
UNIT 2 LANGUAGE AND LEARNING

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2.0 OBJECTIVES

After reading this unit you will be able to:

- understand the relationship between language and learning in the context discipline-based teaching;
- understand what mother tongue, bilingualism and multilingualism mean in the Indian context;
- discuss the responsibilities of a subject teacher in a language across the curriculum classroom;
- discuss the role of a teacher in motivating learners to think critically, analyse and synthesize in the context of teaching different subjects and the role of language in facilitating these aspects;
- explain (with examples) how various texts are structured in different styles and recognizable patterns; and
- analyse the significant role of language proficiency to teach content areas and the need for a teacher to integrate acquire the knowledge to do so with the help of different approaches.

2.1 INTRODUCTION

The subject of this unit, as you can see from the title, has two important segments – Language and Learning. What is the connection between the two? Let us attempt answering the questions given below.

- Is it essential to learn more than one language?
- Do we need to be proficient in a language to learn mathematics?

- Is it important for our students to be careful about spelling, grammar, and coherence in and among paragraphs besides being aware of the diverse but relevant organizational patterns when we are studying different school subjects? Or because these elements pertain to language classrooms, they need not be the concern of the subject teacher?
- Will being an efficient and competent reader and an adept writer in a language help us in transferring the skills learnt in language classrooms to master other curricular subjects?
- What is the difference between skill subjects and content subjects?

2.2 LANGUAGE LEARNING – FROM THE MOTHER TONGUE TO OTHER TONGUES

Matlin (1989) has observed that ‘the use of language is one ability that most differentiates humans from other animals’. Humans acquire language naturally and use it for a variety of purposes, including communication, self-expression and information storage and transmission. It is during period of infancy and early childhood that humans under normal circumstances acquire language naturally. While language comprehension precedes and outstrips language output, children grow increasingly skilled in monitoring their language output and correcting their mistakes. At more advanced stages of cognitive development, children become aware of the interactive nature of communication. They also become aware of their role as listeners and monitor their own responses to other speakers as they develop a sense of which responses are appropriate and which are not.

MOTHER TONGUE

The language to which a child is predominantly exposed from infancy is known as the mother tongue or first language. In most cases, the language acquired is that of the biological parents, but adopted children acquire the language of their adopting parents. Thus, one’s first language is associational in the sense that it is acquired from the environment and learning, not from any physiological inheritance. The mother tongue is so labelled not because it is the mother’s tongue but because like the mother it is the central factor behind the nurture of the children’s mental and emotional makeup. Their perceptions, comprehension, responses, creative expressions, thinking and analysis – all are maximally developed through the medium of the mother tongue (NCF-2005). To quote Sri. S. N. Chattopadhyay, ‘Besides being the most potent means of communication, mother tongue is the most effective means of transmission of culture. Mother tongue is endowed with the eloquent virtues of speed, clarity, spread and comprehension.’ None of the educationists and policy makers contend or challenge the importance of the mother tongue in introducing the child to literacy i.e. when the child begins knowing words, instructions, their contextual and associational meanings for appropriate application in day-to-day life, or the role of the mother tongue in concept formation, critical thinking and creativity and in imparting social values. At the same time, merely conversing in and comprehending the mother tongue to complete reading and writing tasks set in the classroom is not sufficient for a child in a country like India. Why? Because if literacy is monolingual and restricted to the language of the ethnic community, wouldn’t all channels of interaction with other communities speaking other languages be closed? And wouldn’t the consequent isolation from other communities and the fragmentation of the society, in general, lead to inevitable stagnation?

LANGUAGE DIVERSITY IN INDIA

Way back in 1894, Sir George Grierson, a British magistrate resident in India, conducted a Linguistic Survey of India, (which included what are now Pakistan and Bangladesh,) and found the existence of 179 languages and 544 component dialects of these languages in Northern India. He excluded the Dravidian speaking parts of South India. Shortly after gaining independence, the Indian government created states based on linguistic boundaries. For the most part, each state has a majority language which takes precedence over the many others which exist in the region. The official language is not always the majority language of the state; for example, many of the north-eastern states use English for this purpose. Others, such as Gujarat, use Gujarati and Hindi as their official language. The linguistic demography brought out by the 1961 census of India listed 1652 mother tongues. In the findings of the 1971 census the figure was substantially reduced, and only 108 languages spoken by more than 10, 000 people were officially recognised. The census of 2001, recorded the existence 1365 rationalised mother tongues, 234 identifiable mother tongues and 22 major languages. The language-related data of the 2011 Census have not been released by the Government of India.

