

**ROLE OF LANGUAGE IN TEACHING-LEARNING SCIENCE: EXPERIENCES OF  
PRE-SERVICE STUDENT TEACHERS****Priya Khurana<sup>1</sup> & Seema Sharma<sup>2</sup>**<sup>1</sup>Assistant Professor in Education, Aditi Mahavidyalaya, University of Delhi<sup>2</sup>Assistant Professor in Education, Aditi Mahavidyalaya, University of Delhi**Abstract**

*The role of language in the formation and development of concepts is uncontested. Science at school level is largely viewed as a practical subject, but its effective teaching and learning requires language comprehension, whether written or shared orally during classroom discussions (Oyoo, 2012). This suggests that the students' language, teachers' language and scientific language all play an intertwined and complex role in comprehending science concepts. The current study involves a group of pre-service student-teachers/interns pursuing an elementary teacher education course from University of Delhi, having Pedagogy of Natural Science as their specialization. They were asked to share their experiences of teaching science to middle school students during their school internship programme. The interns largely came up with issues in transacting the science content in a language other than in which they themselves had studied science, which in this particular case was Hindi.*

**Key words:** language, science, scientific terminology, teaching-learning



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**Introduction**

Language in science teaching could refer to the medium used by the teacher for communicating or explaining science concepts, the language of the learners which could either be their mother tongue or the everyday language they use to communicate, as well as the language of scientific terminologies which could be either Hindi or English in most of the schools in Delhi. The focus of the current study was on mainly the issues that pre-service

student-teachers came across while their school internship experience. In a way the study refers to all the three above mentioned aspects highlighting role of language in science teaching-learning. The experiences of student-teachers brought into light particular issues of concern relevant for school education as well as teacher education.

### **Experiences of Student-Teachers**

This section presents the excerpts from the student teachers, when asked to reflect upon their experiences while teaching middle school science students during their school internship. Their experiences projected issues particularly like difficulty in teaching in a language other than in which they studied science and trying to communicate meanings of concepts and terminologies together. Where some of the student-teachers shared their experiences only, some others suggested some ways to overcome the challenges they faced, while few raised significant questions related to multiple aspects of concern. Few exemplars are shared below:

#### ***Student-teacher 1:***

Here is an excerpt from one of the pre-service student-teachers teaching science to Hindi medium middle school students: *“Being a learner in English language I faced issues in teaching subjects in Hindi language. I am familiar with the scientific terms in English but when these terms come in Hindi language, the text is no less than an alien type text to me. I have always used words like electric circuit and not vidyut paripath (विद्युत परिपथ).*

*Teaching science with Hindi terms was difficult. My focus was divided between content and terms.”* (Experiences from teaching class VIII students, chapter electricity)

She elaborated, *“This not only happened with the scientific terms but also with the day to day words I am used to. I had to think words in Hindi so that I can complete my sentence and transact that understanding. I feel this breaks the transaction process and the teaching*

*becomes less effective. The terms have worked as a barrier in my teaching, making me less efficient. If a teacher uses terms in English in a Hindi medium classroom, the students would feel disconnected and would then engage themselves in other activities.”*

***Student-teacher 2:***

*Another student-teacher while teaching class VI Hindi medium students, shared “Initially language was a barrier for me because while classroom transaction I was not able to connect with the terms that I was saying. I was not able to map it and visualize all the aspects related to that term. I felt detached”. She went on to add: “The same was with the students as it was difficult for them to comprehend terms like vilyan (विलयन) and priththkaran (पृथक्करण).*

*Here I could not feel confident that I would be able to give students those experiences through which they would develop concepts.”*

*She added: “I pronounced the words in English as I was in flow of teaching but eventually I realised that students were not that involved. I knew their lack of involvement was because of my incompetency of pronouncing and stating terms correctly. Though from my earlier teaching experience in primary classes, the students always were engaged enthusiastically but here they started laughing and said- ‘ma’am, kal se padh kar aana’ i.e. ma’am, please study from tomorrow when you come to teach. I felt like they doubted my content competency....”*

