

Effect of In-Service Training on the Working Capacity and Performance of Science Teachers at Secondary Level

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Abstract

This study was conducted to evaluate impact of in-service training on the professional competence of science teachers at secondary level. All the science teachers of secondary schools constituted the population of this study. A questionnaire for science teachers was developed to explore the nature of in-service training and its effect on professional competence of science teachers. Data analyses revealed that the in-service training has a significant impact on the professional competence of science teachers at secondary level. However some improvement is still needed as for as training procedure and duration is concerned. The main findings of the study Successful completion of in-service training has a positive and far reaching impact on the professional competence, In-Service training has made the implementation of science curricula more effective as it has made science teachers aware of new curricular changes, In-service training has developed science teachers' attitude towards teaching profession.

1. Introduction

With evolution of human civilization, mankind has demonstrated its ability to conquer and harness natural forces for its development and welfare which resulted in large scale introduction of new scientific concepts and technologies for molding economic, social and educational systems." The stock of knowledge of a teacher and his pedagogical skills become obsolete in a short span of time hence requires time to time update. All educational innovations have, therefore, routed through in-service education system which, in order to be responsive, have to develop its own constant flow system of feedback through continuous evaluation."(Sulemani, 1977)

Here it may be appropriate to quote Mehmood (1999) who portrays the aspects of the in service training as "this may be reiterated here that the intention of in-service training has always been to enhance professional as well as personal development of teachers so as to provide its benefits to children they teach, class they deal and schools they serve. The ultimate predominate goals has been to improve teaching learning climate and to make the system absorb various changes that concern education. To achieve this goal INSET (In-service training) agencies provide in-service education to individual teachers drawn from different schools.". He further states that, "In-service training is considered to be a voluntary professional activity. Involvement of a teacher in this activity and its success and effectiveness basically depends on the goodwill of the teacher. It is only when he is inclined and willing to take up such an activity that would volunteer him to an in-service training programe and would take interest in drawing benefit out of it and would improve his attitude towards his work."It is widely accepted that many variables contribute to effective education. The most crucial factor is the quality of interaction between the teacher and the taught. If we accept that the quality of any education system ultimately depends upon the quality of teacher, and that , "no country can rise above the level of their teachers,"

then the matter of teacher development is the one which deserve our urgent, careful and continued attention(Zaman ,2004).

Professional competence involves the ability to function effectively in the tasks considered essential within a given profession (Willis and Dubin, 1990, p. 3). It provides for professional vitality that involves the ability to meet successfully the forth-coming challenges. If we talk about the job competence, it is more concentrated to a specific organization and job as compared to professional competence. Professional competence is reflected in the term of performance of the professional.

According to Kautto-Koivula (1996, p. 154) professional competence involve at least two main domains: (1) proficiencies specific to the science teaching profession. These include the knowledge-base, technical skills considered essential in the science teaching profession, and the ability to solve the type of problems encountered within the profession, and (2) general abilities of the individual/teacher that help him in development and maintenance of professional competence; these are intellectual ability, personality traits, motivation, attitudes and values. She further distinguished three cognitive domains of competence: (1) skills (either manual or intellectual); (2) content knowledge which is simply information committed to memory, and (3) the deeper learning variously described as understanding, conceptual learning or meaningful learning.

Professional Competence in view of Creemers is "Competency is not just a particular knowledge, skill or attitude, but is expressed when an individual uses those resources in order to take action. As knowledge does not guarantee skill, skill does not guarantee professional competency. It is impossible to overestimate the importance of knowledge in competency". (Creemers, 1994).

Teachers' professional and academic competencies are seen in their ability to make use of the learning opportunities available in the environment. They serve the society in many ways. In the future, being a teacher will mean willingness to take active part in influencing social development because the teacher influences the kind of values pupils adopt and how education is imparted in the school.

According to Ololube competent teachers are expected to have a good command on their academic subject and should be prepared adequately to understand the needs of child and help him to learn through a well-integrated general education, professional training and academic orientation (Ololube, 2005)

The dictionary meaning of in-service training as described in "Foundation in Education" is: All the formal and informal activities and experiences those are helpful to a person to assume the responsibilities of a member of the education profession or to discharge his responsibilities more effectively (Good, 1959).

Many studies have been conducted to examine the effectiveness of in-service training in term of teachers' performance and skills.

Khan (2008) conducted a study to examine the impact of training through second science education project (SEP II). The study was aimed to evaluate the effectiveness of in-service teacher training programme of second science education project for science teachers and found that this training resulted in an improvement in the content knowledge, delivery skills, lab management skills and professional attitude of in-service science teachers.

