



## LANGUAGE ACROSS CURRICULUM: MATHEMATICS

**Dipak Chavan, Ph.D.**

*Tilak College of Education, Pune*

### Abstract

*The longstanding Language Across the Curriculum (LAC) movement is built upon a simple, primary concept: Students should have multiple opportunities to apply their knowledge of languages in a variety of curricular contexts, not just within the traditional language classroom. Cultures and Languages Across the Curriculum builds upon this basic idea: Knowledge exists within and is shaped by culture and, therefore, just as materials in many languages can and should be incorporated into all parts of the curriculum, intercultural perspectives can and should inform the teaching of academic content in many curricular contexts. Present paper is an attempt to put relation between languages Across the curriculum through teaching of mathematics as school subject.*

**Keywords:** *Language across the curriculum, Mathematic*



*Scholarly Research Journal's is licensed Based on a work at [www.srjis.com](http://www.srjis.com)*

### 1. Introduction

Language across the curriculum (LAC) is a modern approach to learning languages. According to the LAC approach, language learning should occur throughout the school hours in the language classroom as well as another subject classroom. LAC is a term for school and college courses that allow students to study a foreign language. It allows students to apply their existing knowledge of a foreign language outside of language learning classrooms. As the medium of instruction is the key to understanding the subject content in school, an LAC approach will help improve students' language proficiency and understanding of academic content.

Language Across the Curriculum (LAC) is a concept and a policy. As a concept it acknowledges the fact that language education in school does not only take place in specific language subjects such as mother tongue education, foreign language education, second language education etc., but also in each and every other subject, in each and every activity in school, across the whole curriculum.

Language across the curriculum (LAC) relates to linking different forms and aspects of language education within the school, particularly emphasising the role of language in all

subject-matter learning. LAC has two meanings: in the narrow sense it is a concept suggesting the importance of language work and language training in all non-linguistic subjects. In the wider sense it is a concept demanding a comprehensive model of language education as the basis of a whole school language policy.

The concept of LAC also claims that language and learning are deeply linked. Therefore, wishing to acknowledge and develop children's existing mental and linguistic capacities, LAC focuses on active, constructive, potentially autonomous learning.

## **2. Need of Language across the curriculum approach**

A LAC approach is one that integrates language learning and content learning. The concept of LAC acknowledges the fact that language education does not take place in language class alone. LAC approach advocates that it takes place in each subject class. There is a need for Language across the curriculum approach because language is best acquired through different meaning, making contents and learning in all subjects is dependent upon language. Both content and language are interrelated. Irrespective of the subject learners are studying, learners assimilate new concepts through language. When students listen and talk, read and write in non-language class, they use language. So, while increasing their concepts in non-linguistic fields, they enhance their linguistic skills as well. So, all in the field of education we need a broad perspective that integrates language and content learning.

## **3. Benefits of the language across the curriculum approach**

Language across the curriculum approach helps students to improve their communication skills in a foreign language, to learn the content more, to expand their ideas, to discuss different issues in a foreign language, to collect different technical terms related to different subjects. It opens a vast career world before the students. This enables teachers to contribute and get support in dealing with language in learning issues as well as to work for a common target. It enables teachers to use the language to teach more effectively and help students learn more effectively. It helps students to minimise the problems of adjusting to the new medium of instruction and to learn the subject content better.

All teachers can improve their skills and content in a foreign language. It helps teachers to update their knowledge. It helps teachers give clear instructions to students in Foreign Language. This enables teachers to contribute and get support in dealing with language in learning issues as well as to work for a common target. It enables teachers to use the language to teach more effectively and help students learn more effectively.

#### **4. Objectives of LAC Approach**

1. To support language development in each learner, in all domains of language use, in each learning activity in school;
2. To comprehend ideas, for reflection and thinking, as well as for expression and communication
3. To enhance knowledge acquisition through awareness of language use;
4. To create a link through the learning processes;
5. To enhance awareness of the relatedness of aspects;
6. To develop critical reading, writing and learning;
7. To give learners feedback about their progress

#### **5. Characteristics of LAC Approach**

- 1) Language is more than communication skills
- 2) Language is also linked to the thinking process
- 3) Language is a tool for conceptualising, for thinking, for networking
- 4) Language supports mental activity and cognitive precision
- 5) Language for academic purposes helps to express thoughts more clearly (this is especially true for writing)
- 6) Language helps to structure discourse and practise discourse functions

#### **6. Language Across Mathematics Curriculum**

Mathematics is recognised as one of the sciences and has been described and defined in many different ways. It is a creative activity and is one of the most useful, fascinating and stimulating divisions of human knowledge. It is a process of managing and communicating information and has the power to predict and provide solutions to practical problems as well as enabling the individual to create new imaginative worlds to explore. We use mathematics in everyday life, in science, in industry, in business and in our free time.

#### **Mathematics Language Across the Mathematics Curriculum:**

##### **Points to be considered**

<b>What becomes less important:</b>	<b>What becomes more important:</b>
memorising rules and computing	problem-solving activities involving trial-and-error, active involvement in practical contexts, search of solutions beyond the given frame of school knowledge
solving problems/exercises that have a unique answer	formulating questions, analysing the steps and motivating decisions in problem solving
'pen and pencil' (or 'chalk and blackboard') maths	using various manipulative activities to help learning

teacher acting as an information provider to a pupil that receives it passively and works alone	teacher acting as a facilitator of learning, stimulating pupils to work in teams
assessment with the purpose of labelling pupils	assessment as a part of learning, stimulating classroom activities

## **7. Language of Mathematics**

Mathematics is about ideas -- relationships, quantities, processes, and ways of figuring out certain kinds of things, reasoning, and so on. It uses words, but it is not about words.

