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EFFECTIVE STRATEGIES FOR IMPLEMENTING THE GRADE 1 MATHEMATICS CURRICULUM FOR ETHNIC MINORITY STUDENTS

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ABSTRACT

The paper examines the current state of teaching Grade 1 Mathematics to ethnic minority students in some mountainous provinces of Vietnam. Based on survey results, five proposed strategies are outlined: 1/ Identify the required outcomes for Grade 1 mathematics for ethnic minority students and suggest appropriate teaching plan. 2/ Focus on teaching essential and practical knowledge and skills that are relevant to the students' daily lives. 3/ Mobilize students' experiences and the resources of both the school and the community to help students perceive the relevance, appeal, and benefits of learning mathematics. 4/ Integrate content that enhances Vietnamese language proficiency into mathematics lessons. 5/ Apply multimedia tools in mathematics lessons to help ethnic minority students overcome language barriers.

KEYWORDS: mathematics curriculum, ethnic minority students, primary school.

1. INTRODUCTION

Vietnam has more than 50 ethnic minority groups, and the level of socio-economic development among these groups is often uneven. The conditions for children from different ethnic minorities to

access primary education are also not the same, with the majority of these children often being disadvantaged in education.

In recent years, when implementing the curriculum and textbooks in ethnic minority regions, the Ministry of Education and Training has introduced many measures to support ethnic minority students, creating favorable opportunities to help them overcome difficulties in their studies. However, a majority of ethnic minority students often face challenges when learning mathematics in Vietnamese. In schools, the official language of instruction is Vietnamese, and the curriculum and textbooks are designed for teaching in Vietnamese from Grade 1. Although some localities have organized Vietnamese language classes for ethnic minority children in kindergarten (age 5) or before they enter Grade 1, for various reasons, many ethnic minority children still do not know, or know very little, Vietnamese by the time they start Grade 1. This remains a major and long-term barrier for ethnic minority students in learning various subjects, including mathematics. Due to this barrier, a portion of ethnic minority students often do not understand the lessons and are unable to communicate with teachers and classmates from other ethnic groups. They tend to lack confidence, have little interest in learning, feel reluctant to attend school, attend irregularly, perform poorly, lose interest in their studies, and eventually drop out. Ethnic minority students are often in remote, mountainous areas where there are fewer conditions to ensure the quality of learning in mathematics. Many families live in poverty, with limited ability to support their children's education. Parents do not have the habit or sufficient knowledge to assist their children in learning. The population is scattered, transportation infrastructure is underdeveloped, and the weather is harsh, making it difficult and sometimes dangerous for students to travel from home to school. Both the study time at school and at home is very limited (compared to the minimum time requirements in the educational plan).

The aforementioned socio-economic difficulties, along with the limitations in Vietnamese language proficiency among ethnic minority students, have led some of these students to lack diligence in their studies. Additionally, due to limited study time and frequent absenteeism, many ethnic minority students find it difficult to make up for gaps in their knowledge and skills in mathematics, a subject that is highly systematic. This is one of the key reasons for recognizing that ethnic minority students in disadvantaged areas often have very few conditions to ensure the quality of learning in mathematics.

Since the 2020-2021 school year, the new general education curriculum has been implemented in all primary schools in Vietnam. The implementation of this new curriculum has shown that reforms in teaching methods, forms of instruction, assessment, ... are making positive changes, with quality improving and becoming more effective. However, the implementation of this curriculum in ethnic minority regions faces several difficulties and obstacles that need to be addressed with solutions tailored to the actual conditions.

This paper examines the implementation of the Grade 1 mathematics curriculum in ethnic minority regions, with the aim of proposing strategies to improve teaching quality and meet the demands of educational reform.