Hussain, M (2004) conducted a similar research to study the performance of trained primary school teachers with and without in-service training in Hazara Division. The main focus of the study was to evaluate the effectiveness of in-service training programmes. For this purpose researcher collected data through observation of the performance of both, trained and untrained teachers and found that primary teachers, trained through different in-service teacher training programmes, were better in performance, then the untrained teachers.

Khan, R. (2003) conducted a study to evaluate the effectiveness of PEP-ILE training programme in tehsil Sawabi. The main focus of the study was to evaluate the implementation of programme with special reference to training content, methodology, supervision and assessment. Data was collected through questionnaire from teachers of diverse qualification and it was concluded that the methods introduced by the PEP-ILE training programme in tehsil Sawabi have proved valuable as a monitoring tool.

Another study conducted in this regard was by Mehmood, K(1998) who evaluated the effectiveness of in-service teacher training programmes arranged by teacher training project in Punjab. Researcher found that although there was no significant difference in the attitude of trained and untrained teachers, yet the achievement level of the students was high who were taught by trained teachers.

2. Methodology

The questionnaire for the science teachers was administered to the science teachers of sample schools in order to seek

their opinions about the status and quality of in-service training provided to them and its impact upon their professional competency. The collected data was analyzed by using SPSS software. After scoring process of the data collection tools, the collected data were arranged in data tables. To analyze the data, percentage, mean frequency, mean scores and t-test were used as statistical tools. Findings through analyzed data provided the base for drawing conclusions, while in the light of findings and conclusions, recommendations were made for the improvement of in-service training of science teachers as well as further research in this field. In order to find the effectiveness of training, professional competencies of the science teachers with in-service training and without in-service training were compared, and the impact of this training in the classroom was explored on the basis of science teachers' self-perception.

The questionnaire for science teachers had two parts. First part was to measure the professional competencies of all sample teachers (both having in-service training and without in-service training), while second part was only for those teachers of the sample who had attended in-service training. The purpose of second part was to explore the effect of in-service training on their working capacity and performance in schools. Professional competence scores of science teachers with in-service training and without in-service training have compared in the following tables.

Table 1: Comparison of teachers with in-service and without in-service training in understanding at central concept of science.

Comparison group	N	Mean	S.D	T
Teachers with in-service training	150	15.4	2.43	8.48
Teacher without in-service training	100	12.6	2.74	

* Significant value of t at 0.05 =1.96

Table1shows that calculated value of t (8.48) is greater than the critical value of t (1.96) at 0.05. Thus there was a significant difference between science teachers with in-service training (Mean score=15.4) and science teachers without in-service training (Mean score=12.6) in understanding at central concept of science. Hence the science teachers with in-service training were better in understanding at central concept of science than the science teachers without in-service training.

Table 2: Comparison of teachers with in-service and without in-service training of understanding how students learn.

Comparison group	N	Mean	S.D	t
Teachers with in-service training	150	12.05	1.54	6.89
Teacher without in-service training	100	10.5	1.87	

* Significant value of t at 0.05 = 1.96

Table 2 indicates that calculated value of t (6.89) is greater than the critical value of t (1.96) at 0.05. Thus there was a significant difference between science teachers with in-service training (Mean score=12.05) and science teachers without in-service training (Mean score=10.5) in understanding how students learn. Hence the science teachers with in-service training were better in understanding how students learn than the science teachers without in-service training.

Table 3: Comparison of teachers with in-service and without in-service training in understanding diverse students needs.

Comparison group	N	Mean	S.D	t
Teachers with in-service training	150	12.2	1.67	8.08
Teacher without in-service training	100	10.4	1.76	

* Significant value of t at 0.05 = 1.96

Table 3 reflects that calculated value of t (8.08) is greater than the critical value of t (1.96) at 0.05. Thus there was a significant difference between science teachers with in-service training (Mean score=12.2) than science teachers without in-service training (Mean score=10.4) in understanding diverse students needs. Hence the science teachers with in-service training were better in understanding diverse students needs than the science teachers without in-service training.

Table 4: Comparison of teachers with in-service and without in-service training in developing critical thinking in students.

Comparison group	N	Mean	S.D	t
Teachers with in-service training	150	12.1	1.71	3.89
Teacher without in-service training	100	11.1	2.16	

Significant Critical value of t at 0.05 = 1.96

Table 4 shows that calculated value of t (3.89) is greater than the critical value of t (1.96) and 0.05. Thus there is significant difference between science teachers with in-service training (Mean score=12.1) and the science teachers without in-service training (Mean score=11.1) in developing critical thinking among students. Hence the science teacher having in-service training were better in developing critical thinking among students than the science teachers without in-service training.

