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Effectiveness of the Teaching at the Right Level (TaRL) Program on Numeracy Skills in Adamawa State, Nigeria

By

Bulama H. James & Musa Abubakar
Dept of Computer Science Adamawa State Polytechnic, Yola.
Email: hyaandoda@adamawapoly.edu.ng. +2348065467559 Email: amusa7333@gmail.com. +234808604965

Corresponding author: hyaandoda@adamawapoly.edu.ng

Abstract

This paper examines the Effectiveness of "Training at the Right Level (TaRL)" on pupils' performance". The work assesses the competency in numeracy of pupils in Adamawa state. The study has three specific purposes - to determine the extent to which the programme is achieving its objective of improving numeracy skills for pupils; to determine the effectiveness of the programme and to assess problems associated with the general activity. Data was sourced primarily by invoking the "Pratham tool ", for assessing the numeracy" level of the pupils in grades 3-5; three (3) primary schools from the Central Senatorial Zone of Adamawa State of Nigeria, were randomly selected - Makera, Bekaji and Nassarawo - beneficiaries of the TaRL intervention scheme. Hundred (100) pupils from each of the three (3) primary schools were assessed separately using the "Pratham" Tools. The research instrument used is "Naturalistic Research" - a qualitative method, used to examine the condition of natural objects (as opposed to experiments) where the researcher is the key instrument. The results of qualitative research emphasize meaning rather than generalizations; this is achieved through - observations, tests, and documentation. Descriptive statistics was used to analyze the data recorded. A baseline assessment categorized pupils' numeracy skills into levels: Beginners, One Digit, Two Digits, Subtraction, and Division. Following the TaRL intervention, a midline assessment revealed significant improvements in pupils' numeracy skills, indicating the effectiveness of the program.

The success and encouragement recorded in Makera is replicated in Bakeji and Nassarawo primary schools alike. TaRL approach gave imaginary results and has indeed served the curative purpose as expected. The intervention of TaRL in the pilot primary schools assessed is quite reassuring.

Keywords:

Teaching at the Right Level, TaRL, Primary Education, Numeracy, Baseline, midline

1. Introduction

Despite the progress in expanding school enrollments since 1990, approximately 380 million children of primary school age are not reaching the minimum proficiency levels in reading and mathematics in the world (UNESCO, 2017). This learning crisis is particularly acute in sub-Saharan Africa, where most children are not mastering basic reading and mathematics in primary education (Bashir et al., 2018). One of the reasons for the low learning levels is a mismatch between curricula and learning. Pritchett and Beatty (2015) reviewed basic reading assessments in India, Pakistan, Tanzania, Uganda, and Kenya and found that learning progress per year of schooling was slow. In developing countries, curricula expectations are too ambitious, and the mismatch between curricula and children's learning levels expands every year of schooling.

Even though most children are left behind, teachers are required to complete the prescribed syllabus, which means that their attention tends to be selective, often focusing on a limited number of children who can keep up (Banerji, 2000; Abadzi and Llambri, 2011). The simple provision of traditional inputs in educational development like textbooks does not help the learning of children in developing countries who are left behind. Glewwe et al. (2009) revealed that the provision of textbooks written in English only benefits those children with high baseline test scores in Kenya. Since the textbooks were written in English, a third language for most students in the country, the mismatch with student achievement levels hampered most children's learning (Glewwe et al., 2009). The result suggests that the content of learning and the materials should be adjusted to students' learning levels to improve their learning. Banerjee et al. (2007) demonstrate that a program specifically targeted to weaker students improved basic reading and mathematics in India. The pedagogical approach employed in the program has been subsequently developed through a series of randomized controlled trials and is now called ''Teaching at the Right Level (TaRL)" (Banerjee et al., 2017; Pratham, 2020). Systematic reviews in educational development agree that pedagogical interventions that tailor teaching to student learning levels are effective in improving learning (Evans and Popova, 2016). It is necessary to scale up successful pilots to address the learning crisis in sub-Saharan Africa; however, the limited capacity of teachers and educational administration can hamper the process.

