The Impact of TaRL Approach on Learning Convergence of Numerical Sequences: A Case Study in the Moroccan Educational Context

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Abstract: *Teaching at the Right Level (TaRL) is an emerging and widely implemented remedial educational approach that is currently being piloted in many countries. Morocco has been experimenting with this approach since the 2022-2023 school year. This study aims to assess the effectiveness of using the TARL approach as a remedial model in addressing learning difficulties in the convergence of numerical sequences among 2nd-year baccalaureate students in the experimental sciences series in Morocco. To achieve this goal, a written test consisting of 6 questions related to the concept of convergence of a numerical sequence was administered to 60 students in two cycles to measure the efficacy of this approach. Furthermore, it is worth mentioning that the TaRL approach also resulted in a significant decrease in the number of errors between the two evaluation cycles. This indicates that students not only improved their understanding of the convergence of numerical sequences but also were able to correct and reduce their errors through the implementation of this tailored pedagogical approach. This suggests that TaRL was effective in the learning of convergence of numerical sequences in secondary education according to the Moroccan educational system. In this context, it is essential to apply the TaRL approach more widely in the Moroccan education system. The promising results of this study highlight the advantages and effectiveness of the TaRL approach in teaching the convergence of numerical sequences. By applying it on a wider scale, we can expect this approach to benefit a greater number of Moroccan students, by remedying the specific difficulties they encounter in this area.*

Keywords: TaRL approach, numerical sequences, convergence, pedagogical content knowledge

INTRODUCTION

In the realm of numerical sequences, the concept of convergence poses significant challenges for students, particularly those in the second year of scientific baccalaureate. Lamaizi El Mahdi's (Lamaizi et al., 2024) article sheds light on the difficulties encountered by these students in grasping the intricacies of convergence. Additionally, according to the results of the latest *Progress in International Reading Literacy Study* (PIRLS) (Binaoui et al., 2022; International Association for the Evaluation of Educational Achievement [IEA], 2017),a significant percentage of Moroccan pupils have difficulty with mathematics. Furthermore, Morocco scored 368 in mathematics and 377 in science. These scores are still well below the required thresholds of 420 in mathematics and 410 in science.

Teaching at the Right Level (TaRL) underwent an initial evaluation by the Moroccan Ministry of Education (Moroccan Ministry of National Education [MMNE], 2022), the evaluation assessed the implementation and effectiveness of the project in improving educational outcomes. It highlighted positive results and emphasized the importance of ongoing monitoring and evaluation for continuous improvement. The project aims to tailor instruction to student's competency levels, promoting student engagement and individualized learning. This innovative program, launched in April 2022 as part of the 2022-2026 "road map," places "the pupil" and "the teacher" at the core of educational procedures (Moroccan Ministry of National Education [MMNE], 2022). The primary objective of the program is to mitigate challenges in reading and arithmetic encountered by students at the primary level. It aims to facilitate students' acquisition of fundamental knowledge in mathematics, Arabic, and French languages through the implementation of interactive activities and pedagogical games. Additionally, the program emphasizes the enhancement of the teacher-student relationship. During the first three weeks of the 2022-2023 academic year, this program had a positive impact on more than 15,000 students enrolled in 200 educational institutions situated in rural and semi-urban areas, allowing them to benefit from its provisions and support. The project involved the training of 51 educational advisors and 600 teachers to ensure effective implementation and monitoring. In the upcoming phase, the program aims to reach 100,000 students and involve 6,000 teachers (Moroccan Ministry of National Education [MMNE], 2022).

The TaRL approach was developed by Pratham, an Indian non-profit organization, in response to the identification of "left-behind" students who, despite being in higher grades, still struggle with fundamental competencies such as reading and arithmetic (Banerji & Chavan, 2020). The TaRL approach traces its origins back to the Balsakhi program, a randomized control trial conducted between 2001 and 2004. The Balsakhi program encompassed "pull-out" classes integrated within regular school hours, with a specific emphasis on enhancing fundamental reading and arithmetic skills. The program has resulted in significant improvements.

The TaRL approach encourages students to work at their own pace, providing additional resources or individualized support according to their specific needs related to learning the convergence of numerical sequences. Indeed, the TaRL approach can be efficient in the Moroccan context at the secondary school level to overcome learning difficulties in the convergence of numerical sequences. To confirm or reject this conjecture, practical investigations were carried out. This situation raises an interesting problem: What is the impact of the TaRL approach on the understanding of convergence of numerical sequences among students with learning difficulties in this domain? Is TaRL approach effective in overcoming learning difficulties in the convergence of numerical sequences?