### **Purpose of the Developing Mathematical Language**

1. Encourage students to incorporate language and cultural knowledge into discipline-specific research
2. incorporate language and cultural knowledge into discipline-specific study and research.
3. Foster, maintain and enrich the language abilities of all students (native and non-native speakers)
4. Extend intercultural information and international perspectives on course subject matter
5. Underscore the intricate connections between language, culture and meaning
6. Heighten long-term motivation to maintain and enhance language cross-cultural knowledge

## **8. Development of Language through Teaching of Mathematics**

While there is no doubt that mathematics is itself a language, nevertheless the teaching and learning of this subject requires a sound grasp of the unique nomenclature of the English of mathematics. This is not just about a specific vocabulary, but also a way of framing sentences and statements to have contextual meaning (e.g. “The sum of the two integers is 10”. What is the volume of cone so formed?)

Linguistically, students should be able to relate clusters of vocabulary to express the contents such as angle, triangle or divide, divisor, dividend. Common grammatical structures include comparisons (The \_\_\_ is longer than the \_\_\_\_.); passive voice, nominalizations where verbs are turned into nouns like argue into argument to help condense text and make connections between sentences as in “Jay argued that the sum of two odd numbers is an odd number.

### 9. Common Vocabulary in Mathematics

Vocabulary in Mathematics most commonly deals with concepts, processes, physical features, and subject-specific terminology. The following 25 words are a small sample of words frequently used in the Math classroom.

<ul style="list-style-type: none"><li>• addition</li><li>• calculate</li><li>• circle</li><li>• complete</li><li>• cube</li><li>• division</li><li>• divisor</li><li>• estimate</li><li>• least</li></ul>	<ul style="list-style-type: none"><li>• mass</li><li>• multiply</li><li>• numerator</li><li>• pattern</li><li>• position</li><li>• prime numbers</li><li>• product</li><li>• prove</li></ul>	<ul style="list-style-type: none"><li>• rectangle</li><li>• relationship</li><li>• scale</li><li>• shape</li><li>• sort</li><li>• sphere</li><li>• sum</li><li>• symmetrical</li></ul>
---	--	--

### 10. Typical Exam Questions in the Maths

- *Concept Clarification:* Which of the following is ...? Why

Sample Question: Which of the following is NOT a function? Why?

(a)  $y = x^2$  (b)  $x = y^2$  (c)  $y = \sin x$

*Deduction:* Using previous results, or otherwise, .....

- Hence, .....

Sample Question: Rewrite  $x^2 - 4x + 9$  in the form  $( )^2 + a x + b + c$ .

Hence find the minimum value of  $x^2 - 4x + 9$  and the corresponding value of  $x$ .

Proofs: Prove/Show that .....

Sample Question: Prove that  $\triangle ABC$  is a right angled triangle.

Setting Up and Solving Equations:

- Solve .....
- A father is 3 times as old as his son. In 20 years' time, the father's age will be double that of the son. Find the son's age.

Additional Language Expressions

*Assumptions:*

- assume/suppose that .....
- let us assume that ....., it is assumed that .....
- unless otherwise stated we can assume that .....
- as ..... satisfies the above assumptions/requirements/ conditions, we will need to

make the following assumption;

- unless otherwise stated, we can assume ..... to be an integer;
- under such assumption ..... can be neglected;
- on the assumption that ..... holds;
- the assumption/conclusion/hypothesis/theorem can be regarded as .....
- assume/assuming the equation is valid for .....
- let ..... be a positive number;
- let a be equal to .....; let a equal .....

*Definitions:*

- we define ..... as/to be .....
- the function ..... is defined as/is given by ...../can be defined as .....
- ..... is by definition .....
- define ..... as/let ..... be defined as ..... equal to ....., where .....
- in this way we obtain; the definition is in good agreement with .....

*Implications:*

- then, accordingly, hence, thus, therefore, furthermore; consequently;
- we can conclude from ..... that ..... /hence/therefore .....
- since ..... gives/implies/yields .....
- from what has been said it follows that .....
- from the foregoing it is apparent that .....

*Notation:*

- let us denote ..... by .....
- we will denote by ..... the .....; .....
- denotes/stands for/expresses the .....
- ..... is denoted briefly by .....
- the above expression may be denoted/written/expressed as .....
- let a denote b; the sign indicates that .....
- we follow the notation used by/in .....; let a equal b/be equal to b

As every subject has to contribute to the language development of students, a balance between an emphasis on English and an emphasis on content is recommended. More time and effort has to be spent on the development of students' language Proficiency.

**References**

- Bernstein, B. (1971). Class, Codes and Control. Vol. 1. London: Routledge&Kegan Paul.*  
*TajHassen., Bhargav Mahesh (2015), Language Across the Curriculum, Agra*  
*Ambedkar V. A. (2015) Language Across the Curriculum, Tiruchirappalli, Center for Education, Bhartidarsan University,*