One of the reasons for the low learning levels is a mismatch between curricula and learning. Pritchett and Beatty (2015) reviewed basic reading assessments in India, Pakistan, Tanzania, Uganda, and Kenya and found that learning progress per year of schooling was slow. In developing countries, curricula expectations are too ambitious, and the mismatch between curricula and children's learning levels expands every year of schooling.

To address the multiple challenges to the improvement of student math learning, the Nigerian government, in collaboration with UNICEF, has developed a package of interventions: Teaching at the Right Level (TaRL). The package was developed in Pratham India. TaRL seeks to improve numeracy and literacy skills through extracurricular remedial activities. The package includes whole-class activities, group-wise activities, and individual activities. The first approach involves training teachers as facilitators, and the second involves the distribution of resources (books) to each student. Math workbooks are self-learning materials for students, and students receive workbooks that match their learning levels and study math at their own pace.

Following a successful pilot in Borno state, the government of Nigeria scaled up TaRL to public primary schools in the BAY states. The scaled-up interventions were aimed at helping the students improve their literacy and numeracy learning through extracurricular remedial activities over a period of approximately six months.

2. Literature Review

The importance of numeracy in early education has been widely documented. Studies have shown that early numeracy skills are predictive of later academic achievement (Duncan et al., 2007). Interventions like TaRL, which focus on individualized learning, have been successful in improving educational outcomes in various contexts (Banerjee et al., 2021). This section reviews the existing literature on numeracy interventions and their impact on primary education.

Numeracy education, crucial for developing mathematical understanding and skills, forms the foundation for students' future academic success and everyday problem-solving abilities. In regions with significant educational challenges, innovative pedagogical approaches are essential to improve numeracy skills among students. One such approach, "Teaching at the Right Level" (TaRL), has shown promise in various contexts, including sub-Saharan Africa and India.

Regardless of age or grade, a simple assessment tool is used individually with each child to understand where to begin as well as the level of individual children and of the group in reading and arithmetic. This data is also used for grouping children for instruction. Later in the program, similar assessments are used to track children's progress and re-strategize.

Learning goals are clearly articulated so that children, instructors and parents know what is to be achieved. For instance, in reading, the goal is to read a simple short story fluently while in arithmetic, it is recognition of three digits and proficiency in basic operations. For purpose of instruction, children are grouped according to their current learning levels identified in the assessment tool rather than by grade. As children make progress, they move to the next level group respectively. The number of groups is contingent on the availability of instructors. The pedagogy relies on combining a variety of daily activities to maximize and stimulate different kinds of learning; for example, for building number knowledge and operations – children undertake tasks that require them to listen, speak, do, read and write. Children do activities in big groups, in smaller groups and also individually. Appropriate teaching-learning materials are developed in both subjects and are used thereby providing materials for each group and their activities.