Table 5: Comparison of teachers with in-service and without in-service training in understanding professional and legal obligations of science

Comparison group	N	Mean	S.D	t
Teachers with in-service training	150	15.6	2.06	5.87
Teacher without in-service training	100	13.9	2.36	

* Significant Critical value of t at 0.05 = 1.96

Table 5 reflects that calculated value of t (5.87) is greater than the critical value of t (1.96) at 0.05. Hence there is significant difference between mean scores of teachers with in-service training (Mean score=15.4) and teachers without in-service training (Mean score=13.9) in understanding professional and legal obligations of teaching science, Hence the science teachers with in-service training were better in understanding professional and legal obligations of teaching of science than the science teachers without in-service training.

Table 6: Comparison of science teachers with in-service and without in-service training in implementing technology in science teaching.

Comparison group	N	Mean	S.D	t
Teachers with in-service training	150	12.4	1.56	3.73
Teacher without in-service training	100	11.4	2.36	

* Significant Critical value of t at 0.05 = 1.96

Table 6 shows that calculated value of t (3.73) is greater than the critical value of t (1.96) at 0.05. Thus there was a between significant difference between science teachers with in-service training (Mean score=12.4) and science teachers without in-service training (Mean score=11.4) in implementing technology in the teaching of science. Hence the science teachers with in-service training were better in implementing technology in science teaching than the science teachers without in-service training.

Table 7: Comparison of teachers with in-service and without in-service training in planning subject content.

Comparison group	n	Mean	S.D	t
Teachers with in-service training	150	12.2	1.62	6.17
Teacher without in-service training	100	11.7	2.52	

* Significant Critical value of t at 0.05 = 1.96

Table 7 shows that calculated value of t (6.17) is greater than the critical value of t (1.96) at 0.05. Thus there is significant difference in planning subject content of science teachers with in-service training (Mean score=12.2) and science teachers without in-service training (Mean score=11.7). Hence the science teachers with in-service training were better in planning subject content competence than the science teachers without in-service training.

Table 8: Comparison of teachers with in-service and without in-service training in assessment and evaluation.

Comparison group	n	Mean	S.D	T
Teachers with in-service training	150	19.1	2.83	6.10
Teacher without in-service training	100	16.7	3.19	

* Significant Critical value of t at 0.05 = 1.96

Table 8 indicates that calculated value of t (6.10) is greater than the critical value of t (1.96) at 0.05. Thus there is a significant difference between mean score in assessment and evaluation competence of science teachers with in-service training (Mean score=19.1) and science teachers without in-service training (Mean score=16.7). Hence the science teachers with in-service training were better than the science teachers without in-service training in assessment and evaluation competence.

Table 9: Comparison of teachers with in-service and without in-service training in improving students learning.

Comparison group	n	Mean	S.D	t
Teachers with in-service training	150	12	1.88	3.67
Teacher without in-service training	100	11.45	2.02	

* Significant Critical value of t at 0.05 = 1.96

Table 9 shows that calculated value of t (3.67) is greater than the critical value of t (1.96) at 0.05. Thus there was a significant difference between science teachers with in-service training (Mean score=12) and without in-service training (Mean score=11.45) in improving students learning. Hence the science teachers with in-service training were better in improving students learning than the science teachers without in-service training.

Table 10: Comparison of teachers with in-service and without in-service training in strengthening relationships.

Comparison group	n	Mean	S.D	t
Teachers with in-service training	150	14.7	2.3	3.42
Teacher without in-service training	100	13.4	3.3	

* Significant Critical value of t at 0.05 = 1.96

Table 10 indicates that calculated value of t (3.42) is greater than the critical value of t (1.96) at 0.05. Thus there is a significant difference between science teachers with in-service training (Mean score=14.7) than science teachers without in-service training (Mean score=13.4) in the competence of strengthening relationships. Hence the science teachers with in-service training were better in the competence of strengthening relationships than the science teachers without in-service training.

Table 11: Comparison of teachers with in-service and without in-service training in understanding context of science education.

Comparison group	n	Mean	S.D	t
Teachers with in-service training	150	21.5	4	5
Teacher without in-service training	100	19	3.8	

* Significant Critical value of t at 0.05 = 1.96

Table 11 reflects that calculated value of t (5) is greater than the critical value of t (1.96) at 0.05. Thus there was a significant difference between science teachers with in-service training (Mean score=21.5) and science teachers without in-service training (Mean score=19) in the competence of understanding context of science education. Hence the science teachers with in-service training were better in planning subject content than the science teachers without in-service training.

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