This research study was conducted at the commencement of the 2023/2024 academic year to evaluate the feasibility of introducing the Teaching at the Right Level (TaRL) approach in the Moroccan context. The study specifically targeted a sample of 60 students from the 2nd year of the Baccalaureate program, specializing in experimental sciences with a focus on physics and an option in French. These students were selected from two classes at Lefkih Tetouani High School in the city of Sale. In addressing this question, we want to check whether TaRL approach is really efficient in surmounting the obstacles associated with learning the convergence of numerical sequences in the Moroccan context, discussed in the article by Lamaizi El Mahdi (Lamaizi et al., 2024). We also hope to check if the results of our study are compatible with the results of (Moroccan Ministry of National Education [MMNE], 2022), which states that TaRL has been effective at the regional level in achieving the objectives set as a remediation procedure. This article focuses on the implementation of the TaRL approach as a remediation model for addressing obstacles related to the convergence of numerical sequences in the 2nd year of the baccalaureate, experimental science series.

LITERATURE REVIEW

The literature review on the TaRL approach highlights several key aspects of this educational approach. Firstly, the study conducted by Banerjee, Banerji, Berry and Duflo (Banerjee et al., 2016) provided strong evidence for the effectiveness of TaRL in India. Through randomized evaluations, the study demonstrated that TaRL had a positive impact on students' learning outcomes. The results showed significant improvements in foundational skills such as reading and numeracy.

Additionally, Vromant, Kuppens and Hazemba (Vromant et al., 2021) examined the issue of scaling up TaRL. Their analysis revealed that TaRL could be successfully implemented in different educational contexts. However, they also highlighted the challenges associated with scaling, such as adapting the approach to the specific needs of students in different environments. The work of Widodo and Indraswati (Widodo & Indraswati, 2022) focused on designing inclusive literacy and numeracy learning in primary schools using the TaRL approach. Their research emphasized the importance of creating inclusive learning environments that consider individual students' needs. They also highlighted the effectiveness of the TaRL approach as a pedagogical tool to help students develop their reading and numeracy skills.

Lastly, the research by Banerji and Chavan (Banerji & Chavan, 2020) examined the longstanding partnership between Nobel laureates and Pratham in India, who collaborated to implement the TaRL approach. Their study highlighted the positive and sustainable impact of TaRL on students' educational outcomes. They emphasized the importance of collaboration between researchers and practitioners to enhance the effectiveness of educational interventions. In summary, the synthesis of these studies underscores the effectiveness of the TaRL approach in improving students' reading, numeracy, and overall literacy skills. It also emphasizes the significance of scaling up TaRL to reach a larger number of students. Furthermore, designing an inclusive learning environment and fostering collaboration between researchers and practitioners are key elements to maximize the benefits of the TaRL approach and enhance students' educational outcomes.

The article by Arnal-Palacián and Claros-Mellado (Arnal-Palacián & Claros-Mellado, 2022) explores how pre-service teachers understand and approach the concept of the infinite limit of a sequence. The study focuses on two main perspectives: Specialized Content Knowledge (SCK) and Advanced Mathematical Thinking (AMT). By employing an exploratory qualitative approach with a sample of twelve future teachers, the research aims to identify and classify the difficulties associated with this mathematical concept. The findings reveal that pre-service teachers predominantly rely on algorithmic procedures to solve tasks involving infinite limits, although they tend to adopt more intuitive explanations when teaching these concepts to students. The study highlights several challenges, including epistemological, didactic, and cognitive obstacles that pre-service teachers face. Additionally, the authors emphasize the importance of using multiple representations graphical, numerical, algebraic, and verbal to develop a comprehensive understanding of the infinite limit. The research concludes that enhancing pre-service teachers' SCK and AMT through targeted training can improve their ability to teach complex mathematical concepts effectively.

