Case study of in-service Teacher Professional Development - An occasion or a progression

Anju Das Manikpuri

Teacher professional development contains an extensive diversity of programmes intended to encourage and support the knowledge of teachers. When it is about in-service professional development, then the aim is to expand the knowledge, pedagogy, skills, and obligations of teachers so that they become effective in planning lessons, teaching, assessing student's learning, and responsibility other accountabilities in the school community. In-service programmes could be understood within the following two categories:

1. Sometimes, 'in-service' raises to a prescribed, extended course of study, reflecting the pre-service teacher education curriculum and important to some level of recognised qualification for professionally "unqualified" teachers.
2. Classically, the term is used for professional development activities for teachers, extending from continuous, comprehensive programmes of teacher learning to workshops.

Both practices of in-service courses are equally significant, especially in the present context. For example, the transition from rote learning to facilitation of learning that emphasize critical, analytical, and problem-solving skills is only possible if teachers implement new practices in the classroom regardless of their pre service degree, understanding, knowledge and skills. A teacher education curriculum needs to be in consonance with the curriculum framework for school education. NCF advocates that a teacher needs to be prepared in relation to the needs and demands arising in the school context, to engage with questions of school knowledge, the learner and the learning process[1].

The strength of case studies are that it can be vigorous and more engaging than a lecture because learners are involved trying to put ideas into their own words[2].

With the above view and in continuation of our work on teacher education, I am herewith mentioning two case studies of two schools for which one (school 1- S1) has pursued the teacher education as occasion and for other it is progression, (school 2-S2). Both case studies are from middle schools and are part of science teacher education.

S1*- Here the teacher is professionally qualified with a B.Ed. He easily grasps how children learn and understands the psychological, sociological and scientific aspect of gaining knowledge. He participates in workshops and symposiums, but the learning gathered in various platforms are not reflected in his pedagogy, which will be reflected through dialogue, debate & discussion with the teacher later in the article.

S2* - This science teacher is an active , professionally qualified (D.Ed.) with vibrant energy and totally devoted for putting efforts for better teaching learning process through preparation of numerous tools for learning. He understands the holistic nature of science as well as he also know each stream of science reveals the nature of science in process.

It will be worth to mention each school's class as below-

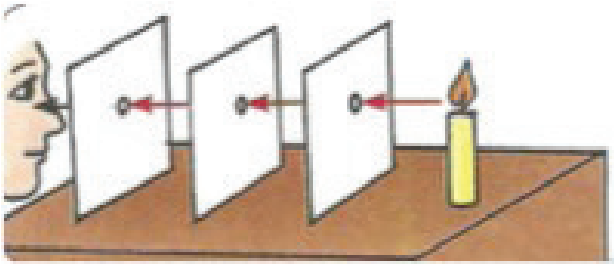
A glimpse of science in "chemistry" class – Chemistry is the study of interaction of matter and energy.

T1* always counts admin challenges which interrupts him for doing activity based classroom. He believes revision (rote) of concepts is better than learning by doing. He prefers the lecture method instead of facilitating the concepts. But I would like to give emphasize this teacher has expertise in designing experiments and models to understand the concepts of science, but he does it for earning purpose only.

T2* transacts the separation of matter by letting the experiment to choose the proper and connected method for suitable separation. He also asked to provide some challenges to separate the mixtures on the basis of different properties of matter. He presents the task why one cannot choose the method of chromatography to separate husk from rice? One of his student added to it, how she was able to find out the lost small needle under bed with

the help of magnet for her Dadi (grandmother), during conversation the happiness was in rhythm with the expression.

Physics as a core of science – So with the continuation of previous dialogue, we asked the teachers what type of challenges they are facing on teaching light. Both responded as, in starting they don't feel challenges but as they move to hierarchy of concepts they feel challenges to go ahead.



