

Integrating Math with Kannada Language: Reflecting on my Experience

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Key Words: Integrated approach, Integrating Math with Kannada, Competencies, Resources, Reflections

Abstract

This is an experiential study to integrate Math with Kannada. It is based on the belief that an integrative approach can help students to visualize Math concepts by making them less abstract when used in the context of stories and poems. The purpose of this study was to get an experience of integrating Kannada and Math and understand what it entails. The study was conducted in a government school and the participants included students of Classes 2, 3, 4 and 5, who were yet to achieve basic competencies in Kannada and Math. The study is concerned with the experience of designing and implementing the integrated approach. The earlier version of this paper was presented at the Seminar, "Teachers in the Current Scenario of School Education", held at Mysore in April 2018.

Introduction

Making connections is necessary for meaningful learning. In the process of learning, children make connections between the new knowledge they have just learnt and their prior knowledge; between knowledge and the real world; and between subject knowledge and their experiences. Integration is a critical means of making connections. An integrated approach to curriculum ensures active participation of the learners in the learning processes and creates opportunities for them to apply their skills across their learning. For instance, if children learn the skill of inductive thinking by arriving at the rules of grammar, this skill can be applied in the case of Math learning. The advantages of this approach have led to the development of more integrated curricula.

According to Beane (2005), curriculum integration involves meaningful learning that is organized around issues important to teachers and students. The word "integration" holds multiple meanings (Drake & Burns, 2004). One meaning is that of a multi-disciplinary approach, where teaching is around a set of identified themes and subjects are integrated around these, as, for example, water, family and environment. The other is an interdisciplinary approach where integration is within a discipline. In language learning, for example, the skills of listening, speaking, reading and writing are integrated. Still another approach is the transdisciplinary approach, as in project learning, where a local problem is selected and students address this problem, bringing with them several skills such as communication skills, research skills, social skills, leadership and collaboration, to mention a few. The theme-based approach is popular in the Indian context, particularly in early

childhood education (NCERT, 2015). This approach requires a reorganization of the curriculum based on themes. In this study, since the scope for reorganizing the curriculum is extremely limited, I used an approach that negotiated the Math and the Kannada language curriculum.

Why Math?

Math was selected as a theme because in the initial years of schooling, children find it challenging to understand Math. This is because Math textbooks use standard Kannada, and the home language of children is either a dialect of Kannada or Telugu or Urdu. They have little access to mathematical terms in Kannada. Moreover, they are not familiar with the Kannada script. So, when Math is taught in Kannada, many children are not able to visualize the context. Despite these problems, children have an intuitive sense of basic Math. When I gave an addition problem without context, the children found it difficult to give the right answers. However, when I used a story to contextualize the same problem, many children were able to give the correct answer. The children's answers indicated that Math and language could be integrated. I believe that this approach will help to meet the goals of Math education discussed in the National Curriculum Framework (2006).

The purpose of this study was to get an experience of integrating Kannada and Math and getting an understanding of what integration entails. An integrated approach was tried out in one Government school on 83 Class 5 students, which included both boys and girls. The classes were held outside of school hours, for about 45 minutes in the morning and 45 minutes in the evening. I also tried to assess the impact of integration on the learning of Math and Kannada, through a

pre and post-test. Although the purpose of the test was to evaluate the effectiveness of the approach, I was more concerned with the process of designing and implementing the approach.

Process

I used a five-step process, namely: listing competencies, selecting participants, identifying resources, preparing a workbook and preparing and administering a pre and a post-test.

Listing Competencies

First, I listed the competencies that I intended to focus on, both in Math and Kannada. These competencies were used to guide resource preparation as well as design the pre-test.