In an informal attempt to bring to the world's notice the phenomenal language diversity in India, Dr. G.N. Devy, Chief Editor of the monumental People's Linguistic Survey of India, provides an overview of the extant and dying languages of India as perceived by their speakers till 2011-12. It is not surprising that in a country where 780 mother tongues belonging to six language families,(viz. Andamanese, Sino-Tibetan, Indo-Aryan, Dravidian, Austro-Asiatic and Tai-Kadai) co-exist-- it is difficult, rather impossible, to use only the mother tongue outside the four walls of one's own home or unless people are compelled to stay in some remote corner of the country not having any contact with others. But this is never the case in India. Language diversity is an accepted fact and way of life. No Indian has one single language. "We speak one language at home, one language of the street, another of the province, besides the language of communication. Even while speaking, we are always translating from one language to another," said the President of the Sahitya Academy in 1995.

THREE LANGUAGE FORMULA

The Indian Constitution recognizes twenty two scheduled languages. But in many cases, a language that may or may not be the mother tongue of the student is used as a medium of instruction in the school that the child goes to. The government schools in the states provide for instruction in the regional language of the state e.g. Bengali in West Bengal or Tamil in Tamil Nadu. The fact remains that no Indian student can ever hope to complete his schooling and higher education without learning two or three languages. The Government of India promoted the three-language formula at least till the secondary level (Class X) as recommended by the Education Commission (1964 -1966) and the National Curriculum Framework -2005 so that school going children in India can learn their mother tongue, the state or regional language and English. Most Indians, particularly those in urban areas, grow up in a milieu of multiple languages. Simply put, having to interact with many languages does not strike most Indians as being anything out of the ordinary. When communicating with others, Indians use whatever language or mixture of languages that is understood by all parties. Code-switching is quite common and extensively used.

In fact, the National Curriculum Framework 2005, states that in many cases, children come to school with two or three languages already in place at the oral – aural level. They are able to use these languages not only accurately but also appropriately. “Grassroots Bilingualism” is widespread in India.

2.2.1 Language Learning – From the Mother Tongue to Other Tongues

Some of us as English language teachers teach English through rules of grammar. Is that the only way we can teach our students English or is there another way? Somebody has rightly said that languages are best learnt when the focus is not on language learning. What does this mean? It means that instead of focusing on language structures, it would be more fruitful to focus on the messages contained in those structures. Let the students explore and discover or derives the rules of English on their own.

But how can we do that? Let us take the cns of teaching plural-formation in English using the multilingual method. In a context like Delhi, it is likely you’ll have Bangla, Punjabi, Tamil, Garhwali and many other mother tongue speakers besides Hindi in your classroom. Follow the following simple steps:

English	Hindi	Malyalam	Assamese	Bangla
Cap : caps	टोपी : टोपियाँ	tappu : tappigal	tupi : tupibore	tupi:tupiguli
Dog : dogs	कुत्ता : कुत्तें	patti : pattigal	kukur : kukurbore	kukur:kukurguli
Book : books	किताब : किताबें	pustakam : pustakgal	kitab : kitabore	boi: boiguli
Cat : cats	बिल्ली : बिल्लियाँ	puchcha : puchchagal	mexuri:mexuribore	billie: bilieguli

Even with this kind of little data on board, the students could be asked to observe and identify the plural makers in each language. In one glance, the students will be able to tell you that the plural makers in English is – s, in Hindi it is iya, and – e, in Malyalam it is – gal, in Assamese it is – bore and in Bangla it is – guli.

The students could be further initiated into thinking that although English has – s as a plural maker, its realizations are different (i.e. it has the sound – s in caps but it has the sound – z in dogs) or that there are certain exceptions in the language which do not take – s as their plural makers (for example ox : oxen, sheep: sheep; tooth: teeth; etc.) Or that Hindi has more than one plural maker or that there is a connection between the singular and plural as the final sound of singular decides the shape or form of the plural in English and Hindi, or that just like English, almost all languages have exceptions where tlic plural maker cannot be suffixed.

Let us take yet another example of question-formation in grammar teaching. Adopt the same approach as in the teaching of plurals. Give them certain questions in English and ask the students to give equivalent of those questions in their LI. Again the data that you elicit may look like the following.

English: Where did you go yesterday?

Hindi: आप कल कहाँ गए थे ?

Haryanvi: तू काल कि गया था ?

Punjabi: तुस्सी कल किथे गए सी ?

English: Why are you crying?

Hindi: आप क्यों रो रहे हों ?

Haryanvi: तू क्या तई रौवे हो ?

Punjabi: तुस्सी क्यों रो रहे हों ?

English: What have you brought?

Hindi: आप क्या लाए हैं ?

Haryanvi: तू के लाया है ?

Punjabi: तुस्सी की लियाये हों ?

The students will be able to identify the question words in all the languages, observe the similarities across the Indian languages such as, that, the question word begins with – K in Indian languages whereas it begins with – wh in English; that the question word always comes at the sentence-initial position in English whereas it is not the case in Indian languages.

You will notice the level of excitement and involvement as the students are initiated into observing, exploring and deriving rules on their own. In the process, they'll soon discover that their own language is just as rule-governed as any other.