*To overcome these issues she marked that, “To be more confident and be more comfortable in class, I didn’t only learn these terminologies in Hindi but read about the whole concepts in Hindi medium itself, so that I could have a mind-mapping of those. With these efforts I became fluent and I felt that transaction was meaningful. Then with practice I started using words with fluency and it almost felt like an unconscious effort. My focus was not only on terms but on skills and content. We had studied that once language creates bond so to*

*connect to our students well, we have to be fluent and have command on it so they pay attention to us.”*

***Student-teacher 3:***

*Yet another student-teacher felt quite similar. She mentioned “For me as a teacher or being a regular English medium student, it was very difficult to deliver the concept in Hindi language. At one time I could focus on the concept or on the terminology. Like when I started discussing the role of stomach and pancreas, I delivered the concept in confusion and interchanged roles because my focus was on pronouncing words in Hindi i.e. stomach-amaashay (आमाशय), pancreas-agnashay (अग्नाशय). Then I corrected the concept again but now I used terminology in English. So, at one time I could focus only on one aspect-either the concept or the language”.*

*She suggested a way out that she used in her own classroom: “To overcome this problem, I wrote the terminologies on blackboard in both languages, but the students themselves shared that they found the English terms easier than the complicated terms in Hindi. When students understand the role and see the diagram, they tell the everyday used terms like stomach: pet (पेट); small intestine: chhoti aant (छोटी आंत); large intestine:badi aant (बड़ी आंत); veins: naliyan (नलियां); blood: khoon (खून)”. She further suggested, “Now the question was how to find the validity of these terms. If I find these terms in authentic resource then I can also use them in class but how to find relevant resources of translating scientific terms from one language to another? Somewhere I felt that due to language the learning gets affected as the topic is new to children and the terminologies are also new and different...rather terse. So it was difficult for me also to focus on the concept and the language simultaneously. On the other hand, if I used simple terminology (which me and my students knew and generally use*

*in our everyday communication) could make the class more effective and meaningful and created learning environment but due to this learning which is the ultimate purpose of teaching lacked.”*

***Student-teacher 4:***

This student-teacher shared, “It was difficult to translate English words in Hindi even if you had Hindi medium book to help you. Some terms were not even comprehensive and much more difficult in Hindi for example: pendulum: lolak (लोलक); circulatory system: parisancharnn tantra (परिसंचरण तंत्र); excretory system: utsarjn tantra (उत्सर्जन तंत्र); evaporation: vashpikarn (वाष्पीकरण). In fact students seemed more comfortable using ‘pendulum’ than ‘lolak’.” She raises a question in solution to the issues she faced: “*I strongly felt that ‘can English medium terms be used by Hindi medium students rather than using complex scientific terms as they are not there in their real life experiences?’ As otherwise it doesn’t make you feel connected with the content as she herself might feel no comprehension.”* Another aspect that she drew attention to was “*teaching in mother tongue or the native language or the first language of the child seems important as it helps students to relate better but sometimes it feels more difficult in Hindi than in English, so to teach could the use of mother tongue or the first language of the child be promoted?*”

***Student-teacher 5:***

Another student-teacher who could feel comfortable in using either of the language in her class faced yet another issue. She recollected, “*I had to teach class VIII in middle school and on the very first day I was not aware about the medium of the class (students). That class actually consisted of both Hindi as well as English medium students. So when I started to*

*teach them, I felt difficult to deal students from both the mediums together. At one time when I was using Hindi medium and at the other-English medium. In between this swing, the whole class was disturbed, as the students of one medium concentrated at one time and the other at the other time....it all became chaotic at one point...”*