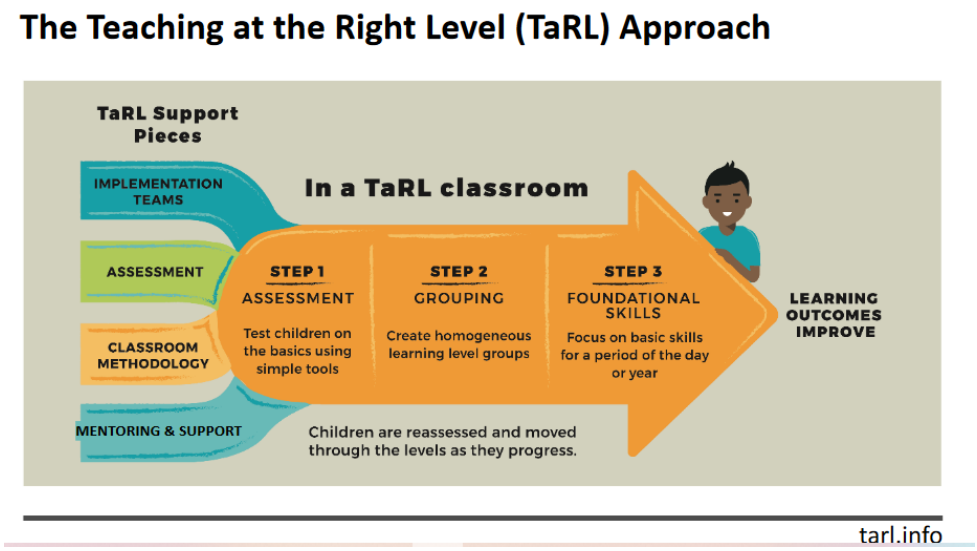

Figure 1: **TaRL Approach (A new website for Teaching at the Right Level)**

Historical Development of Numeracy Education

Numeracy education has evolved significantly over the decades. Traditional methods often focused on rote memorization and repetitive practice, which, while effective to some extent, did not always foster deep understanding or the ability to apply mathematical concepts in real-life situations. In response to these limitations, educational researchers and practitioners have developed and implemented more dynamic, student-centered approaches.

Teaching at the Right Level (TaRL)

The TaRL approach, initially developed in India by the organization Pratham, aims to address the learning crisis in numeracy and literacy through a tailored educational framework. The essence of TaRL is to assess students' learning levels and provide instruction that meets them at their level, rather than following a one-size-fits-all curriculum based on age or grade .

Core Principles of TaRL

1. **Assessment-Based Grouping**: Students are assessed to determine their current learning levels in numeracy and literacy. Based on these assessments, students are grouped by their proficiency rather than their age or grade level.
2. **Clear Learning Goals**: Specific learning objectives are set for each group, ensuring that both instructors and students are aware of the goals and can work towards them systematically .
3. **Activity-Based Learning**: TaRL employs a variety of activities that cater to different learning styles and needs, promoting engagement and better understanding. These activities range from group exercises to individual tasks, all designed to reinforce mathematical concepts and skills.
4. **Regular Monitoring and Adjustment**: Continuous assessment and monitoring allow instructors to track progress and make necessary adjustments to the teaching strategies and group compositions.

Impact of TaRL in Different Contexts

India

In India, TaRL has been instrumental in addressing the declining learning levels in numeracy and literacy. Studies have shown that children participating in TaRL programs significantly improve their basic skills in reading and arithmetic over relatively short periods. The program's success in India is attributed to its structured approach, regular assessments, and adaptive teaching methods.

Nigeria

The adaptation of TaRL in Nigeria, particularly in the BAY states (Borno, Adamawa, and Yobe), illustrates the approach's flexibility and effectiveness in different cultural and educational contexts. Following a successful pilot in Borno state, the Nigerian government, in collaboration with UNICEF, scaled up the program to other regions. The implementation involved training teachers as facilitators, providing self-learning workbooks to students, and incorporating extracurricular remedial activities .

A study conducted in three primary schools in Adamawa State demonstrated significant improvements in students' numeracy and literacy skills. The results indicated that the TaRL

intervention successfully enhanced students' abilities in basic arithmetic operations and reading comprehension.

Challenges

Despite its successes, the implementation of TaRL faces several challenges. These include the limited capacity of local educational administrations, insufficient training and support for teachers, and logistical issues related to the distribution and use of learning materials. Addressing these challenges requires a concerted effort from policymakers, educational leaders, and community stakeholders to ensure that the program's benefits are maximized and sustained.

The TaRL approach represents a significant advancement in numeracy education, particularly in regions with educational deficits. By focusing on students' current learning levels and providing tailored instructional strategies, TaRL has shown considerable potential in improving numeracy skills. Continued research and adaptation of this approach will be crucial in addressing the global learning crisis and ensuring that all students have the foundational skills necessary for their academic and personal success.

3. Methodology

The sample for this study consists of primary school pupils from several schools in Adamawa State. The selection criteria ensure a diverse representation of pupils from different socio-economic backgrounds and educational levels within the state. The schools and pupils are chosen to provide a comprehensive understanding of the program's impact across various contexts within the region.

The study employs a quasi-experimental design to evaluate the impact of the "Teaching at the Right Level" (TaRL) program on the numeracy skills of primary school pupils in Adamawa State, Nigeria.Quasi-experimental designs are used when random assignment is not feasible, allowing researchers to study the effects of an intervention in a naturalistic setting while still maintaining some level of control over confounding variables. A baseline assessment was conducted to categorize pupils' numeracy skills into levels: Beginners, One Digit, Two Digits, Subtraction, and Division. The TaRL intervention was then implemented, and a midline assessment was conducted to measure the changes in numeracy skills.