Check Your Progress – 3

- Elicit some data of at least two Indian languages on the degrees of adjectives (i.e. comparative and superlative). Derive the rules on the basis of the data and discuss the similarities or dissimilarities across the languages. You could begin like this:

(a)	(b)	(c)	(d)
English	Hindi	_____	_____

2.2.2 Skills Acquired in the Mother Tongue are Transferrable

Research has shown that many skills acquired in the mother tongue or the first language can easily be transferred to another language. e.g. if a learner develops good reading skills in Bengali, he/she is likely to be able to apply these skills for learning English. But in India the craze for English medium instruction leaves thousands of children illiterate in their mother tongue with equally low levels of achievement in English.

Activity 1

1. *What are some of the advantages of knowing and learning your mother tongue very well? Do bilinguals have any advantage over monolinguals?*
2. *In how many languages are you proficient? What is your mother tongue and why and how did you learn your second language?*
3. *What, according to you, would be the effects of learning English on a learner who belongs to:*
 - a. *an educated, affluent family in a metropolitan city and attends an English medium public school from day one of her schooling?*
 - b. *a lower middle class family in a small town who goes to a Government school where English is taught as one of the subjects from class V onwards?*
 - c. *List the factors that affect the learning of English in situations (a) and (b).*
4. *J.C. Richards and T. S. Rodgers state that “some 60% of today’s world population is multilingual. From either a contemporary or a historical perspective bilingualism or multilingualism is the norm rather than the exception.” Justify your answer with examples from at least three countries around the world.*

2.2.3 ‘Translanguaging’ *

‘Translanguaging’ is a relatively new term for an age-old practice – that of switching between the languages one knows in order to maximise communicative potential. Translanguaging is flexible multilingualism. Whether it involves combining elements from different languages in the same utterance (‘codeswitching’) or alternating between languages in different parts of a task, it is a natural means of employing one’s linguistic resources to their greatest effect. It occurs because individuals associate a given language with a specific

Multilingualism in the classroom task, topic or situation, or because some concepts (such as ‘the Internet’) tend to be more commonly expressed in a given language, or because it can be playful and witty. Translanguaging is something most people do all the time with their friends, family and other members of the community without even thinking about it.

In the classroom, translanguaging may involve:

- translating between languages
- comparing and being playful with different languages
- mixing words and expressions from different languages in the same spoken or written utterance
- using the home language in one part of an activity and the school language in another part.

Thus, students might listen to information in one language and explain the gist of it orally or make written notes about it in another. Similarly, they might read a text

in one language and talk about it or summarise it in writing in another. As a resource for both teachers and students, translanguaging has many educational benefits because it:

- validates multilingualism, viewing it as a valuable asset rather than a problem or a temporary transitional interactional tool in early schooling
- represents a more efficient and effective teaching and learning technique than is possible in one language only
- offers opportunities for individuals to develop rich and varied communicative repertoires for use within and outside school.

Case Study: Translanguaging in the classroom

Mrs Indra, a Class IV teacher in a rural school outside Bhopal, describes how she has started to incorporate translanguaging in her language lessons. Many of my students are not first-language Hindi speakers. Since I started incorporating translanguaging practices into their language lessons three months ago, they have become much more talkative and engaged in their learning. Their confidence in using Hindi has noticeably improved too. I have observed that monolingual Hindi speakers in my class are starting to pick up words and phrases from their classmates as well. If my students are going to read a section or page of their Hindi textbook, I begin by introducing the topic, inviting my students to volunteer anything they know about it and encouraging them to translate the key Hindi vocabulary into their home language. I ask them to help me if I can't follow what they are saying. I then ask my students to read a section or page of their Hindi textbook aloud in pairs or small groups, or silently and independently on their own. In either case, I invite them to pause at the end of each page or section and discuss what they have just read with their partner or other group members, making sense of it and establishing the meaning of any unfamiliar words together. I suggest to them that they use their home language for this. I encourage them to add any new words or expressions in the dictionaries they have created. If I want pairs or groups of students to present something to the rest of the class in the school language, I encourage them to use their language to discuss how they will express their ideas first. I do the same if I want them to write a summary or report in the school language. To maintain the interest of all my students, I try to vary the organisation of the pairs and groups, while ensuring that they include at least two students of the same home language each time. At other times, I place a more confident student with a less confident one, so that the former can support the latter in their shared home language. If there is someone in the group who does not speak the shared home language, I ensure that my students translate what they are discussing into the school language. Recently I located a traditional short story that was available in Hindi and my students' home language. I used this with my Class VII students. I made copies of the stories in each language and got small groups of students to read them in parallel. I then invited them to use their home language to compare the different versions of the two stories, including the key words that had been used in each. Students discuss a topic in pairs using their home language.

- Notice which parts of the activities Mrs Indra encouraged her students to do in their home language and which in the school language. Are there any patterns here?

