages of teaching practice. They were motivated to evaluate their performance at the various stages of professional and personal development.

Another aim was to evaluate student –teachers development with respect to their understanding of the concept of learning and teaching, concept of content knowledge, concept

of content and task analysis.

A new purpose was to evaluate the quality of student teachers' performance with respect to instructional design. Student teachers need sufficient time to change their concepts related to teaching and learning and it is a slow process. Teacher educators need to have faith in the process of transformation through learning. They should be able to work as learning partners of student teachers.

- Constructive approach toward instructional designing helped student teachers to experiment with innovative learning activities.
- A sound programme of professional education of teachers is essential for the qualitative improvement of education. 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. In the absence of other influences, a teacher tries to teach in the way that tends to perpetuate the traditional methods of teaching. In a situation like the present society when new and dynamic methods of instruction are needed, such an attitude becomes an obstacle to progress. It can be modified only by effective professional education, which will initiate the teachers to the needed revolution in teaching and lay the foundations for their future professional growth. First-rate teacher-training institutions can thus play a crucial role in the development of education.

Unfortunately, the major weakness in the existing system of professional education was that the professional education of teachers has been comparatively neglected in the post-independence period. Its significance was stressed by university Education Commission (1949), the Secondary Education Commission (1953) and the International Team on Teachers and Curricula in Secondary Schools (1954). Several seminars

were held and study groups were appointed to discuss improvements in elementary and secondary teacher education, but their recommendations have not yet been implemented in any large measure. By and large, training institutions for primary and secondary teachers have remained isolated from the main stream of the academic life of the university as well as from the daily problems of the schools.

The quality of training institutions remains, with a few exceptions, either mediocre or poor. Competent staff are not attracted; vitality and realism are lacking in the curriculum and programme of work, which continues to be largely traditional. Moreover, set patterns and rigid techniques are followed in practice-teaching, with a disregard for present-day needs and objectives. A comprehensive programme of improvement is urgently needed in teacher education and we propose to discuss this under the following heads:

Procedure / Methodology

The present study was conducted in 2 phases. The 1st phase of the research will develop the task profile for secondary school science teacher. 2nd phase need assessment questionnaire cum perceptual scale was developed for science teacher.

Tools of the study

The investigator developed a rating scale for policy maker and curriculum expert, science teacher educator and science teacher from secondary school for the development of task profile of secondary school science teacher. Need assessment questionnaire cum perception scale was developed by investigator for science teacher to identify the need and difficulties of science teacher in performing the given tasks.

Analysis of Data

Data will be analyzed qualitatively.

Delimitation

The study was conducted only on secondary school teachers in directorate of NCT of Delhi. The study was conducted only on the science teachers of secondary schools of directorate of NCT of Delhi.

Procedure for Data Collection

The data was collected from both primary and secondary sources by using the above mentioned tools. Data was also collected from the training centres and classrooms regarding the impact of training on teachers and students by administering the tools.

Analysis

The data was analysed qualitatively in which it is very clear that more than 60% of the secondary school science teachers perceived the in-service training as a useful activity for their development of professional skills. Only 50% of the teachers felt that in-service teacher education helps them to prepare to face the changes day to day life, that it provides them with the ability of new thinking and makes them able to use their ideas continuously. The rest of the 50 % of the teachers felt that the role of secondary teachers is changing so fast that no amount of teacher education can probably cope with the expectation of the profession. There is a need to equip the in-service training with the requisite additional knowledge of the content and scholastic tasks of the teacher, personality, attributes, skills, and etc. The performance of secondary science teacher depends on the competency possessed by him to perform their respected task perfectly. Teachers also face the problem of extra burden of various scholastic and non-scholastic tasks for which some programme should also be developed and included in in-service training. They found that these types of training programmes

are highly confined to the subject areas, which many a time only brings boredom among teachers which also should take care of making the training programme more successful. From the data taken there is a significant difference found in the perception of secondary school science teachers of private and government schools. Private schools teachers are found to be more interested in attending the in-service training courses. They want to equip themselves with additional knowledge and they also want to explore the area of their teaching and subject as compared to government school science teacher who show mixed response toward the in-service training.

Conclusion:

There is a need to make a bridge between the school authority and teacher training courses to make it more fruitful. There is a need of organizing some classes for their non-teaching tasks/ non scholastic tasks. Also teachers need to know how to make teaching interesting and meaningful in spite of the entire burden they have.