2. The current situation of implementing the Grade 1 mathematics curriculum in ethnic minority regions

2.1. Survey objectives

To understand the current situation of implementing the Grade 1 mathematics curriculum in ethnic minority regions, we conducted a survey to gather information on the following:

- The actual time spent implementing the curriculum
- The method of selecting content
- The approach to teaching each unit and topic in Grade 1 mathematics
- The difficulties encountered in teaching Grade 1 mathematics to ethnic minority students in practice

2.2. Brief information on the provinces surveyed

Bac Kan is a mountainous province in the northeastern region of Vietnam, with a population of approximately 320,000 people, including 7 main ethnic groups (Tay, Nung, Kinh, Dao, Mong, Hoa, and San Chay), of which ethnic minorities make up over 88%. The province has 77,716 students from preschool to high school, with 27,937 ethnic minority students in primary school, representing 92.69%. Lao Cai is a highland, border province with a natural area ranking 19th out of 63 provinces and cities in the country. It has a population of 730,420 people and is home to 25 ethnic groups, with ethnic minorities comprising 66.2% of the total population.

Quang Ngai is a coastal province located in the South-Central Coast region of Vietnam. The province is home to 29 ethnic groups, with 187,090 ethnic minority people, accounting for 13.32% of the total population.

For the survey sample, we selected representative districts and schools from areas with varying conditions: Ngan Son, Ba Be, and Cho Moi districts in Bac Kan Province; Si Ma Cai and Bao Thang districts in Lao Cai Province; and Minh Long and Ba To districts in Quang Ngai Province.

2.3. Survey methods

To understand the current situation of implementing the Grade 1 mathematics curriculum in ethnic minority regions, we employed several investigative methods, including:

- Conversations and interviews
- Consultations with teachers about related issues
- Questionnaires for teachers at the surveyed schools
- Observation of Grade 1 mathematics lessons
- Discussions with Grade 1 students during the survey process

The survey was conducted from October 5, 2023 to November 21, 2023 at the specified schools and also conducted online via Google Forms.

2.4. Survey Results

From the opinions collected from questionnaires of 748 teachers and through the deep interviews with teachers directly teaching grade 1 and management staff at ethnic minority schools in the survey sites of the several provinces, we have summarized some results as follows:

Advantages: With the close and flexible guidance of the district department leaders, teachers are fully trained in the mathematics curriculum and textbooks. Teachers are empowered to proactively organize teaching in accordance with the characteristics of students and are provided with the best facilities and teaching conditions for first grade students. The District Department of Education has organized new topics and professional activities in clusters so that teachers have the opportunity to learn and share with each other. Teacher La Hoang Oanh, the principal of a primary school in Ba Be district, Bac Kan province said: "Being as a principal, right from the beginning of the school year, I have directed that do not force teachers to teach the entire content in 1 or 2 lessons according to regulations, but need to teach students to fully understand. Observing classes does not evaluate that. Teachers should observe which part of the student is weak, focus on that part, teachers are proactive in preparing their lesson plan; extend the lesson time to suit the student's level based on consensus within the professional group to implement."

Difficulties: So far there are a lot of difficulties/challenges such as living conditions of students, transportation, family concerns, facilities and equipment, Vietnamese language barrier, etc. in ethnic minority areas. In this paper, we focus on the difficulties considered from the implementation perspective of the first-grade mathematics curriculum as follows:

- (i) The ability to use Vietnamese in Mathematics lessons: Five-point Likert scale was utilized to determine the levels of Vietnamese language proficiency (listening - understanding, speaking - writing, expression, etc.) of ethnic minority students in the class from level zero (unable to use Vietnamese) to level 5 (proficient). The survey results are as below:

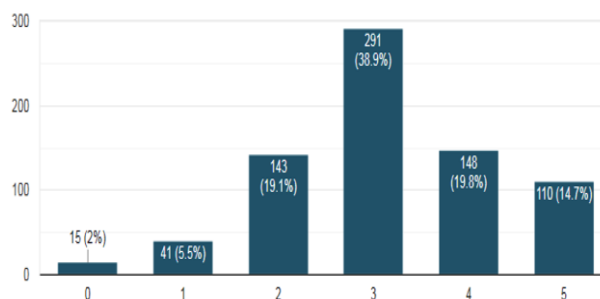


Figure 1. Vietnamese Language Proficiency in Ethnic Minority Students' Classroom

Among 748 survey teachers, 110 (14.7%) rated the level of Vietnamese language use in learning mathematics of first graders at the proficient level, 148 (19.8%) rated it at the relatively proficient level, 40 (38.9%) rated it at the average level, and 15 (2%) rated it as not knowing anything. This shows that the majority of ethnic minority students have problems using Vietnamese language in learning mathematics. Talking to teachers who directly teach first graders, it is known that this is also the biggest barrier to learning mathematics in first graders. Limited Vietnamese language proficiency makes students unable to understand the teacher's lectures, unable to understand the commands and requirements of the exercises, so they cannot answer questions and also express their understanding. So they become increasingly less confident.