- What instructions might Mrs Indra have used to support the translinguaging practices described in the case study? Make a list of all those you can think of.

Here are some possibilities:

- ‘In Hindi we say xxx, in [your home language], we say yyy.’
- ‘How do you say xxx in [your home language]?’
- ‘What [home language] words do you know for this topic?’
- ‘Work in pairs. One pupil says the word in Hindi, the other in [their home language]. Then change over.’
- ‘I’m going to ask the questions in Hindi. You can tell me the answer in [your home language].’ • ‘You can start in [your home language], then move to Hindi.’
- ‘You can use [your home language] to discuss this topic in your pairs [or groups], and then give your report back to the class in Hindi.’
- ‘Now we have some time for questions in [your home language].’
- ‘Make a list of new words in your notebook. Write the Hindi word on the left and the [home language] equivalent on the right.’

(Adapted from Simpson, 2014)

Source:http://www.open.edu/openlearncreate/pluginfile.php/145491/mod_resource/content/2/LL12_AIE_Final.pdf

2.2.4 Consequences of Using Multi- Lingualism as a Resource

The benefits of using such an approach which is activity based will be far greater and challenging than the usual classes which focus on learning rules.

- 1) Languages of the students will be used more creatively in the classroom. The students will have enormous exposure to multiple languages at the same time.
- 2) The students will learn to make rules across languages in a simulating environment which will help to sharpen their skills of observing, deducing and reasoning, thus leading to greater linguistic and cognitive flexibility.
- 3) The level of participation and involvement will increase in the students are asked to contribute by sharing language data of their mother tongues.
- 4) The amount of data that will be generated from within the classroom could, in effect, turn out to be better than any standardized textbook. These learning materials, based on students’ experiences and communicative needs, would be far more dynamic.
- 5) The sole of teacher will be that of a facilitator and a learner. Apart from planning cognitively challenging tasks to our students. We’ll also learn by becoming a keen listener, observer who’ll have to gradually build on classroom experiences and bridge the gap between the students as us. By giving space to our students to participate and contribute, we’ll help them to boost their confidence and self-esteem.

- 6) We'll have to become reflective teachers who continuously reflect on our experiences and evolve classroom practices that would enhance their linguistic growth. We'll have to be sensitive enough to adjust to their communicative needs
- 7) The whole teaching-learning enterprise will revolve around developing functional proficiency in English rather than focus on academic skills.
- 8) The final outcome may be a social change in which our students in their journey will discover that all languages are patterned, flexible and rule-governed and that their own language is no less complex or inferior as compared to English.

Check Your Progress – 4

1. Do you think using multilingualism as a classroom resource will be an asset to you? Try out this approach and make a list of the changes that you notice in your classroom.

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Language Learning – From The Mother Tongue to Other Tongues

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2. Can multilingual approach work in classrooms in an effective way knowing the time frame of 'covering the syllabus' and examination pressure at the end of the year? Give reasons to support your answer.

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2.3 IS LANGUAGE IMPORTANT FOR LEARNING? EVIDENCE FROM RESEARCH

Let us try to answer this question with the help of some research findings of studies carried out in New Zealand (The Relationship between English Language and Mathematics Learning for Non-native Speakers.)

1. The Researchers (Pip Neville Barton and Bill Barton) introduce their topic with the common perception that students from Asian countries, specially China, enter the New Zealand education system with good backgrounds in mathematics and they think that Mathematics is less reliant on language skills.

The purpose of undertaking the research was twofold:-

- To explore the difficulties of the learners in learning Mathematics because of their low proficiency of English;
- To discover particular language features that might cause problems.

The researchers indicated that students were unaware of their disadvantage due to low English proficiency and believed that Mathematics learning is language free. (It must be mentioned here that English was the medium of instruction of these learners whose L1 was Chinese (Mandarin), Tongan and Samoan. The researchers also wanted to explore the relative importance of technical knowledge compared with general language proficiency in the learning of mathematics at senior secondary and undergraduate levels.

All studies undertaken in five different schools reported that students in general performed worse than the teachers and researchers anticipated. Both general and technical English were factors in the problems experienced by these non-native speakers of English. Prepositions and word-order were key features causing problems at all levels. So were the logical structures such as implication, conditionals and negation. Students indicated that they had most difficulty with understanding the contextual questions with combinations of complex phrases, syntax and technical mathematical vocabulary. Mathematics couched in everyday contexts caused problems. Researchers also observed that students having difficulty with language switch off in class, relying on texts or handouts. They tend to focus on procedures and approach mathematics problems in tests by trying to recognize a suitable procedure without trying to understand the context, e.g. the word less produced a response of subtract even when inappropriate. Language difficulties limited students' mathematical solving techniques e.g. such students had difficulty drawing a diagram and were restricted to symbolic mode. Moreover, the type of language causing difficulty is related to mathematical proficiency of the students.

