

Improving learning outcomes in literacy and numeracy: the experience of the former Yugoslav Republic of Macedonia



Introduction

This document presents the former Yugoslav Republic of Macedonia's journey on the path to improving literacy and numeracy learning outcomes for students in primary school through the implementation of a nation-wide teacher education programme: the **Teacher Education Programme on Early Literacy and Early Numeracy**. It describes the overarching approaches, highlights their innovative components, documents results and highlights success factors and lessons learnt that could be useful to support other countries embarking on the same journey.

Programme overview

The literacy and numeracy programme was conceived in response to repeated low student achievement in international assessment tests such as PISA, PIRLS and TIMSS and to the weak mechanisms in place to support learners lagging behind or not performing to the best of their abilities. The system and teachers in particular had generally low expectations for students and little attention was paid to those not mastering the language of instruction, such as Roma children.

PISA 2000 ranked the former Yugoslav Republic of Macedonia 38th out of 41 countries. 71% of students did not reach Level 2 in reading, which corresponds to the basic proficiency level.

The Programme was conceptualised as a Teacher Education Programme aiming to improve students' outcomes in early literacy and early numeracy by developing teachers' understanding of what constitutes quality instruction in numeracy and literacy and by equipping them with the necessary skills for effective teaching and learning. The objectives of the programme were to:

- Establish effective and sustainable approaches to teacher professional development;
- Deepen teachers' understanding of quality teaching in numeracy and literacy;
- Maximise on-the-job support to encourage teachers to change their classroom practices;
- Improve students' outcomes in early numeracy and literacy and results in future international assessments.

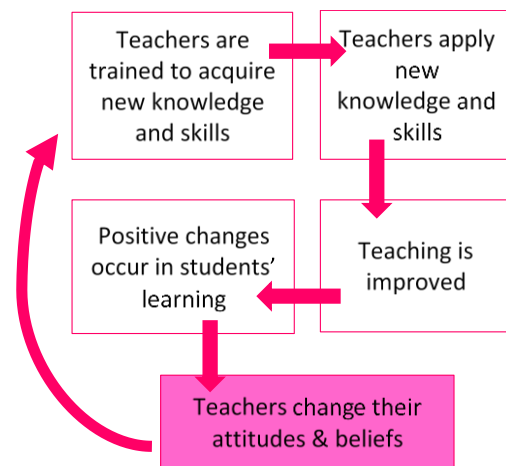
The programme was managed by the Bureau for the Development of Education (BDE)¹ under the leadership of the Ministry of Education and with financial and technical support from UNICEF. A local NGO, the Macedonian Centre for Civic Education provided research, logistics and expert support.

The teacher professional development model followed was inspired by the *Core Conceptual Framework for Effectiveness Studies of Professional Development* (Desimone, 2009) that identifies core features of professional development (content focus, active learning, coherence, duration and collective participation), intermediate outcomes (teacher learning and instructional change) and final outcomes (improved student learning) mediated in the particular context in which it occurs (Westrick, 2012).

The programme was underpinned by a simple theory of change: when teachers see improvement in their students' learning following a change in their classroom practice, only then does attitudinal change occur, solidifying teaching improvement based on the new skills acquired.² This means that it is not the professional development alone that changes teachers' attitudes and beliefs but the experience of successful implementation of new skills.



Theory of Change



After review of curricula and teaching practice in mathematics and language for early grades, international best practices were identified to support the shaping and the content of the programme in FYR Macedonia. "Thinking Mathematics in Early Grades"—developed by the American Federation of Teachers was selected for use in the country; the teacher education programme for literacy was developed by Miske Witts & Associates.

The training approach

The programme aimed to reach a critical mass of teachers in order to ensure the institutionalisation of the methodology in schools and to maximise the sustainability of results. To achieve this a teacher training cascade model was implemented. To avoid the usual pitfalls of such a model, the approach was complemented by a teacher professional development strategy which included:

- embedding professional development and career advancement in the cascade training process, and
- maximising support to teachers at school level to change their instructional practice through: (i) opportunities to practice their new skills and to reflect on their practice,

¹ The BDE is responsible for in-service teacher training and advisory support at school level.

² Guskey (2002). Professional Development and Teacher Change. Teachers and Teaching: theory and practice, Vol. 8, No. 3/4, 2002.

(ii) continuous support from trainers, (iii) improved feedback from BDE advisors, and through (iv) the establishment of Regional Learning Teams (RLTs).

Teacher training was content focussed, interactive and provided opportunities for teachers to reflect and collaborate with each other. Trainees were asked to develop their own vision of a high quality literacy/numeracy classroom: what teachers do, what students do and what classrooms are like.

National trainers

The cascade training model was based on the recruitment of 90 national trainers and 30 BDE advisors for numeracy and for literacy.