Teachers from Ngan Son district, Bac Kan province shared more: "The 2018 Grade 1 Mathematics Curriculum is oriented towards developing qualities and competencies, so students participate in many activities with the interactions, students need to discuss, communicate, cooperate, and express their opinions, but because of limited Vietnamese language use, a lot of activities cannot be implemented. Teachers can only focus on helping students grasp some of the most important knowledge, and know how to express mathematics content in language with simple sentence patterns. Currently, the grade 1 mathematics only has 3 lessons per week and we often do not have enough time to teach." When asking how to help students achieve the requirements of the 2018 Grade 1 Mathematics Curriculum, how many lessons of extra instruction do teachers give students each week? We obtained results in 748 responses, 5 survey teachers answered that they did not need to add more lessons to guide students, 45 answered that they needed to add 1 lesson, 233 answered that they needed to guide 3 more mathematics lessons a week, 270 answered that they needed to guide 4 more lessons a week, 76 answered that they had to guide 5 more lessons a week. This shows that teachers all have to add more time to guide ethnic minority students to achieve the requirements of the 2018 Grade 1 Mathematics Curriculum and mainly add 2 to 5 math lessons per week.

(ii) Regarding the mathematics textbooks that grade 1 student are using: Most students use the set of Connecting knowledge with life textbook (42.9%) and the set of Learning together to develop capacity mathematics text book (52.1%). This shows that currently, ethnic minority students are also studying different book sets. Raising the issue of management direction to suit the teaching reality of teachers and students in ethnic minority areas.

(iii) With the suitability between the content of the grade 1 mathematics textbook and the implementation of teaching in reality: When asking whether teachers have to rearrange the exercises in the textbook to suit better their students, 84.4% of opinions confirmed that it is necessary to rearrange and adjust, only 16.6% never adjust.

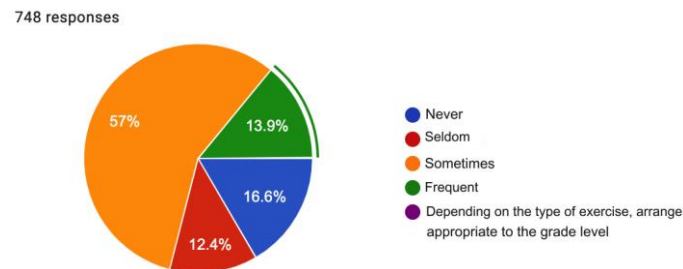


Figure 2. Percentage of teachers who had to rearrange the sequence of content in textbooks to make them more appropriate for their ethnic minority students

This shows that in reality, teaching mathematics for grade 1, teachers have to arrange and adjust the content in textbooks to suit students in ethnic minority areas. Deep Interviewing and discussing with teachers in some provinces as Bac Kan, Lao Cai, Quang Ngai related to this issue, we find out some more information as follows: Firstly, teachers think that it is necessary to adjust the content, to rearrange some exercises in the teaching process because the language materials are not suitable for ethnic minority students, the context of the situation is unfamiliar to them, the content that needs the most adjustment is the command to give a summary, many ideas that students with limited Vietnamese proficiency cannot understand, so we have to find other ways to express them to suit the language level of students. Secondly, teachers realize that in a lesson there are many knowledge units, many different types of exercises, leading to students who have not yet grasped one type of exercise but have switched to another type, making the knowledge grasp even more vague. Third, the teacher thinks that in the first weeks of grade 1, the textbook has more words than the students' level. At this time, students cannot read yet, so all the math problems require many words. Students do not understand the requirements of the problem, so the teacher has to explain to each student, leading to passivity and lack of initiative and positivity of the students.