In the words of one of the teachers/researchers, the project had uncovered an iceberg. The recommendations not only suggested further research into mathematical discourse (in student's home language) but also further studies on the feasibility and effectiveness of providing opportunities for students to discuss mathematics in their home language as part of the pathway to learning mathematics in English. The project was also a step towards the capacity building of the teachers who became aware of how to transact better to benefit non-native mathematics learners. The feedback from teachers that bear this out are given below:

- I now try to speak slowly and pronounce words clearly.
- I write meanings on the board. Make those meanings clear. Repetition of these keywords is vital.
- Encourage mathematical discourse amongst the students.
- I am more appreciative of the gaps in their mathematical language and encourage them to ask for help or tell me when they do not understand a term used.

The NCF 2005 (Position Paper in English: page 20) makes a point regarding the use of Indian English in the context of mathematics. "...The use of into in mathematics: (it) means the division of one number by another in British English, but the multiplication of two numbers in India." If the teachers are aware of such minor differences, they can make their students mindful of such usage.

2. The Annual Status of Education Report (ASER 2014) (facilitated by Pratham) reports that of all children enrolled in standard V about half cannot read, at standard II level in Hindi (their L1). 48.1% can read standard II level text (or higher). Without being able to read well, will these children progress in the education system? It further provides data for children enrolled in government schools in standard V and reports that apart from a decline in reading levels between 2010 and 2012, reading levels over time are ‘low’ and ‘stuck’. And although reading levels in standard V in private schools are not high, the gap in reading levels between children enrolled in government and private schools seem to be growing over time. Without basic skills in place, it is difficult for children to cope with grade level content. Knowing numbers and operations is needed before tackling higher content. The report suggests that children need to be encouraged to speak, to discuss, to express their opinions and to solve problems together. This has huge implications for the teacher who needs to question his/her role in the context of the role language plays in learning in all subjects.

2.4 LANGUAGE AND LEARNING: THE RESPONSIBILITIES OF A SUBJECT TEACHER

Think for yourself, can you learn any subject, including Maths or Music, without using a language as a medium of instruction or thinking? **The National Curriculum Framework 2005 (NCERT, India)** highlights the role of language in learning:

‘Language – as a constellation of skills ...cuts across school subjects and disciplines. Speech and listening, reading and writing are all generalized skills, and children’s mastery over them becomes the key factor affecting success at school. In many situations, all of these skills need to be used together. This is why it is important to view language education as everybody’s concern at school and not as a responsibility of the language teacher alone.’

The document further states that, “Language education is not confined to the language classroom. A science, social science or mathematics class is ipso facto a language class. Learning the subject means learning the terminology, understanding the concepts and being able to discuss and write about them critically.” In other words, there has to be roughly equal opportunities for learning through the four strands of

- *Meaning focussed input – learning through listening and reading;*
- *Meaning focussed output – learning through speaking and writing;*
- *Language focussed output-learning through deliberate attention to language features; and*
- *Fluency development –learning through working with known materials across the four skills at a higher than usual level of performance. (Paul Nation)*

Given the centrality of the four language skills to promote effective use of language across the curriculum, why do subject teachers restrict themselves only to correcting sentence structures and spelling mistakes in their students work?

HOW CAN SUBJECT TEACHERS SCAFFOLD LANGUAGE LEARNING?

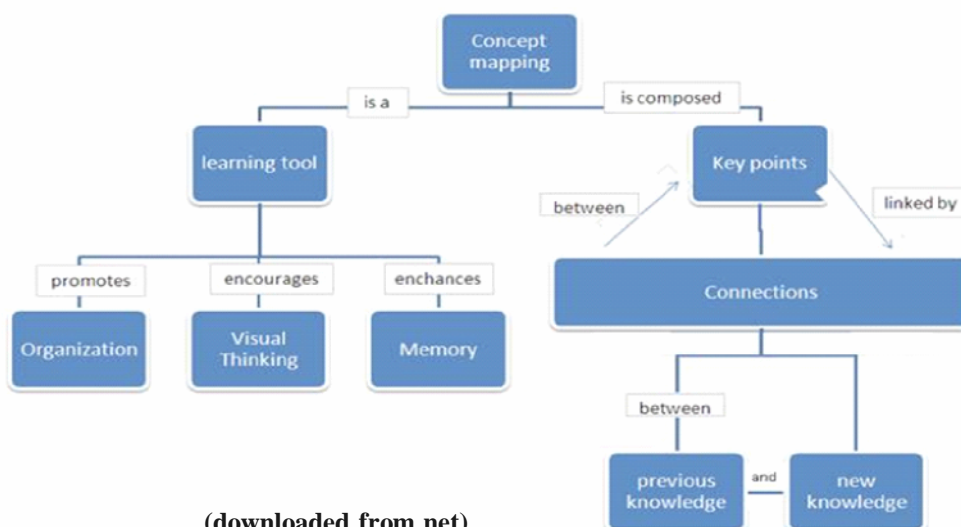
- **Develop in students competency and skills required for comprehending, identifying, selecting and integrating information** in connection with specific tasks and materials, e.g. it is not enough to ask students to extrapolate (from the graph or ask them to write a hypothesis relevant to the experiment or compare source A and source B).