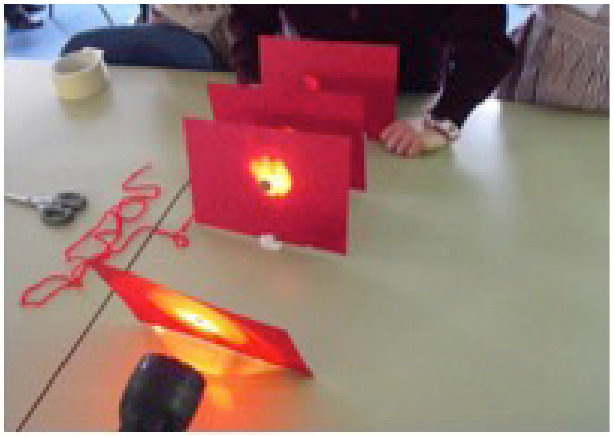
We again started discussion on how a teacher starts the class to teach "Light"?

The response is given in the form of dialogue. Let's have a look on key point of discussion-

T1/S1: I used to start my class by giving facts and information on what is light. For the same, I ask the object we see, are visible in light only and we can't see in dark. In this way, I introduce, that light is a required medium to see an object.

T2/S2: I start my class by asking that what is required to see an object. Generally, children used to say that we can't see the object without eye. I further used to ask them, you have eyes, but could you tell me about the things which are kept behind the wall.

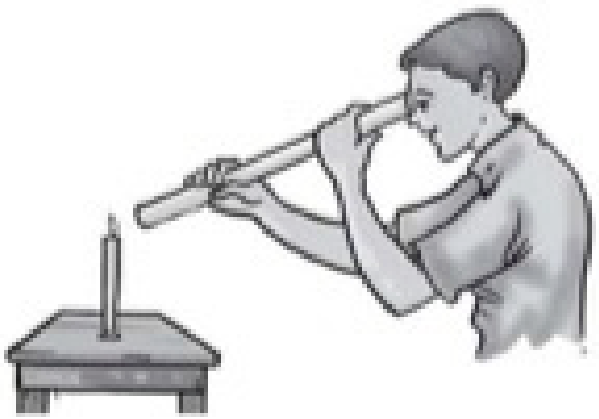
In the meantime, T1 interrupted that "Sir, you went very fast, it is more than light, you are mixing the concepts of shadow, transparent and opaque matter to the concept of light.



T2 addressed him how sequencing and interlinkage of concepts are required for an active science class and further he started to share.

From these dialogues he used to move by asking children to see a chalk, shaking the hand, what is there in between finger and eye that we are able to see the fingers, why we are not able to see the same finger in dark? In this way the importance of light is being understood with an open discussion and it is good reflection how we see the linkage among concepts by being a science teacher. Again the teacher shared about two activities to explain that light travels in straight line, which has been represented as pictorial representation. On asking further, when there is more than one room then how light enters to each room and how it would be explained to children.

Teachers responded that now it is the time to explain the reflection and how light moves could be well explained by taking examples. For an experiment T2 shared that every child does experiments in his class, one who could not do is supported by peer students.



But now he shared challenge that there is only one activity on reflection; given in the text book and we have to be stick on it. If it's not understood then we feel more challenges.

Teachers are given multiple opportunities to practice what they are learning about facilitating inquiry through analysis. For example, after a discussion about ways to interpret children's thinking about light from their exploratory behavior, teachers observe child experiencing traveling light through tube. This prompts a discussion about the child's current ideas about travelling of light and the science that the child is experiencing. Activities are used to build understanding of the teachers' role as a facilitator of the Involve-Reconnoiter-Replicate

cycle, including examples of teachers leading engage-and-reflect chats, supporting children as they represent their observations through depiction, and intermingling with children.

Biology and process of life

We all know that a major percentage of government middle school has no subject specific teachers. T1 has math academia in his graduation whereas T2 has Bio academia. T1 and T2 both used to teach science and math to the middle school students. During discussion on Bio and process of life, T1 says that he has no expertise in Bio, so he teaches it by dictation from textbooks.

T2 added and shared that there is a pond near to his school where almost all kinds of microorganisms are found, mentioned in the syllabus of middle school science. He used to ask the students to collect the samples in every season and observe the sample microscopically. When students see the various microorganism in different seasons then gets more enthusiastic to watch more samples of ponds and canal of their villages. In this way, they enjoy the process of collection of samples, prediction about presence of microorganism and reporting the observations. He happily adds that he learns a lot from the students especially when they ask how the cell is structural and functional unit of life.