**Student-teacher 6:**

This particular student-teacher shared similar experiences such as: *“In my experience of teaching middle school students, I used to have difficulty in pronouncing and learning scientific terms in Hindi”*. She went on to raise significant questions like, *“We use terms such as: chakshuvrikrtiti (चक्षुविकृति), dolan kriya (दोलन क्रिया), parisancharn tantra (परिसंरचण तंत्र) etc, so ‘Does language have an effect on the understanding of the concept?’ and ‘Is the usage of scientific terms by students required or not?’ Moving further on she emphasized ‘Can difficult terms be replaced by more comprehensive sentences? Like chakshuvrikrtiti (चक्षुविकृति) be called as aankhon ki bimariyan/kharabiyaan (आँखों की बीमारियां/ खराबियां) or aankhon ke vikaar (आँखों के विकार)?”*

She contemplated over aspects like: *‘How the language of the content could be restructured?’* and *‘what could be the impact on conceptual understanding if these terms are used in simplified and easily recognizable words or language?’*

**Student-teacher 7:**

This student-teacher too raised significant questions while reflecting over her experiences. She noted, *“If we do not remember specific words/terms, then do we also forget the concept?”; ‘If anything of this sort happens, do teachers tend to lose confidence?’;*

*‘Sometimes the terms get so technical that we cannot recollect them but we remember the concept, so is it important to teach the technical terms?’; ‘Are there any substitutes/alternatives for these words which are more comprehensive?’ and most importantly ‘Do we need to teach terminology in a separate class altogether?’.*”

The above mentioned excerpts highlight important aspects that could be of concern to other student-teachers/trainee-teachers/interns or in infact many practicing school teachers might also be facing similar issues especially in the beginning period of their professions. The issues identified upon analyzing the experiences of student-teachers are pointed out in the following section.

## **Results and Discussion**

Oyoo (2015) marks, “Science is considered a difficult school subject. This is partly because pupils find science words tough or unfamiliar.” In fact more or less similar experiences were shared by the student-teachers in the present study. The participants particularly pressed analogous issues while teaching science to the students of middle school. They faced challenges mainly because of language used to communicate science concepts in class. The language here referred to both-the language of the scientific terminologies/concepts and at times also to the language used as a medium of transacting concepts.

Some of the student-teachers shared that they felt less confident if they forgot terms in Hindi medium while teaching, while others felt disconnected from the concepts altogether. They felt the urge to use simpler terminologies instead of scientific jargons and terminologies, which seemed unfamiliar and difficult to pronounce and comprehend. Some of them even tried to use everyday familiar words to ease out the lessons for their learners, but then they seemed to doubt about their authenticity.

## **Challenges**

Bielenia-Grajewska and Gunstone (2015) mentioned that “there had been many reviews written from a range of perspectives on the form of language involved from the specifics of student understanding of particular science words used in science to the ways/modes of science related language”. This particular paper dealt with specific issues that a group of pre-service student-teachers came up during their school internship experience while teaching science to middle school students. The major concerns were like: ‘If a teacher feels language as a barrier while teaching science, then what practices can he/she adopt to make it a bridge and not a barrier?’; and ‘To what extent a teacher should one use scientific terms in English while teaching a Hindi medium class?’; ‘Is it so that the use of mother tongue or first language should be promoted over second language for better comprehension in science?’; ‘How teacher can sort out the problem of students regarding comprehension of scientific terms?’; and ‘Why can’t we have simpler terms rather than complex terms so that learner would feel attachment with science classroom?’.

## **Suggestions**

Sullivan (2008) reported that “using everyday language to teach science may help students learn”. She analysed a study conducted by Bryan Brown and Kihyun Ryoo on alternative approach to science teaching they called *A ‘Content-First’ Approach*. She went on to elaborate the method used by them in their study. The approach recommended introduction of concepts in simpler everyday language first and then later on introduce the scientific terminologies. They proposed that this approach had been particularly useful with a small group of students at elementary stage and suggested for an in-depth study. Oyoo (2015) too concluded, “Students learning in their mother tongue are generally thought to have an advantage over their counterparts who are being taught in a second or their language”.



## **Conclusion**

Though the approaches suggested above might prove helpful in learning various science concepts but finding everyday words that communicate exact meanings in science might itself be contested. Nevertheless such approaches might be utilized for the topics/concepts where we can have words in everyday language to facilitate science learning.

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