The National Trainers were recruited through a public call. This ensured that the best teachers were selected nationwide in a transparent manner, based on clear criteria. Only motivated teachers applied, in full understanding of how demanding the programme would be.

National trainers received 3 times 5 days of extensive training alongside BDE advisors, which contributed to building up a shared understanding and a common language between advisors and trainers to address literacy and numeracy instruction.

Cascade training

National trainers first trained all early grade teachers (Grade 1 to 3) within their school and within one neighbouring school in both numeracy and literacy. They then trained four school trainers (two in literacy, two in numeracy) in remaining schools. All school trainers were responsible for training the remaining teachers in their respective schools. Teachers were not trained in literacy and numeracy in the same year to avoid overburden. While initially only teachers from grades 1 to 3 were targeted, teachers from

grades 4 to 6 were later included as all primary teachers may be required to teach early graders.

Practice change support

The training approach was geared towards classroom application of the newly acquired knowledge and skills to bring about instructional change.

To support this process, the teacher education programme was implemented so that trainees could practice their new skills and assess the relevance and effectiveness of the new pedagogical approaches in between training sessions.

Throughout the training process, BDE advisors, national trainers and school trainers supported all trained teachers in implementing the new literacy and numeracy approach in their classrooms and schools. This was done through classroom observations, feedback and school meetings to discuss specific themes, exchange ideas and share experience.

The fidelity tools

Three fidelity tools in reading, writing and mathematics were designed to assess whether and how teachers were implementing the new literacy and numeracy teaching strategies. The fidelity tools are organised around a number of indicators and teaching principles for which the observer collects and records evidence during the class observed. The evidence serves as the basis for discussion and feedback with teachers. The indicators can also be used by teachers as a checklist to ensure they are drawing from a range of new strategies made available to them through the programme. The fidelity tools have been used by BDE advisors before being gradually adopted by the Regional Learning Teams and schools.

Regional Learning Teams

Regional Learning Teams (RLTs) were set up in 2013 as a professional networking mechanism to offer teachers an opportunity to deepen their professional competences in the area in which they were trained and to receive extra support as they change their practice.

Through RLTs, teachers, school trainers, national trainers, BDE advisors and academics exchange experiences, support learning across schools and review and assess best practices and materials. Based on the fidelity tools, areas for improvement are identified and discussed drawing on the RLTs' expertise and external expertise where necessary. RLTs meet four to six times per year and must report on the impact of the programme on teachers' practices and students' learning based on evidence. RLTs also provide an opportunity for academics to get involved in action research on pedagogical innovation.

Teachers are encouraged to make videos demonstrating how they are applying the new methodologies and capturing evidence of their students' learning process and learning outcomes. BDE advisors have been trained on how to evaluate videos and best practices will be posted on their website.

Teacher certification

An innovative teacher certification model was established to motivate and incentivise participants to implement the programme. Rather than being awarded at the end of the training, certificates were issued upon evidence of concrete application of the new techniques (new literacy & numeracy instruction strategies, mentoring other teachers etc, depending on who certificates were awarded to: National Trainers, School Trainers, regular teachers, RLTs' mentor teachers).

The teacher certification scheme responded directly to the introduction of teachers'

portfolios in the Law on Primary Education as part of the external evaluation of schools and teachers conducted by the State Education Inspectorate at least very three years.

The research and monitoring component

By embedding a research component in the programme, activities outcomes and impacts have been carefully monitored allowing adjustments to be made as needed.

Baseline and mid-term studies were conducted to measure teachers' knowledge, attitudes and beliefs on literacy and numeracy instruction techniques, to assess the school environment and the extent to which it is supportive and conducive to pedagogical change, and to assess Grade 4 students' learning outcomes in literacy and numeracy.

Linking in-service and pre-service teacher training

In the interest of sustainability, academics were also trained on the new literacy and numeracy teaching approaches in order to support their integration in university courses, including in pre-service teacher training.

Programme results

Outputs

To date, **all schools** (335) are involved in the numeracy component with 6,400 teachers trained in numeracy. Most schools (250) are also involved in the literacy component with about 3,000 teachers trained in literacy.

The network of School Trainers spans across 218 schools for numeracy and 143 schools for literacy. 109 schools have School Trainers in both subjects, i.e. about a third of the total number of schools in FYR Macedonia. Overall there are about 500 School Trainers in numeracy and 330 in literacy.

18 RLTs have been set up across the country, 11 in numeracy and 7 in literacy, with 174 schools taking part.

Results for teachers

Mid-term surveys and analysis of BDE monitoring reports have shown that teachers have improved their knowledge, skills and attitudes towards literacy and numeracy teaching:

- Teachers' confidence has increased in terms of implementing new pedagogical approaches, creating new materials and being open to share practices and receive critical feedback. Reports show that teachers have implemented the new approach in respectively a third and three quarters of their mathematics and literacy instructional time
- Teachers have developed reflective strategies and are more ready to accept change
- Classrooms have become more conducive learning environments (display of students' work, teachers' aid and literacy and numeracy corners)
- Teachers are gradually transferring their newly acquired pedagogical skills to other subjects
- Teachers' portfolios are of better quality, demonstrating a diversity of approaches and the development of innovative materials and activities.³



³ MCGO report to BDE.