In Kannada, the competencies targeted are as follows:

- Reading and writing alphabets
- Identifying vowels and consonants.
- Reading and writing consonant clusters (example: ಹತ್ತನೇ /"hattanee" [tenth], /ಬೆಟ್ಟ /"Betṭa" [hill],)
- Reading at least 50 words with syllabic structures of 3, 4 and 5 syllables

In Math, the study looked at the following skills:

- Writing the names of the numbers
- Compare Numbers: Greater than and lesser than
- Reading-writing three-digit numbers.
- Place value
- Simple addition and subtraction
- Decimals
- Recognizing Math functions based on symbols

Selecting Participants

The next step was to select the participants from among the students. I was aware that most of the students studying across Classes 2-5 had not achieved their grade level competencies. Hence, I limited the skills to basic competencies in Kannada and Math (listed earlier). Since I have been working in the school for more than 15 years, I had a clear idea of the children who had not acquired these competencies. The findings from the pre-test confirmed my general observations. The number of participants selected is given in Table 1 as follows:

Table 1: *Number of Participants Selected for the Study (N=83)*

Classes	2	3	4	5
Number of Student Participants	19	21	22	21

Identifying Resources

The third task was to identify the resources that had scope for integrating Math and Science against the backdrop of the competencies listed earlier. This was a real challenge because there were very few resources. I used poems and stories with a focus on the required competencies. The pieces selected were:

- G.P. Rajarathnam's poem "Ondu, Eradu, Baalele Haradu" [One, two, spread the banana leaf] (Figure 1) and a story. These resources were used to teach number concepts (one to ten), quantity and ascending and descending order of numbers.
- A story on decimals
- A folk song on a variety of measurement tools (e.g.: basket of fruits; a cup of sugar, a full hand length (called maaru) of flowers). The poem also talked of kinship across generations (Figure 2)

- A rhyming song using numbers and consonant clusters (otthaksara), e.g., ಹತ್ತೊಂದುಹನ್ನೊಂದುಮತ್ತನಕಡುಬುಇನ್ನೊಂದು [ten and one is eleven, soft Kadabu (a sweet) another one – where eleven and another one rhymes in Kannada)

Figure 1

Poem by G.P. Rajarathnam

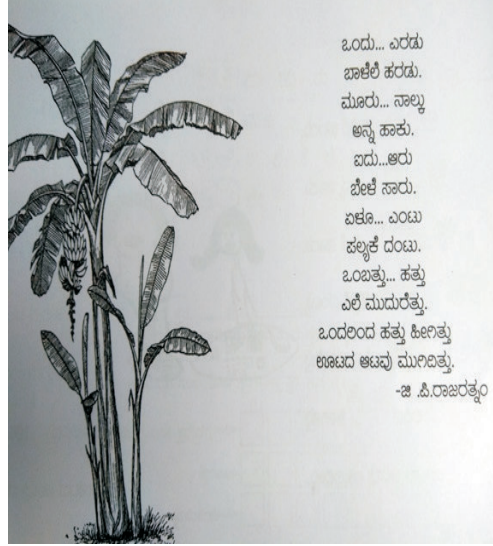


Figure 2

Part of the Folk Song (Along with a Rough English Translation)

ನಂಮುತ್ತಾತಂದನೇಬೆಟ್ಟಕ್ಕೋದೊಂದುಮಾರುಮುತ್ತಿನಸರತಂದ
ಸೂರಲ್ಲಿಮಡಗುಲಂದ್ರೆಊರೋರ್ಗೇಲ್ತಾಕೊಟ್ಟುಬಂದ
(My great-grandfather went to the first hill to get one length of pearl chain.
Keep it in the attic I said, but he distributed it to everyone in the town.)
ನಂಮುತ್ತಜ್ಜಿಎರ್ಡನೇಬೆಟ್ಟಕ್ಕೋದೊಂದುಮೊರಬಂಗಾರದೊಡ್ಡೆತಂದ್ಡು
ಸೂರಲ್ಲಿಮಡಗುಲಂದ್ರೆಊರೋರ್ಗೇಲ್ತಾಕೊಟ್ಟುಬಂದ್ಡು
(My great-grandmother went to the second hill to get two measures of gold.
Keep it in the attic I said, but she distributed it to everyone in the town.)
ನಮ್ಮಪ್ಪಮೂನೆಬೆಟ್ಟಕ್ಕೋದಮೂರುಮಂತ್ರಿಬೆಳ್ಳಿಕಡಗತಂದ
ಸೂರಲ್ಲಿಮಡಗುಲಂದ್ರೆಊರೋರ್ಗೇಲ್ತಾಕೊಟ್ಟುಬಂದ

(My father went to the third hill to get three baskets of silver.