Furthermore, The results of Fernández-Plaza and Simpson (Fernández-Plaza & Simpson, 2016) suggest that a lack of integrated teaching approaches contributes to students' confusion, and the study calls for instructional strategies that emphasize the interconnectedness of these limit concepts to foster a more cohesive understanding. Additionally, the article of Pérez-Montilla and Arnal-Palacián (Pérez-Montilla & Arnal-Palacián, 2023) examines the role of teacher educators' pedagogical content knowledge (PCK) in fostering the development of professional noticing among pre-service teachers. Professional noticing is the ability to observe and interpret students' mathematical thinking effectively. The study emphasizes the importance of PCK in helping teacher educators design and implement instructional strategies that enhance pre-service teachers' skills in identifying, interpreting, and responding to student thinking. By focusing on the integration of theoretical knowledge and practical application, the article highlights the critical components of PCK that contribute to the effective preparation of future teachers. The findings suggest that a deliberate focus on developing professional noticing can significantly improve the instructional practices of pre-service teachers, ultimately leading to better student outcomes in mathematics education.

The article by Sierpinska (1985) explores the epistemological obstacles that students encounter when learning the concept of limits in mathematics. It delves into the cognitive and conceptual challenges that impede students' understanding and provides insights into the nature of these difficulties. By analyzing these obstacles, Sierpinska aims to improve teaching strategies and enhance students' comprehension of mathematical limits.

THEORETICAL FRAMEWORK:

In this section, the theoretical framework is based on a description of the TaRL approach and the PCK model, as well as an explanation of these two cycles.

TaRL Approach

TaRL is an instructional approach that aims to tailor teaching based on individual students' competency levels, developed by the Indian NGO Pratham, enables children to quickly acquire basic reading and arithmetic skills (Lakhsman, 2019). Regardless of age or school level, teaching begins at the child's level (Pratama et al., 2024). This approach recognizes that students may have varying levels of proficiency within the same classroom and that a one-size-fits-all approach may not meet the specific needs of each student. The primary goal of TaRL is to ensure that students genuinely grasp the concepts being taught and acquire the necessary skills before progressing to more advanced levels of learning. To achieve this, TaRL divides students into homogeneous groups based on their competency levels rather than relying solely on age or grade level. Within each group, teachers employ methods and resources that are appropriate for the students' proficiency levels. They may use explicit instructional materials, hands-on activities, and exercises designed to reinforce core skills. Emphasis is placed on repetition, regular practice, and the use of concrete examples to facilitate concept comprehension. TaRL also emphasizes ongoing assessment of students' progress. Teachers employ formative assessments to identify individual students' gaps in understanding and adjust their instruction accordingly. This allows additional support to be provided to students who need it, helping them progress at their own pace. Studies and evaluations of the TaRL approach have shown promising results. Students who benefit from this approach tend to demonstrate significant improvements in academic skills, increased motivation, and enhanced self-confidence. Furthermore, TaRL promotes greater equity in education by enabling students with different competency levels to receive instruction tailored to their individual needs. In conclusion, TaRL is an instructional approach that customizes teaching to match students' competency levels. With homogeneous groups, adaptable methods, and ongoing assessment, this approach fosters better concept comprehension, academic progress, and greater equity in education.

PCK MODEL

The PCK model is a theoretical framework developed in the field of education to describe and understand the specific knowledge and skills required by teachers to effectively teach a specific content (Tumurang & Tumurang, 2019). The PCK model proposes two distinct cycles to support teaching development and improvement (Arikunto, S., 2021). The first cycle consists of the stages of planning, acting, reflecting, and observing, while the second cycle includes revised planning, reflection, action, and observation (Berry et al., 2015).

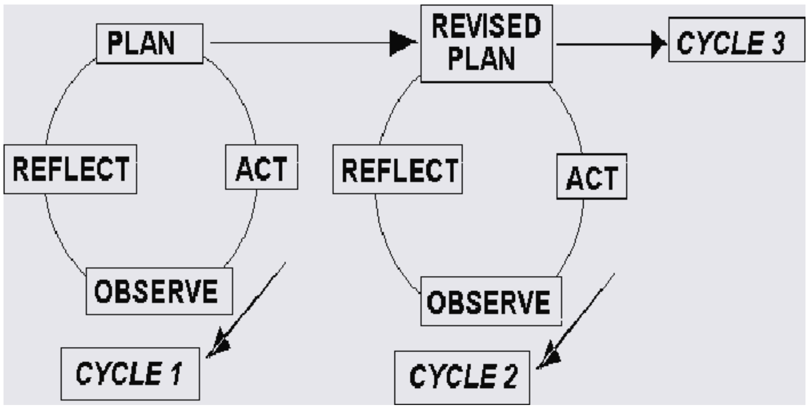

Figure 1. Design of PCK (Arikunto, S., 2021)