3.1 Instrumentation

Naturalistic research is the method used in this study. A qualitative method, to examine the condition of natural objects (as opposed to experiments) where the researcher is the key instrument. The results of qualitative research emphasize meaning rather than generalizations (Jennings, 2018). The purpose of using this method is to obtain data primarily based on special circumstances to ascertain their level of competency. The instrument used is a test (assessment). The tests used for literacy skills are letter cards, word cards, paragraph text, and short story texts. While that of numeracy skills include one-digit, two-digit subtraction and division. The instrument is a valid measuring instrument for all pupils under the study (grade 3-5). Thus, the results become more valid.

i. Assessment: test the pupils to identify their competency level at baseline and endline of a circle of the intervention. The Pratham assessment tools for literacy and numeracy wasused.

ii. **Observation: The teaching method and methodology of the teacher was observed and recorded during the assessment.**

iii. **Interview was administered on the teachers, basically targeting their challenges and way of making their teaching more effective.**

4. Results

The analysis of the numeracy results from the TaRL (Teaching at the Right Level) intervention in Adamawa State, Nigeria, reveals significant insights into the effectiveness of the program. Here, we delve into the specifics of the changes observed between the baseline and midline assessments.

Baseline Assessment

- **Skill Levels**: At the baseline, students were categorized into five levels based on their numeracy skills:
    - **Beginners**: Students who could not recognize or work with basic numerical concepts.
    - **One Digit**: Students who could recognize and perform operations with single-digit numbers.
    - **Two Digits**: Students who could recognize and perform operations with two-digit numbers.
    - **Subtraction**: Students who were proficient in subtraction operations.
    - **Division**: Students who had mastered basic division.

Midline Assessment

- The midline assessment was conducted after implementing the TaRL intervention, which focused on tailored instruction based on students' initial numeracy levels.

Key Findings:

1. **Beginners**:
    - **Reduction in Beginners**: There was a 2% reduction in the number of students classified as Beginners. This indicates that some students advanced from not recognizing basic numbers to recognizing and working with single-digit numbers.
    - **Implication**: This improvement suggests that the TaRL program effectively supports the development of foundational numeracy skills, enabling students to transition from complete beginners to the next level.
2. **One Digit**:
    - **Transition to Two Digits**: Approximately 16% of students in the One Digit category progressed to the Two Digits category.
    - **Implication**: This significant movement reflects the program's ability to enhance students' understanding and proficiency in handling more complex numerical operations.

3. **Two Digits**:
    - **Progression to Subtraction**: A small percentage (1%) of students progressed from the Two Digits level to the Subtraction level.
    - **Implication**: Although the increase is modest, it demonstrates that some students are beginning to grasp more advanced mathematical concepts.
4. **Subtraction**:
    - **Increase in Proficiency**: There was an 18% increase in the number of students who became proficient in subtraction.
    - **Implication**: This substantial improvement indicates that the TaRL intervention significantly bolstered students' abilities to perform basic arithmetic operations, particularly subtraction.
5. **Division**:
    - **Emergence of Division Skills**: Initially, no students were classified at the Division level. By the midline assessment, 2% of students had reached this level.
    - **Implication**: This emerging proficiency in division highlights the intervention's success in introducing and reinforcing complex arithmetic skills, even among students who initially struggled with basic numeracy.

Specific School Results

- **Makera Primary School**:
    - **Overall Improvement**: The school exhibited clear progress across all numeracy levels, with a noticeable number of students advancing from lower to higher numeracy categories.
    - **Implication**: The results suggest that the TaRL approach is particularly effective in this school, likely due to successful implementation and support mechanisms.
- **Bekaji and Nassarawo Primary Schools**:
    - **Consistent Trends**: These schools showed similar trends of improvement, with students advancing through the numeracy levels as observed in Makera Primary School.
    - **Implication**: The consistent improvements across different schools indicate that the TaRL program's principles and methods are broadly applicable and effective in various educational settings within the region.