Keep it on attic I said, but he distributed it to everyone in the town.)

ನಮ್ಮಮ್ಮನಾಲ್ಕನೇಬೆಟ್ಟಕ್ಕೋದೊಂದುನಾಲ್ಕುಕೊಳಗಹೂವುತಂದ್ಡು
ಸೂರಲ್ಲಿಮಡಗುಲಂದ್ರೆಊರೋರ್ಗೇಲ್ತಾಕೊಟ್ಟುಬಂದ್ಡು

(My mother went to the fourth hill to get four pots of flower.

Keep it in the attic I said, but she distributed it to everyone in the town.)

Preparing a Workbook

For the stories and poems selected, I prepared exercises keeping in mind the Kannada and Math competencies of the children. In Rajarathnam's poem, the exercises were centred around number concepts, indicating numbers using symbols, and adding length to alphabets by using the corresponding diacritics of the letter (e. g. ಇ :ರಿ, ನಿ, ದಿ).

For decimals, the students had to prepare decimal grids and count the number of words; for each story or poem, the workbook had both Kannada and Math exercises. In the rhyming poem, children had to segment the consonant clusters. I used two types of consonant clusters, namely:

a) Consonant clusters of the same letters (swajathi – the subscript is of the same letter to which it is added; example:

/ಅಕ್ಕ/[sister], and

b) Consonant clusters of different letters (vijaathi – the subscript belongs to a different letter to which it is added; example: ನಿತ್ಯ/[daily]– here the subscript represents /ಯ/ "y" and is added to /ತ/ "t")

Preparing and Administering Pre and Post-Tests

The pre and post-tests were used to assess the skills listed in the competency list. Students had also to summarize the story of *Panje Mangesh Raya*. The findings of these tests are given in Table 2.

Table 2: Findings of Pre and Post-Tests

Pre-Test			
No of Students who took the test (N)	Percentage of students who achieved language competencies	Percentage of students who achieved Math competencies	Percentage of students who showed story comprehension
83	12	8	2
Post-Test			
81	37	46	17

It is evident from Table 2 that the students benefited from the integrated approach to Kannada and Math. A higher percentage of students achieved grade-level competencies in Kannada, Math and story comprehension. While this finding is encouraging, it must be taken with caution because seven months is too short a time to assess the real competency achieved and besides, whatever was achieved could be because of Pollyanna effect.

Reflections on my Experience

The key learnings of my seven-month engagement with integrating Math with Kannada include:

1. The approach of integrating Math with Kannada is more engaging for the children and makes them active learners.
2. This approach also helps children to increase their Kannada proficiency because they are gradually introduced to textbook Kannada through stories and poems.
3. Math concepts when contextualized through stories and poems become

more concrete; this helps children to visualize Math operations.

4. The facilitator must know the art of storytelling and reciting a poem to capture the imagination and interest of the children. Developing this skill is an essential requirement.
5. The identification of resources is a challenge because of their paucity. One must work with writers who write for children to come up with authentic and enjoyable stories as well as poems that can be used to integrate Math and Kannada. If the stories and poems are not authentic, there is a danger of learners not connecting with them.
6. Preparing authentic exercises is also a challenge. The study has practice exercises on counting the number of words and letters as a part of a Math exercise. While this is acceptable as a starting point the complexity of the exercises must be increased.
7. A work of this nature requires a strong rapport with not only the children but also the schools.
8. In this study, breaking up the 190 minutes into two sessions, one in the morning and one in the evening was suboptimal. Instead, it is better to go in for one block of 190 minutes.

One needs to explore in-depth whether resources are either available or can be

prepared for all Math concepts that primary school children have to learn.

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