In the first cycle, planning is a crucial initial step. Teachers engage in a thorough study of the specific content they intend to teach and develop a teaching plan by integrating their general and content-specific pedagogical knowledge. This rigorous planning ensures coherent organization and adequate structure for instruction. Next comes the action stage, where teachers implement their teaching plan by conducting the planned learning activities and providing guidance to learners. They have the opportunity to put their content-specific pedagogical knowledge into practice and create an environment conducive to student learning. After acting, teachers move to the reflection stage. They closely observe classroom interactions, collect data on teaching and learning, and reflect on their practice. This reflection enables teachers to assess the effectiveness of their teaching, analyze student-learning outcomes, and identify strengths and weaknesses in their pedagogical approach (Listyaningsih et al., 2023). See Figure 1.

Finally, teachers proceed to the observation stage, where they gather additional information on teaching and learning. This may involve observing their own practices, using qualitative and quantitative data, and seeking student feedback. The additional observations help teachers consolidate their reflections and make informed decisions to improve their practice.

In the second cycle, teachers revise the initial plan, taking into account the reflections and observations made in the first cycle. They adjust their teaching, modify learning activities, or adapt strategies to better meet the needs of learners. After revising the plan, teachers again move to the reflection stage, where they evaluate the effectiveness of their adjustments and analyze student-learning outcomes. This deep reflection allows them to continue improving their teaching and making informed decisions to maximize student learning. Next, teachers take action, implementing the planned adjustments and conducting new learning activities. They are able to leverage their new reflections and continue providing relevant guidance to learners.

Finally, teachers return to the observation stage, where they once again gather information on teaching and learning to assess the impact of their adjustments. This ongoing observation enables them to maintain an iterative cycle of reflection and improvement, using the collected data to inform their future pedagogical decisions. In summary, the two cycles of the PCK model, with their distinct stages, provide a solid framework for teachers' professional development. The successive cycles of planning, action, reflection, and observation allow teachers to enhance their pedagogical content knowledge and continually improve their practice to teach more effectively and meet the needs of learners.

METHOD

This type of research is classified as classroom action research (PCK). According to Kusnadar, PCK is a scientific activity conducted with the aim of improving the quality of learning through multiple cycles of collaboration, including design, implementation, observation, and reflection on actions (Cahyani et al., 2021). We used a mixed-methods approach, combining quantitative and qualitative methods. Quantitative data in the form of student responses were analyzed using descriptive analysis techniques and will be presented in percentage form.

A mixed-methods approach was employed combining both quantitative and qualitative techniques. Initially, a test comprising six questions was administered, and students were subsequently grouped into six groups based on their performance observed. The results of the initial test are documented in the article by Lamaizi (Lamaizi et al., 2024). Following this, the TaRL approach was implemented, and the same test was re-administered. Quantitative analysis involved measuring the percentage of errors, while qualitative analysis focused on the students' written responses. A significant reduction in errors was observed, demonstrating the effectiveness of the TaRL approach in enhancing student performance.

Choice of population

The test is designed for students aged between 17 and 18 years old, in the 2nd year of the baccalaureate in the experimental sciences, physical sciences stream French option, in the 2023-2024 school year, who number 60 and represent two classes at the Lefkih Tetouani secondary school in the town of Sale in the Rabat-Sale-Kenitra regional education and training academy.

Test elaboration

The test we submitted to the students is the same as the one in Lamaizi El Mahdi's article (Lamaizi et al., 2024), which shows the percentage of errors made by the students in each of the 6 questions.