From the above mentioned dialogue with teachers, I will add that pre-service teacher education and in-service teacher professional development programs should be designed as a whole, a range of learning that flinches with pre-service education; includes periods of school-based investigation and practice teaching; continues into an orientation or mentoring period of full-time teaching. Each stage builds on previously acquired knowledge and skill.

Teachers need a significant amount of knowledge about the nature of science and practice in using scaffolding tools throughout progression of the replication. Without professional development in this field, teachers are in danger to fall back to straight teacher centered methods. Teachers should apply reasonable pedagogical strategies for addressing nature of science explicitly, which means to incorporate NOS as an intentional and planned instructional outcome of the science lessons.[3]

With the same context, after interaction and interview process, I am herewith representing case study of classroom of both the school with taking example of concept “Separation of matter”.

Case study of a classroom of T1- Here teacher took 2 days to finish this chapter. On day 1, he asked students to read the paragraphs one by one and after completion of the chapter he asked students to do homework (answer of questions) on it. On day 2, he checked the homework and asked students to memorize the answers in 45 minutes. He was satisfied that his students have learned the concepts/content of the chapter “separation of matter” well.

Case study of a classroom of T2 – For the same concept, this teacher took 4 days with interlinking the other two concept “changes around us” and “properties of matter”. The momentary of class room process is given here-

Day 1: A table kept centrally and some black boxes remain to be one of the preferred corner in the room. I liked to see how had engaged the students to know what was there inside the black box.

The teacher came and asked the students that what they will do if they come across husk and stone in the rice while preparing to cook it.

How will they decide that among the materials- rice, stones and husk which are the ones suitable for them to cook? How will they choose a particular method of separation of wanted & unwanted constituents of mixture?

Day 2: It was too hot for the students to go outside today, so the children were distributed in small groups and were provided with one black box each group. The task for the group was enlisting materials inside the black box and to write the characteristic of provided materials whatever they can make from their earlier experience or predict from the instant appearance. Group 1 had mixture of sand and iron powder. Group 2 made a list of materials having rice, husk, small stones and some white powdery material. Group 3 had some water in a bowl on which white pieces of material was floating, one kid was interested to taste it, but the teacher had already instructed them not to taste any materials. All were engaged to write in their note book, some were also drawing the pictures of the materials.

Day 3: The children in a small group asked if they can carry out the separation of materials today, so the group did. It was the group’s idea to separate the materials given in the black box. They were arranging the resources required viz filter paper, bowls, magnet, burner etc which were required for

separation processes of crystallization, filtration, decantation, evaporation, magnetic separation, threshing, winnowing etc. I asked them where that idea came from. Some of them, paused for a minute, and then said, "We see it in around us every day". But group 3 was puzzling to identify the materials, anyhow they filtered the white flakes but wondering to see the content of water. Now teacher came as facilitator to this group and told "if I will say the names then can you separate the materials", students were in agreement. He told this water has common salt and the flakes are camphor. In this way he guided the students.

Day 4: This was the day of free choice to choose any mixture and to separate the materials by using suitable process of separation, the children continue to spend lots of time at the table, outside of the hall and near the water source. It's almost as if the children' probes at the group are "nourishing" their work with science learning background. After all, it's at the black box where they can test out new ideas and possibilities that they can then bring back to the materials mixture. This was the day when teacher asked students to summarize the work of four days and mean while he was adding few more points for building the understanding of the concept.

In the words of T2, I had chosen this particular challenge and set of mixtures because I felt that most of the children in my group were ready for a more in-depth study of the matter. Through my observations, conversations, and group discussion, I believe almost each child in my group would agree that matter can be purified, but were not able to choose the particular method of purification and separation. They are getting quite skilled with few resources. I felt introducing the glass funnel might be just the task to set their thoughts competing with ideas on how to master this more interesting task. He was also documenting the group's discussion with taking snaps of working children.