By increasing teachers' motivation, the certification process has also resulted in an improvement of the quality of teachers' portfolios. There is indicative evidence that teachers are developing a range of diverse materials for their classes and are collecting evidence of students' learning. More teachers have also been submitting reflective notes about their lessons/practices and an analysis of their effectiveness.

Reports also show that:

- Teachers' knowledge of writing concepts needs improvement
- There is a discrepancy between Macedonian and Albanian language teachers, the latter demonstrating less understanding of the new pedagogical approaches
- Half of the teachers remained concerned about how the new approach would positively impact on students' learning in numeracy and literacy.

"Interactions with my students have improved. The new literacy techniques I learned are easy to introduce. By doing things step by step my students are learning better."

Results for students

Comparison between baseline and mid-term surveys demonstrated an improvement in Grade 4 students' learning outcomes in schools that participated in the programme.⁴

In numeracy:

- Learning outcomes were improved in project schools, with no equity gap between students of Macedonian and Albanian language of instruction,

⁴ Data was collected in 2009 and 2012 in Mathematics and in 2010 and 2013 in Literacy.

- There is a positive statistically significant difference in the improvement of learning outcomes between project schools and control schools.

In literacy:

- Better learning outcomes in project schools compared with control schools after programme implementation, particularly in reading.
- Students tested in Macedonian language are more successful than those in Albanian language but the equity gap in learning narrowed after programme implementation, with students learning in Albanian experiencing greater gains.

BDE reports identify improved student engagement in the classroom, improved learning strategies and reasoning,

To note that:

- Although students in project schools achieved better in writing in comparison with control schools, their performance was lower than the expected level established in the curriculum,
- Some curriculum components remain challenging for most students both in literacy and numeracy.

“My students are communicating better. They are also more aware of their own knowledge.”

“Teachers are now using everyday problem situations rather than merely mathematical tasks, which increases pupils’ motivation and interest.”

Results for schools

The programme has greatly contributed to increasing teachers’ cooperation within and across schools and the frequency of training workshops. Schools are better equipped to set up and sustain mentoring schemes and continuous professional development practices. This is a positive first step towards transforming Macedonian schools into

professional learning communities although more work is needed in order to sustain and transform these initial results. To date constraints have included the weak understanding of some management and support staff of the extent to which pedagogical practices need to change to improve learning outcomes and the poor culture of monitoring of students’ performance and achievement to inform school planning. Involvement of support staff (pedagogues and psychologists) and school directors in the Regional Learning Teams is a critical step in ensuring that learning improvement for all students becomes a collective responsibility as opposed to one which lies only with teachers.

There is indicative evidence of School Development Plans addressing better learning assessment and students’ achievement. Some have made provision for literacy or numeracy focal points in the school, some have embedded action research on students’ performance and others have committed to monitor student achievement more closely.

Contribution to national level outcomes

Legislation on teacher professional development

A major hindrance to programme implementation has been the absence of teacher competences and standards that could provide a framework for the implementation of teacher training and mentoring activities. Since 2010, USAID has been funding a Teacher Professional and Career Development Project, implemented by the Macedonian Civic Education Centre in collaboration under the leadership of the BDE.

The Teacher Education programme has been instrumental in shaping the USAID project outputs by identifying the competences required to teach literacy and numeracy and to be teacher-mentor and teacher-advisor, working on core parameters of teacher

motivation, on classroom practice change and performance improvement and by testing a certification model with applied knowledge at its core. The RLTs are also providing an innovative professional development opportunity that teachers might want to seize for their career advancement and which has been included in the draft legislation on professional development to be institutionalised.

New curriculum

The pedagogical strategies introduced by the programme have had an indirect influence on the development and implementation of the new National Curriculum (known as the Cambridge Curriculum). It has prepared the ground for changing teachers' expectations on students' achievement, allowing for higher expectations for all children.

There is indicative evidence that the training of most teachers in both literacy and numeracy has smoothed the transition between the old and the new National Curriculum as the latter includes pedagogical approaches and methods for teaching numeracy and literacy that are similar to those introduced by the Teacher Education programme.