Questions	Capabilities required
Q1. If you had to explain a convergent sequence to one of your classmates. What would you say?	*Recognize the definition of a convergent sequence.
Q2. Let's consider the sequence (w_n) defined by: $w_n = \ln(u_n)$ such that: $\lim\limits_{n\to+\infty} u_n = 1$ and $(\forall n \in \mathbb{N}) : u_n > 0$. Determine $\lim\limits_{n\to+\infty} w_n$.	*Recognize a sequence of type: $v_n = f(u_n)$ and determine its limit.
Q3. Study the convergence of the sequence (u_n) defined by: $(\forall n \in \mathbb{N}) : u_n = \frac{2n-3}{3n+2}$.	*Study the convergence of a numerical sequence.
Q4. Let's consider the sequence (w_n) defined by: $(\forall n \in \mathbb{N}^*) : w_n = \frac{\sin(n)}{n}$. What can we say about the nature of convergence of the sequence (w_n)?	*Use convergence criteria to determine the limit of a numerical sequence.
Q5. . Let's consider the sequence (v_n) defined by: $(\forall n \in \mathbb{N}) : v_n = \frac{2^n - 4^n}{4^n + 3^n}$. Calculate the limit: $\lim\limits_{n\to+\infty} \frac{2^n - 4^n}{4^n + 3^n}$. What can we say about the convergence of the sequence (v_n).	*Limit of geometric sequence (q^n).
Q6. Let's consider the sequence (u_n) defined by: $u_0 \in [0,1]$. $u_{n+1} = \frac{u_n}{2} + \frac{u_n^2}{4}$. a. Is (u_n) a convergent sequence? b. Determine the limit of the sequence (u_n).	*Recognize a sequence of type: $u_{n+1} = f(u_n)$ and determine its limit.

Table1. Test on the convergence of a numerical sequence

RESULTS

In this section, we present the results of the test with the number of errors made by the students in each question.

Cycle 1

The distribution of tested students in Cycle 1 is presented in Figure 2, based on the error situation for each question.

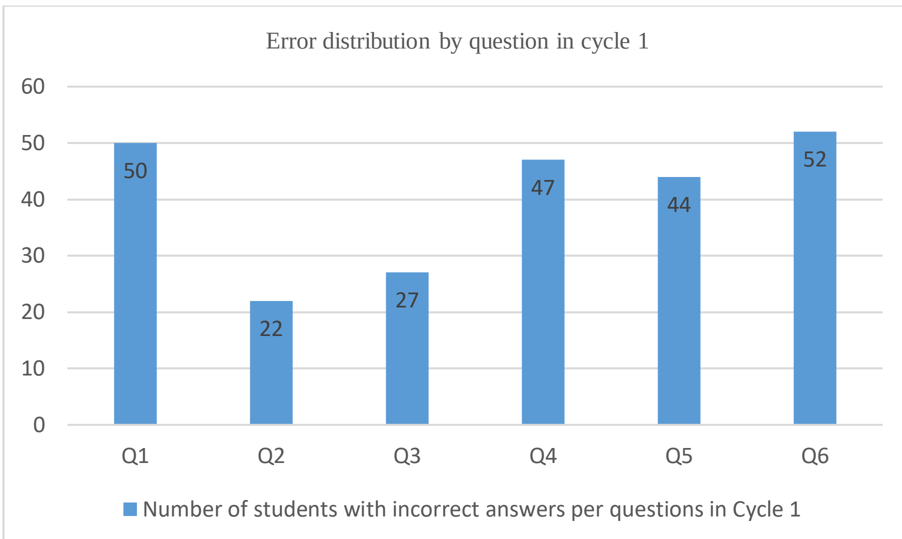

Figure 2. Error distribution by question in cycle 1

An analysis of data collected from 60 students reveals variations in the distribution of errors across the different questions examined in Figure 2. Among the six questions, question 1 exhibits the highest frequency of errors, with 50 errors committed by the students. This observation suggests considerable difficulties encountered by a significant percentage of the sampled students in understanding this particular question. Similarly, question 6 also stands out due to its notable number of errors, totaling 52. This finding indicates that a substantial number of students found this question particularly challenging. Questions 4 and 5 also exhibit relatively high levels of errors, with 47 and 44 errors recorded, respectively. These results imply significant hurdles faced by students in comprehending these questions. In contrast, questions 2 and 3 exhibit relatively lower numbers of errors, with 22 and 27 errors, respectively. These figures suggest that these questions were relatively more accessible to students compared to the other questions. The analysis of error distribution reveals significant disparities in understanding the concept of convergence of a numerical sequence across the different questions. Identifying these variations raises inquiries into the factors contributing to these outcomes, prompting an examination of the errors made by students through an analysis of associated obstacles and the utilization of a questionnaire administered to qualified secondary school teachers.