It is clear how to rearrange and adjust the exercises in the textbook to better suit the students in their class, but how to do it effectively is still a concern for teachers. Teachers share that they mainly do it based on experience, when they see that students do not understand, they find ways to help them understand, but they have not thought about why they do it. Thus, it is very necessary to have support and training so that teachers have the skills to design teaching plans suitable for first grade students in ethnic minority areas.

- Regarding some difficulties of students in the process of learning math 1 in each topic through questionnaires and direct discussions with teachers, we found that students encounter the following difficulties:

+ When learning to count, read, and write numbers within 10/100, the main difficulties of ethnic minority students are: Counting, reading numbers in Vietnamese (19%); writing numbers backwards (77.5%); counting and stating the results after counting (21.4%).

+ When learning to compare numbers within 10/100, the main difficulties of ethnic minority students are: Using the signs $>$, $<$, $=$ to compare two numbers (44.8%); Finding the largest number, finding the smallest number in a group of no more than 4 numbers (18.9%); arranging numbers in order from smallest to largest or from largest to smallest (57.6%); using Vietnamese to state the results after comparison (28.5%).

+ When learning to add and subtract numbers within 10, the main difficulties of ethnic minority students are: Not knowing how to perform addition and subtraction (18.5%); Not being able to use addition and subtraction tables to perform calculations (54.5%); Not being able to describe situations involving addition and subtraction in Vietnamese (32.2%); Confusing addition and subtraction, plus and minus signs (49.3%).

+ When learning word problems, ethnic minority students encounter difficulties such as: Not being able to read the content of the problem (15.4%); Reading the problem but not understanding the content of the problem (55%); Not understanding the meaning of addition and subtraction (32.3%); Performing the calculation correctly but not knowing the answer (54.2%).

+ When learning about Measurement (Measuring length, reading the clock, reading the calendar,...), ethnic minority students encountered difficulties such as: Reading and writing measurements with units of length and time (30.7%); measuring length and measurement results (32.1%); Reading the correct time on the clock (15.5%); Reading the calendar and determining the day of the week (63.6%).

The good news is that out of 748 opinions asked, 64.9% of opinions said that the quality of students studying under the 2018 General Education Program is higher than that of the 2006 General Education Program, only 28.4% of opinions said that the quality is equal. This shows that overall, the learning quality of first graders studying under the 2018 General Education Program is higher than that of those studying under the 2006 General Education Program.

From the above situation, we propose some effective strategies for implementing the Grade 1 Mathematics Curriculum in ethnic minority areas.

3 Effective Strategies for Implementing the Grade 1 Mathematics Curriculum for Ethnic Minority Students

3.1 Determine the requirements of the Grade 1 Mathematics for ethnic minority students and plan an appropriate lesson plan

The requirements of the 2018 General Education Program are the result that students need to achieve in terms of qualities, abilities, and learning content that students need to achieve after each learning stage (after completing the program of each grade, each level of education, and each educational activity) [4].

At the end of grade 1, students need to meet the requirements set by the curriculum. For example, regarding natural numbers, students need to meet the requirements: Count, read, and write numbers within 10; within 20; within 100. Recognize tens and units, and round tens [2]. This is also a common requirement for all first graders nationwide, both in favorable and disadvantaged areas. However, for first graders in ethnic minority areas, the requirements can be divided into different stages with appropriate duration and level to create conditions for students to achieve by the end of the year. Based on the characteristics of the students, based on the language level of students in the area at the beginning of first grade, there will be reasonable adjustments to extend the completion time. For example, when forming numbers within 10, teaching activities need to focus on counting skills to determine quantity, reading numbers, identifying numbers, and getting the correct number cards in the learning kit so that students can form symbols of numbers firmly, and extending the time required for students to complete the skill of writing numbers correctly until students know how to count, read, and answer orally the numbers within 10, then focus on the skill of writing numbers. Or, with the requirement to compare numbers within 10, ethnic minority students often have difficulty determining which number is smaller, which number is larger, and using the symbols $>$, $<$, $=$ to express. Therefore, it is possible to extend the time to complete this requirement and have appropriate support solutions for students. For example, in the first semester, students may not be required to find the largest and smallest numbers, or arrange numbers in order from smallest to largest. In the second semester, when students' Vietnamese language proficiency is better, students may be required to compare two-digit numbers.