One can observe, in case of second school, at first the students were asked for reflecting on their own activities, results, solutions, ideas and thoughts. During a second step their experiences are related to the information about the actions and cognitions of a past experiences. This part of the conversation primes over to the discussion of more general facets of science. General and guiding inquiries focus the nature of science like "How new knowledge is generated?" or "How do science person work?"

Discussion and representation are both acute to science learning and an important part of the inquiry process; the expansion of science cognitive. Both in small groups and in large ones, discussion boosts children to think about what they have skilled, attend to the experiences of others, and reflect on their notions. Similarly, depiction using a variety of media—including portrayal, writing, and collection—cheers children to observe thoroughly and reproduce on their experiences over time as well as build vocabulary and language constructions.

The Teacher's Role in both case

The teacher's role is critical to children's science learning, and it is a multifaceted that is informed by her knowledge of children, of teaching and learning, and of pedagogical science knowledge. I want to highlight just one of these pedagogic science familiarity. Learner's logical inquiry is shown by the teacher's open understanding of the important fundamental science perceptions of the emphasis, T2 has chosen. For example, the children's work with mixture above is indeed about matter," but it is also about mixture has to be separated to its components—a basic property of mixture. While explicit teaching of the concept is not applicable, the construction of the understandings and the teacher's facilitation is guided by knowledge of the concepts and how children learn them. His questions, comments, and reviews draw the children's attention to the concept. This kind of teacher guidance and facilitation is based in each teacher's understanding of the concepts behind the children's work and enables him to encourage children to notice and reflect on key aspects of the phenomenon they are exploring. But in case of S1, no such elements of science education was found although T1 and T2 both were part of continuous teacher's professional development.

Calendar and pedagogy – Like every school, here is also a calendar; provided by SCERT for scheduling the work of teachers. Here also a clear difference could be observed. T2 teaches the concept of science as per climate, season but T1 is strictly following the calendar viz there is no rain but teaching about soil and rain.

Assignment for self-learning- After every in-service teacher's workshop, teachers are provided an assignment which are related to their classroom process. T1 does it in his table, T2 reflected it with compiling the classroom experiences to work

on own pedagogy practice and to enhance own knowledge on the subject.

Conclusion

The vital significance of in-service teacher professional development in developing teachers as professionals is indisputable as it can make teachers reflect on her own practices. For in-service teacher professional development to be meaningful, incorporation of such things in in-service teacher professional development is imperative. It should also inculcate in teachers the sense of accountability and the kind of attitude required for teaching and learning.

To do justice with the teaching profession, a teacher needs to keep on questioning her own belief system, updating her knowledge and skills, knowing the objectives of teaching that subject and understanding the nature of the subject; for they all play crucial role in determining the classroom process.

From the above two cases, it is very clear that professional development programs will benefit teachers most if they are based on strengthening their pedagogy and content knowledge. Continue follow up will support those teacher also who see the in-service teachers professional development as an occasion and will motivate the teachers who takes it as a continue process.

Both the mentioned experience brought into unambiguous relief the contrasts between what is possible and what is often probable in classrooms. It fueled my own reflection on the challenges that teachers face as they try to implement an inquiry-based approach to science teaching and learning.

Classroom observation and interviews with the teacher reveal the importance not only of training teachers in the appropriate classroom techniques but also of providing ongoing support as they develop expertise and acquire deeper understanding and acceptance of the science education underlying the new approach. I recommend that such reflections must be supported as teachers are learning new classroom practices.

Acknowledgement:

Writing this paper was not possible without support of Prasun and Ravishekhar, especially in editing the language.

* T1- Teacher of school 1, T2- Teacher of school 2, S1- school 1, S2- School 2

References

1. National Curriculum Framework for Teacher Education, New Delhi, 2005, 1-89
2. Clyde Freeman Herreid: The Use of Case Studies and Group Discussion in Science Education National Center for Case Study Teaching in Science, University at Buffalo, State University of New York, 2002, 1-8
3. Rudge D. W., Howe E. M. An explicit and reflective approach to the use of history to promote understanding of the nature of science. Sci & Educ, 2007, 18: 561-580

Anju is working in the area of science education at Dhamtari District Institute, Azim Premji Foundation. She may be contacted at anju.manikpuri@azimpremjifoundation.org