Cycle 2

The distribution of tested students in Cycle 2 is presented Figure 3, based on the error situation for each question:

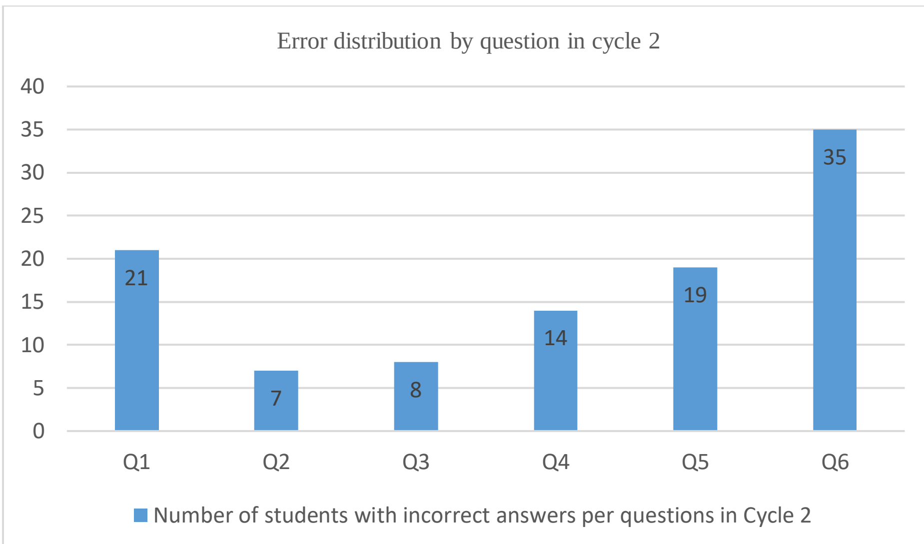

Figure 3. Error distribution by question in cycle 2

The analysis of the number of errors committed by students in each question provides valuable insights into their understanding of convergence of numerical sequences. When examining the results, it is evident that certain questions posed greater difficulties than others did. Question 6 stands out as the most challenging, with 35 errors made by students out of a total of 60. This indicates that nearly 58% of the students struggled with comprehending this specific question. Understanding the reasons behind these errors is crucial in order to tailor teaching methods and provide additional support to the students. Similarly, question 1 presented significant difficulties, with 21 errors recorded. This represents approximately 35% of the students who had difficulty grasping the concepts related to this question. Exploring alternative teaching methods that can help students had better understand this specific aspect of convergence of numerical sequences is important. On the other hand, questions 2 and 3 generated a relatively low number of errors, with only 7 and 8 errors respectively. This suggests that these questions were relatively more accessible to the majority of students. It would be interesting to analyze the reasons for this better understanding in order to apply effective pedagogical approaches to other aspects of learning convergence of numerical sequences. In conclusion, the analysis of error distribution in each question reveals significant differences in students' understanding of convergence of numerical sequences. These findings highlight the importance of considering these variations when developing teaching strategies to address specific difficulties encountered by students and promote a better understanding of this complex mathematical concept.

We employed the Mann-Whitney U test to examine the variance in error rates per question across different pedagogical approaches. This non-parametric test allows us to discern any significant differences in student performance between the instructional methodologies. By analyzing the ranks of errors made, we can determine which approach, if any, yields a statistically distinct impact on students' learning outcomes. We set a stringent significance level of 1% ($\alpha = 0.001$) to ensure a high level of confidence in our statistical findings, compared to the conventional 5% threshold commonly used in the scientific community.

	Q1	Q2	Q3	Q4	Q5	Q6
Total N	120	120	120	120	120	120
Mann-Whitney U	858,5	1340,5	1221,5	828	998,5	1182
Asymptotic Sig. (2-sided test)	0,000	0,001	0,000	0,000	0,000	0,001

Table 2. The results of the Mann-Whitney U

The results of the Mann-Whitney test for each question (Table 2) indicate a statistically significant difference between the two cycles of students for all questions. For Question 1, the Mann-Whitney U is 858.5 and the associated p-value (Asymptotic Sig.) is 0.00. This suggests that there is a significant difference between the groups in their responses to this question. The test results indicate that the two cycles of students differ significantly in their performance for this question. Similarly, for Questions 2, 3, 4, 5, and 6, the associated p-values are all below 0.05, indicating a significant difference between the two cycles of students for these questions. The test results suggest that the students' performances differ significantly between the two cycles for each of these questions.