Determining the requirements to be achieved in accordance with students' cognitive level should be specifically stated in the school's and class's lesson plan.

3.2 Teaching focuses on basic, practical knowledge and skills related to the daily life of ethnic minority students.

On the basis of teaching, ensuring that all students achieve the requirements of mathematics in each subject of grade 1, at the same time helping students recognize the practical meaning of the lesson content and know how to apply what they have learned to solve problems in practice, in daily life at home, school and in the locality.

To fulfill the above requirements: When planning a lesson: Teachers base on the requirements in the Grade 1 Mathematics Curriculum, based on the lessons in the textbook and student characteristics; instructions from the teacher's book and other reference materials to determine the requirement of the lesson.

The requirements need to clearly identify:

- + What can students do;
- + What can students apply in the mathematics lesson to solve problems in real life;
- + What opportunities do students have to form and develop qualities and abilities (especially the components of mathematics ability)?

When designing teaching activities, it is necessary to first determine the core content of the mathematics lesson to focus on important goals; then, review and possibly rearrange the content in the lesson to create opportunities for students to participate in learning activities aimed at developing Mathematical Competence in particular and Computer and Mathematical Competence in general. The core content is determined based on the requirements of the program and the guidelines of the management agency.

For example, when teaching addition and subtraction of numbers within 10, based on the curriculum's requirements, the teacher determines that the focus of the lesson is to help students know how to perform addition and subtraction so that with each addition or subtraction of two numbers within 10, students can find the result of the calculation themselves. Therefore, activities, exercises, questions, games, etc. all revolve around this focus. The selection of exercises or tasks is also considered and arranged from easy to difficult to highlight the focus. The use of supporting teaching aids also helps students easily focus on the focus of achieving the curriculum's requirements.

Identify which mathematics content and knowledge is suitable for ethnic minority students, which content is not suitable and needs support activities. For example, teachers can adjust some content of textbooks to be more suitable for the context that ethnic minority students can understand, adjust some content so that students' learning activities focus on the core. Math content and teaching materials need to meet the diverse learning needs and levels of students and differentiated teaching requirements. The number and level of minimum practice exercises for students to achieve the requirements and expected practice exercises (not required) for students with difficulties who need support as well as opportunities for some students to develop

Main teaching activities, duration, how to perform each activity, etc

When organizing and guiding students to perform learning activities according to the lesson plan, teachers should:

- + Actively guide students to focus on basic knowledge and skills, the core of the lesson, promoting the active learning of students.
- + Appropriately use learning organization forms (individual learning, small group learning, class learning, ...) to motivate and encourage students to complete the practice exercises, drills identified for each student right in the lesson; ensure that all students achieve the requirements; create opportunities to develop math learning capacity for gifted students.

+ Flexibly adjust the learning time and provide support for each activity of each student, prioritizing support for students in difficult circumstances, so as not to prolong the lesson and help each student learn according to their own ability

3.3 Mobilize students' experiences, school and community resources to help students feel the closeness, appeal and benefits of learning Mathematics.

Mobilizing students' experiences and school and community resources will help students be interested and actively participate in learning activities, practice applying knowledge and skills of Mathematics to solve problems in learning and in life. Specifically:

a) When making lesson plan, teachers should:

- Actively choose real situations in the locality (shown in pictures, photos, models, real objects, word problems, etc.); close to students and directly related to new knowledge (in the lesson, in the practice lesson) to replace or clarify the "real content" of the new knowledge or of the practice lesson, learning game.

- Choose from the school's Math teaching aids (including Math teaching aids that have been issued, self-made, etc.) teaching aids that are suitable for the new lesson.

Attention: Note. Teachers should make the most of the teaching aids in the "List of minimum teaching equipment for Mathematics" prescribed by the Ministry of Education and Training. Make some more tools from locally available materials. Teaching aids are for students to make, manipulate and participate in activities, not just demonstration tools of the teacher.

- Plan to organize and guide students to mobilize their own experiences, with the appropriate support of visual aids and the cooperation of their friends, so that students can discover and solve the key problems of the lesson.

b) When organizing and guiding students to carry out learning activities according to the lesson plan, teachers should:

- Make planned improvements (if any) to the actual content of the lesson, practice and draw experience on:

+ The effectiveness of those improvements.