It is very important for the subject teacher to know if the students know how to go about such tasks. Rather than assuming that students have developed these skills, classroom time should be devoted to teaching such thinking skills directly where the subject content becomes the vehicle for thinking.

A word of caution though. Teachers know that students do not learn anything at one go. Hence, the need to repeat similar tasks. But students should be given credit when they try to express any idea in their own way and not just memorize answers from textbooks or teacher dictated notes.

- **Focus on subject-specific vocabulary** These can be either content obligatory (=you must do it) or *content-compatible* (=words that can be used together; consistent with the topic being taught). For example, when studying the topic of volcanoes in geography – content obligatory language might include words like *magma, lava, core, erupt, force, melt* and linking devices such as *therefore, as a result*, etc. Content compatible language can include recycling description of a process with linking devices like – first, then, after that, etc.
- **Highlight the underlying conceptual framework** : Concepts are the building blocks of thinking. A concept is a category used to group similar events, ideas, objects or people. Concepts are abstractions. They do not exist in the real world. Concept learning therefore, refers to the development of the ability to respond to common features of objects or events. Teachers do not just introduce their students to new concepts but also help them to comprehend the relationship between different concepts through **concept maps** which visually illustrate the relationships between concepts and ideas. The concepts are written either in circles or in boxes, and are linked by words and phrases that explain the connection between the ideas, helping students to organize and structure their thoughts to understand information and new relationships. Most concept maps represent a hierarchical structure with the broad concept first with connected subtopics, more specific concepts, later.

Given below is an example of a map concept.



Moreover, if teachers just read out from prescribed textbooks without reformulating the ideas and concepts, if they do not pitch their explanations to the level of their students, then students take recourse to memorising without comprehending a word of the topic being taught. Hence it is important to adapt texts so that it is at the right level of difficulty for the class being taught and is a good model of the sort of phrases that underpin effective expression in different subjects.

- **Analysing subject specific word formation** (i.e. prefixes, suffixes, word roots) and comprehend and apply this knowledge of parts separately and all parts put together to arrive at the meaning of a word. e.g.

Word meaning	Suffix (meaning)	Prefix (meaning)
Life Science	-ology (study of a particular science or subject)	Bio – (life)
Writing about someone's life	-graphy	Bio – (life)
Heat under the earth's crust	-thermal (caused by heat – root word /not suffix)	Geo – (earth)

Please note: thermo – means heat and is a prefix – hence thermal is an adjective here – thermal means relating to or caused by heat or change in temperature. Don't we use *thermals* – clothes specially designed to keep us warm in cold weather? Hence geothermal springs are hot water springs – springs with water temperatures above its surroundings. Now you can easily understand the meaning of words like geology, sociology, etc. Understanding word formation is essential for improving language because once learned it gives students skills to decode unfamiliar vocabulary.

Activity: Write the meaning of words given below with the help of a dictionary. Can you break the word into prefixes, suffixes and word roots?

genocide, nanotechnology, geothermal, biometric, exothermic, quadrupeds

- **Develop an ability to focus on the structure of texts.** Understanding the features of a text type and how these texts are arranged, are vital to better comprehension and reading and help students when writing. When a student is able to understand texts at a deeper level, they can perceive language not just as a set of rules but as a set of options available for constructing a variety of meanings. Students can anticipate what information would be included and use this knowledge to summarise the key points.

There are a variety of structures that authors use to organize information. Let us go through a few of them.

Chronological/sequential – Related to time, order or a series of events or things that come one after the other e.g. there is a particular procedure to be followed when a new law is made in our country; stories (narratives) also have a chronological order; or you have to follow a particular process (a series of steps) to make cookies or to bake a cake.

Critical words: *First, second, before, after, finally, then, earlier, next, etc.*

Cause and Effect – Informational texts often describe cause-effect (causal) relationships. For example, you must have studied in your geography classes why earthquakes are so frequent in Japan, Nepal, India, Indonesia and the havoc that comes in the wake of earthquakes. Even a simple thing like an apple turning brown when you leave it half eaten can be explained as cause and effect pattern. Of course, you have learnt all about it in your chemistry lessons. But did you ever think about it as a particular style of organizing information? If you think of it, you'll find many examples of causal relationship in our daily lives. (If there is a CAUSAL relationship between two things, one thing is responsible for the other thing e.g. the gravitational pull of the moon on the earth's oceans causes tide. But unfortunately people often misread or misspell the word as CASUAL. Minor changes in spelling thus change the meaning and correct use of a word.)

Critical Words: *Because, since, if/then, due to, as a result, consequently, etc.*

Problem-Solution: The text describes a problem and suggests solutions e.g. Global warming; Road rage on the rise in Delhi; Diabetes – the silent killer, etc.