DISCUSSION

The results indicated that the use of the TaRL approach improved student performance, and proved to be more efficient than the Moroccan education system's use of competency-based teaching, which emphasizes the development of student key competencies. The TaRL approach to teaching the convergence of numerical sequences gives teachers the freedom to teach with freedom according to students' level of acquisition. According to Suharyani et al. (2023), the TaRL approach can be implemented by teachers to provide learning adapted to learners' skill level, ensuring that it is equivalent to their level of ability. Students were divided into 3 groups to help us provide guidance according to each group's ability. Overall, it is evident that both cycles faced similar challenges, as the questions that posed the greatest difficulties in Cycle 1 also presented difficulties in Cycle 2. However, it is noteworthy that in most questions, Cycle 2 displayed a lower number of errors compared to Cycle 1. This may indicate an improvement in understanding and skills among the students between the two cycles. Question 1 showed a significant reduction in the number of errors, decreasing from 50 in Cycle 1 to 21 in Cycle 2. This suggests that students were able to better grasp the concepts related to this question after receiving additional teaching or revision. Similarly, Questions 2, 3, 4, and 5 also recorded a decrease in the number of errors between the two cycles, indicating an overall improvement in student understanding. However, Question 6 showed a slight increase in the number of errors in Cycle 2 compared to Cycle 1. This could indicate that this specific question continues to pose difficulties even after an additional cycle of learning. In conclusion, the results suggest that Cycle 2 exhibited an improvement in understanding of convergence of numerical sequences compared to Cycle 1, with a reduction in the number of errors in most questions. However, further efforts may be needed to address persistent challenges, such as Question 6, in order to provide additional support to students in their learning of this complex mathematical concept.

The attainment of high-quality learning outcomes is closely intertwined with the effectiveness of the learning process. Trigwell and Prosser asserts that enhancing the quality of learning outcomes can be achieved through the establishment of an academic environment that promotes deep learning (Trigwell & Prosser, 1991). This entails not only expanding the educational context but also fostering a conducive learning environment that encourages students to engage in meaningful and transformative learning experiences. It is important to note that our results are in line with those of the Moroccan Ministry of Education, which carried out an initial evaluation of the pilot project (TaRL) (Moroccan Ministry of National Education [MMNE], 2022). They stated that TaRL is efficient at primary level, but we applied it at secondary level on the convergence of numerical sequences.

The limitations associated with our study included a scarcity of pedagogical materials (a laptop and a data visualization device, along with a few educational tools), schedule overlaps with regular classes, and teaching sessions held after official school hours, which resulted in some student fatigue. Additionally, absenteeism hindered the progress of providing support to absent students. However, it is worth noting that each absent student missed only one session, which mitigated the impact of support provided to absent students, not forgetting the limitations associated with the sample size of 60 students. To address this issue, a questionnaire was administered to teachers with the aim of validating the classification of obstacles related to the errors made by students. By collecting additional data from educators, we were able to strengthen the reliability of our conclusions, confirming the identified obstacles and gaining a more comprehensive understanding of the challenges faced by students.

CONCLUSION

This study concludes that the use of the TaRL approach is effective as a remedial procedure for addressing the challenges associated with learning the convergence of numerical sequences in the Moroccan educational system. The TaRL approach is characterized by adapting instruction based on students' competency levels, allowing for more targeted and individualized learning. By identifying specific gaps in students' understanding and providing personalized support, this approach promotes a better grasp of concepts related to the convergence of numerical sequences. As such, the TaRL approach proves to be an effective strategy for improving learning outcomes in this area within the Moroccan educational system. Furthermore, the reorientation of instruction based on TaRL has yielded significant benefits for over 60 million students in India and Africa (Abdul Latif, 2023). This research will provide crucial insights for tailoring future interventions to meet students' learning needs in the context of convergent numerical sequences. It will enable teachers to design more effective pedagogical strategies, develop tailored resources, and provide personalized support to help students overcome challenges and succeed in this specific area of mathematics. The utilization of the TaRL approach offers promising perspectives for enhancing student learning by adapting instruction to their specific needs, promoting engagement and motivation, providing individualized tracking, and achieving a wide-reaching impact.

For future research, it would be valuable to explore the long-term effects of the TaRL approach on student learning. Additionally, comparing the effectiveness of this method across different demographic groups could provide valuable insights into its adaptability and impact. These studies would help refine teaching strategies and optimize the application of TaRL in various educational contexts. Finally, this article should serve as an informative source for teachers regarding the effects of the TaRL approach in the Moroccan education system and its potential application in other countries. This study encompasses a range of remedial approaches in mathematics.

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