Analysis Summary

The detailed analysis of the numeracy results reveals several key outcomes:

- **Effective Learning Gains**: The reduction in the number of beginners and the advancement of students to higher numeracy levels highlight the effectiveness of the TaRL intervention in enhancing basic mathematical skills.

- **Significant Skill Development**: The substantial increase in proficiency in subtraction and the emergence of division skills demonstrate the program's success in fostering deeper mathematical understanding.
- **Consistency Across Schools**: The positive trends observed in multiple schools suggest that the TaRL methodology is adaptable and can be successfully implemented in diverse educational environments.

The detailed analysis underscores the success of the TaRL program in improving numeracy skills among primary school pupils in Adamawa State. By assessing students' initial levels and providing targeted instruction, the intervention has enabled significant learning gains, particularly in foundational and intermediate numeracy skills. The results support the continued use and expansion of the TaRL approach to address numeracy education challenges and enhance student outcomes in similar contexts.

5. Discussion

The findings of this study are consistent with previous research on the effectiveness of individualized learning interventions. The significant improvements in numeracy skills observed in this study highlight the potential of the TaRL program to address the learning needs of primary school pupils in developing regions. This section discusses the implications of the findings and suggests areas for further research.

The education within the TaRL program in Adamawa State highlights several critical points regarding the program's implementation, impact, and areas of improvement.

1. Impact on Numeracy Skills: The TaRL (Teaching at the Right Level) program has shown a significant positive impact on the numeracy skills of primary school pupils in Adamawa State. The data collected from the baseline and midline assessments indicate considerable improvements across various numeracy levels, from basic number recognition to more complex arithmetic operations such as subtraction and division.

2. Baseline and Midline Assessments: At the baseline, many students were at the beginner level, unable to recognize single digits or perform basic arithmetic operations. The intervention helped categorize and target specific learning needs, ensuring that students received instruction appropriate to their current level of understanding. By the midline assessment, there was a marked improvement, with many students advancing to higher numeracy levels. This progression demonstrates the effectiveness of the tailored teaching approach employed by TaRL .

3. Challenges and Limitations: Despite the successes, the program faced several challenges. One of the primary issues was the initial low baseline performance of the pupils, which indicated a substantial gap in their foundational numeracy skills. Additionally, the implementation faced logistical challenges such as ensuring consistent attendance and engagement from the pupils, and adequate training and support for the teachers.

4. Teacher Training and Support: Teacher training was a critical component of the TaRL program. The success of the intervention relied heavily on the ability of teachers to deliver the curriculum effectively and adapt their teaching methods to the needs of their students. The program included regular training sessions and support from mentors and supervisors, which helped maintain the quality of instruction and provided ongoing professional development for the educators involved.

5. Community and Stakeholder Involvement: The involvement of various stakeholders, including parents, local government authorities, and educational administrators, was essential for the program's success. Efforts to engage these stakeholders helped create a supportive environment for the students and ensured that the program received the necessary resources and attention. The positive feedback from the community also played a role in sustaining the program and encouraging continuous improvement.

6. Recommendations for Future Implementation: The report suggests several recommendations for enhancing the effectiveness of the TaRL program in the future. These include expanding the program to more schools and regions, providing ongoing training and resources for teachers, and implementing regular monitoring and evaluation to track progress and address any emerging challenges. Additionally, fostering a stronger collaboration between schools, parents, and the wider community is recommended to support students' learning outside the classroom.

The TaRL program in Adamawa State has made significant strides in improving numeracy skills among primary school pupils. The tailored approach to teaching and the strong support system for teachers and students have been key factors in its success. However, continuous efforts are needed to overcome challenges and ensure that all students have the opportunity to reach their full potential in numeracy.

6. Conclusion

The TaRL program has proven to be an effective intervention for improving numeracy skills in primary school pupils in Adamawa State, Nigeria. The tailored teaching methods enabled pupils to progress from basic to more advanced numeracy levels. Further research is recommended to explore the long-term impact of the program and its potential scalability to other regions.

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