Critical words: *Propose, conclude, a solution, the reason for, the problem or question.*

Compare and contrast: Text books often highlight the similarities and differences between objects. For example –

A study of two different forms of carbon, diamonds and graphite; differences between deltas and estuaries or hot and cold deserts in the world, etc.

Critical words: *While, yet, but, rather, most, same, either, as well as, like/unlike, as opposed, to, etc.*

Descriptions: Sensory details help the reader to visualize information which can be organized in order of space e.g. a description of a room from left to right or from outside to inside or description of a process e.g. how paper is made.

Critical Words: *Description adjectives and words like – on, over, beyond, within, etc.*

These are just a few text structures that you often find in your textbooks. There are many others like narrative, argumentative (discussing for or against a topic) or classification. You must also understand **that one particular text structure is not used through a lesson/chapter.**

We would also like to draw your attention to the **critical words given after each text structure.** These are different **linkers** (or cohesive devices) that add to the meaning of the text, e.g.

and (addition, more information) Hot *and* humid.

but (difference/contrast) Speed thrills *but* kills.

or (alternative) Igneous *or* sedimentary rocks transform to metamorphic rocks)

because (reason) Because of daily heavy rainfall equatorial rainforest have dense vegetation.

The use of correct and appropriate linkers makes a text coherent and meaningful.

“We often find a science text book, e.g. which asks students to make a conclusion based upon data observed during an experiment. We assume students know how to draw conclusions, yet we seldom teach students that skill.” While we may assume that students know how to summarize, analyse or extrapolate i.e. perform the thinking skills implied in the subject matter, “... we often find they have never learned what it means to perform these basic thinking skills. As a result, students are often dismayed, confused and handicapped when asked to perform them.” (Costa, A.I)

When subject teachers explain the requirements of the task in detail (e.g. to write a summary the students should read the given text carefully; underline the important ideas, pay special attention to the first and the last sentence; should not include examples etc;) and allow the students to write in small groups so that they get an opportunity to formulate their responses in their own words/language, students are compelled to think and learn. Similarly, when a student is expected to analyse trends; interpret bar diagrams or pie charts or graphs, subject teachers in geography/statistics or economics can provide appropriate language prompts like (an increase, growth of or from to, a decrease, went down, plummeted, drastic/sudden change; remained stable, fluctuated; a plateau after a rise etc.). Such verbal cues help students to organize their answers better.

In this section we tried to bring to your attention why and how “language is in every subject” and how language and subject teachers can and should cooperate to encourage learning in schools. While teachers cannot make students learn, they can promote learning by helping students become motivated to learn, handle information and experience, develop knowledge, attitude and skills and transfer their learning from the classroom to the real world. In practice, this means students often need to have the opportunity to say or write things in their own ways, in their own styles rather than copying from books or taking notes from dictation. Thus a learner at any level should be able to reformulate what he/she is learning. It is true that teachers at all levels have time and resource constraints and many of them are more than happy to complete a given syllabus, accept memorized answers from the text or guide books. Moreover, in the Indian context, maintaining discipline in a class means pin-drop silence; thus making pair/small group work for allowing children to construct their own knowledge, formulating and expressing their ideas, paraphrasing a given text or interpreting and analyzing trends difficult if not impossible. But revisiting their teaching in the light of the discussions above will facilitate learning, make the process more exciting and help them save time.

Discussing, explaining, questioning and using talk and writing to tussle with ideas are all means of achieving better understanding of a subject.

Structured talks enable students to rehearse their ideas, solve problems, develop thinking skills and prepare for writing. Students would learn better if teachers generate open questions and extend students’ thinking through partner and group discussions. In practice, this means students often need to have the opportunity to say or write things in their own ways, in their own styles rather than copying from books or taking notes from dictation. Thus a learner at any level should be able to reformulate what he/she is learning.

Activity: Regardless of whether you teach science or geography, language is essential. Explain.

1 Read the following paragraph selected from an NCERT Physics textbook. Will it be easy or difficult for an English teacher to teach the given text? Give reasons for your answer.