+ What experiences of students can be mobilized and how to mobilize them so that students are interested, confident, like to learn, and effectively learn new knowledge.

- Flexibly handle new situations that arise when mobilizing students' experiences to discover and solve key problems of the lesson.

- Create a file of lessons with many problems that can mobilize students' experiences, in which all kinds of documents related to the lesson are stored, collected and recorded by teachers and students, especially the experiences and initiatives of students during the learning process of that lesson.

3.4 Integrating Vietnamese language enhancement content into Mathematics lessons

Teaching mathematics to ethnic minority students must both achieve the objectives of the subject of mathematics and provide support in Vietnamese so that students can learn mathematics in Vietnamese from the beginning of grade 1.

Supporting Vietnamese for ethnic minority students in mathematics lessons is not about teaching new knowledge outside the lesson content, but about enhancing the teaching of some words, commands, expressed in Vietnamese in the mathematics lesson at the appropriate time, using appropriate methods commonly used in teaching a second language.

When planning a lesson, teachers need to:

- + Clearly and concisely define the goal of enhancing Vietnamese and write it as part of the lesson goal.
- + Plan to select and use appropriate second language teaching methods to teach the content of enhancing Vietnamese in the lesson. If using ethnic languages to support students' understanding of the lesson, be careful so that students do not rely on it but instead use Vietnamese to learn mathematics.
- + Prepare teaching aids appropriate to the chosen method (if necessary).
- + Plan the duration and time of teaching Vietnamese enhancement.

When organizing and guiding students to carry out learning activities according to the lesson plan, teachers should:

- + Teach Vietnamese language enhancement in the right place, at the right time, at the right level, in accordance with the expected duration, not turning mathematics lessons into Vietnamese lessons.
- + Enhance students' speaking, reading, and writing practice (when they already know how to read and write in Vietnamese) to regularly consolidate and review the content of Vietnamese language enhancement in Mathematics.
- + Establish an "inter-subject" connection with Vietnamese and Vietnamese language enhancement in mathematics in each class to create coordination and mutual support.

After each mathematics lesson, teachers should:

- + Attach picture cards with new words (in Vietnamese) written on the classroom wall so that students can regularly review both math knowledge and Vietnamese enhancement content.
- + Organize some activities outside the classroom (for example, reviewing old lessons in groups, quizzes, etc. in Vietnamese) to create an environment for ethnic minority students to use Vietnamese, and at the same time review Vietnamese enhancement content in Mathematics.

3.5 Multimedia applications in mathematics lessons help ethnic minority students reduce difficulties related to language barriers

Teaching with multimedia support, such as text, graphics, images, sound, video, open educational resources, virtual resources and virtual reality applications can create dynamic effects that enhance student engagement and memory [6]. Instead of merely reading, understanding, and memorizing, students can quickly and accurately grasp mathematical concepts and processes, and easily generate arguments, ideas, and immediate feedback. As a result, lessons become more interactive, capture students' attention, and not only achieve the goal of transmitting knowledge and skills but also provide opportunities for students to develop their abilities and qualities.

Educational equipment in ethnic minority regions has not kept pace with modern developments. However, with current trends, an increasing number of multimedia tools are being equipped in

classrooms. The use of multimedia to support teaching can, on one hand, convey large amounts of information in a visual and effective manner, and on the other hand, engage students' visual, auditory, and other senses to enhance learning and stimulate their interest. Visualizing learning content helps ethnic minority students reduce language barriers.

3. CONCLUSION

The 2018 General Education Program is a common program for the whole country, implemented according to a national standard level. When implementing the program in ethnic minority areas, We need to pay more attention to support, and guidance on implementation appropriate for student characteristics and local conditions.

In the context of students from different schools using different sets of textbooks, many teachers hope that the Ministry of Education and Training will soon have detailed instructions on the requirements of the 2018 General Education Program, on teaching techniques, methods, and assessment methods in the direction of developing qualities and competencies.

In addition, it is necessary to research and propose pedagogical solutions, develop materials and textbooks suitable for ethnic minority students in different regions.

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