The Maxwell's equations of electromagnetism and Hertz experiments on the generation and detection of electromagnetic waves in 1887 strongly established the wave nature of light. Towards the same period at the end of 19th Century, experimental investigations on conduction of electricity (electric discharge) through gases at low pressure in a discharge tube led to many historic discoveries. The discovery of x-rays by Roentgen in 1895, and of electron by J. J. Thomson in 1887, were important milestones in the understanding of atomic structure. It was found that at sufficiently low pressure of about 0.001mm of mercury column, a discharge took place between the two electrodes on applying the electric field to the gas in the discharge tube. A fluorescent glow appeared on the glass opposite to the cathode. The colour of the glow of the glass depended on the type of glass, it being yellowish green for soda glass. The cause of this fluorescence was attributed to the radiation which appeared to be coming from the cathode. These cathode rays were discovered in 1870, by William Crookes who later, in 1879, suggested that these rays consisted of streams of fast moving negatively charged particles. The British physicist J. J. Thomson (1856-1940) confirmed this hypothesis. By applying mutually perpendicular electric and magnetic fields across the discharge tube J. J. Thomson was the first to determine experimentally the speed and the specific charge [(charge to mass ratio (e/m)] of the cathode ray particles. They were found to travel with speeds ranging from about 0.1. to 0.2 times the speed of light (3×10^8 M/S). The presently accepted value of e/m is 1.76×10^{11} C/Kg. Further, the value of e/m was found to be independent of the nature of the material/metal used as the cathode (emitter), or the gas introduced in the discharge tube. This observation suggested the universality of cathode ray particles.

- 4 Based on the concept map given in this section (1.4) write two paragraphs focusing on the two questions:
- What is a concept map?
 - What are the advantages of a concept map drawn by a student?

2.5 COMPLEMENTARITY OF LANGUAGE SKILLS AND SUBJECT KNOWLEDGE OF TEACHERS

In the words of John Clegg, "...The problem comes to a head in urban poor, (small towns) or rural areas where children get little exposure to English....It is difficult for students to learn school knowledge in a language in which they are still struggling. It is also difficult for teachers

to teach, and they may be struggling with the language almost as much as their students... There is no hiding the fact that learning school subject-matter knowledge satisfactorily is often well-nigh impossible when neither teacher nor pupils can really speak English adequately to use it as a vehicle for giving or getting an education..."

(From Innovation and Best Practice: 1999; pp.70-77)

Reading out from textbooks by teachers, without adequate explanations and discussion, compel students to memorise information without comprehension. What is true in the subject of Maths, as discussed earlier, is true for all content areas. As Buchmann (1984) quoted in the study – The Subject Matter Preparation of Teachers by Deborah L. Ball and G. W. McDiarmid – points out,

'It would be odd to expect a teacher to plan a lesson, for instance, writing reports in science and to evaluate related student assignments, if that teacher is ignorant about writing and about science, and does not understand what student progress in writing science reports might mean.'

What teachers need to know about the subject matter they teach extends beyond the specific topics of their curriculum. For example, while English teachers need to know about particular authors and their works, about literary genres and styles, they also need to know about interpretation and criticism. A history teacher needs content knowledge but must also understand what history is: the nature of historical knowledge and what it means to find out or know something about the past. History teachers want their students to understand that history is fundamentally interpretive. Learning history means studying accounts of the past have already been constructed as well as learning about alternative accounts of the same phenomenon and how such accounts are constructed. Nevertheless, teachers may adopt either a teacher – centered and teacher-fronted pedagogy or a student-centered approach to teaching the same content.

As teachers, we know that each subject has its own vocabulary and sentence patterns. As Julia Strong points out in her paper, 'Literacy Across the Curriculum' that the language of explanation for science is different from the patterns of arguments needed by the historian. She observes that '...Talk is central to learning. To deepen understanding, talking through problems plays an important role. Discussing, explaining, questioning and using talk and writing to tussle with ideas are all aspects of the struggle towards clarity and deepening thought in any subject. If teachers know how to generate open questions and extend their students thinking through focussed discussion and through partner and group discussion, they can not only promote thinking but also encourage learning. Similarly, by promoting co-operation among students, encouraging active learning, by providing prompt feedback, by communicating high expectations from students, a teacher can impact a learner. Let us conclude this section by saying that there is no doubt about the fact that subject matter is an essential component of teacher knowledge but integrating it with the use of language is important. After all, if teaching involves helping others to learn, then understanding what is to be taught is a central requirement of teaching. We all accept that teaching involves, not just dissemination of a particular thing or concept, rather it is the responsibility of the teacher to offer

many interconnected concepts in such a way that students are cajoled into making difficult connections. This can be done with the help of making language-content connections. The teacher's ability to frame thought provoking questions would definitely encourage students to become independent thinkers if shown the right direction.

2.6 LET US SUM UP

The very basis of language and learning are the four language skills of Listening, Speaking, Reading and Writing where the ability to think is the invisible thread that runs through all the four strands. However, if the foundation of literacy is poor, any attempt to progress further would collapse like a house of cards.

Leaving the development of language skills to the English teachers per se would compel students to struggle to express their ideas in other subjects. Each subject has its own vocabulary and sentence patterns. The language of explanation for science is different from the patterns of arguments needed by historians. Each subject has its own pattern of language that is tied up inextricably with meaning. An English teacher cannot teach students the vocabulary of science let alone the patterns of language needed to express scientific thoughts effectively. Only a science teacher can do that. Having said that, all teachers whether teaching science or geography need to be proficient in the language used in the classroom for purposes of instruction.

2.7 REFERENCES AND SUGGESTED READING

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