“It would have been difficult for teachers to implement the new curriculum before the implementation of the Teacher Education programme in literacy and numeracy. The new curriculum also insist on practical examples and using everyday situations to contextualise the learning process.” (BDE advisor)

Pre-service teacher training and university education

Despite the involvement of university staff in training and the sharing of materials, the impact of the Teacher Education programme has been limited on university education and pre-service in particular. There is great variety of pre-service curricula due to the absence of

teacher standards in terms of knowledge, competences and skills. This has hampered the harmonisation of pre-service provision. Universities have conducted, however, a review of their teacher programmes against the literacy and numeracy programme and have identified areas for alignment and improvement. Some pre-service training programmes for mathematics have been adapted accordingly, particularly with regard to the inclusion of real life problem-solving situations.

*“Goce Delcev University has trained two cohorts of students on a revised pre-service training programme including some of the numeracy project techniques. They have been able to instantly engage in the teaching process in schools. The experience has been very positive.”
(University Lecturer)*

Inclusive Education Programme

UNICEF is currently implementing a long-term system-wide programme on Inclusive Education, aiming to introduce the International Classification of Functioning for Children and Youth (ICF-CY) in the country. Although the remit of this programme is much wider than the Teacher Education programme in early literacy and numeracy, it is believed that it will benefit from the steps that teachers and schools have been taking through the implementation of the literacy and numeracy programme:

- the reflective approaches and change process instilled in schools,
- the understanding that the environment and the practices of professionals need to change to achieve increased learning outcomes for all children regardless of their starting point,
- the understanding of the need to focus on what children can do,
- the growing professional learning communities established in schools and

municipalities through the mentoring and the RLTs mechanisms.

- the need for specific instructional techniques for children whose mother tongue is not the language of instruction.

Success factors

Comprehensive training

The use of the Core Conceptual Framework for teacher education at the outset of the programme has been critical in delivering a comprehensive and relevant training approach which offered:

- extended specific training in literacy and numeracy, set in the context of teacher’s own practice,
- engagement in the kinds of learning teachers are expected to practice with their students,
- opportunities for teacher collaboration, observation and learning between teachers,
- access to support from within and outside the school,
- opportunities to practice and to reflect on practice, based on evidence,
- highly contextualised follow-up mechanism through the RLTs.

Training focused both on increasing teachers’ knowledge of numeracy and literacy concepts and their understanding of pedagogical techniques to facilitate students’ learning.

Another success factor has been the multi-level capacity building approach, including training for all stakeholders: from teachers to university lecturers, from BDE advisors to school directors, building a collective understanding of what the programme has been trying to convey and achieve. Every new step has also been facilitated by training: mentoring skills for National Trainers, guidance and instructions for BDE advisors and RLTs’ facilitators, training on the use of the fidelity tools, training on video making and on evaluation of good classroom practices and videos.

Feedback and multi-level support mechanisms

All participants - National Trainers, School Trainers, RLT mentors and school teachers- have gone through the same change practice support mechanism. This enabled all participants to realise the value of observation, feedback and discussion. It also helped trainers to acquire mentoring skills by modelling the good examples they themselves had benefited from.

Multi-level support approach:

Level	Support type
School	Peer support
Municipal	RLTs
National	BDE advisors

The provision of multi-level support has overcome resistance, enabled self-reflection about practice and provided opportunities for observation, modelling and learning. The use of a standardised tool, the fidelity tool, has provided a common language and framework for observation and feedback discussion. By using observation and feedback in a non-evaluation fashion, teachers have been more relaxed about being observed and about discussing their practices. Routine feedback has been core to changes in teachers’ practices.

“The colleagues from the RLTs are positive mediators. We exchange opinions which improves my professional capacity. We analyse techniques in details and discuss their effects. I thought that I knew some of the techniques, but I realised that it is necessary to go back, because it is important that they are applied gradually and correctly” (Teacher)

Best practices and evidence

The programme strongly encouraged teachers, mentors and advisors to collect evidence of the effectiveness and relevance of the pedagogical techniques and materials used in the classroom. This focus on evidence has enabled teachers to reflect on their practice in a more constructive way and BDE advisors to professionalise their observations and feedback to teachers. All practitioners have also been encouraged to collect and showcase good practices: through videos, lesson planning records, projects and so on.

As good practices are more widely shared across the country through the RLTs, the BDE website and other online networks, the reflection and change process will be sustained and encouraged in future years.

Working on institutionalisation from the outset

A key success of the programme has been the institutionalisation of some of its components in current policy reforms. Linking the certification process to career advancement is one example. Initiating linkages with pre-service teacher training providers and academics has also contributed to influencing teacher training beyond in-service. The strong research base underlying the development of the teacher education programme and the numeracy and literacy approaches has also been critical in advocating for change and equipping professionals with the necessary knowledge and rationale for changing practices and attitudes. The multiple layers of support have ensured continuous teacher professional development for greater impact in the classroom and on the system. Lastly, the wide participation base of teachers in the programme has enabled a critical mass of professionals to be reached and will ensure the sustainability of the new practices.

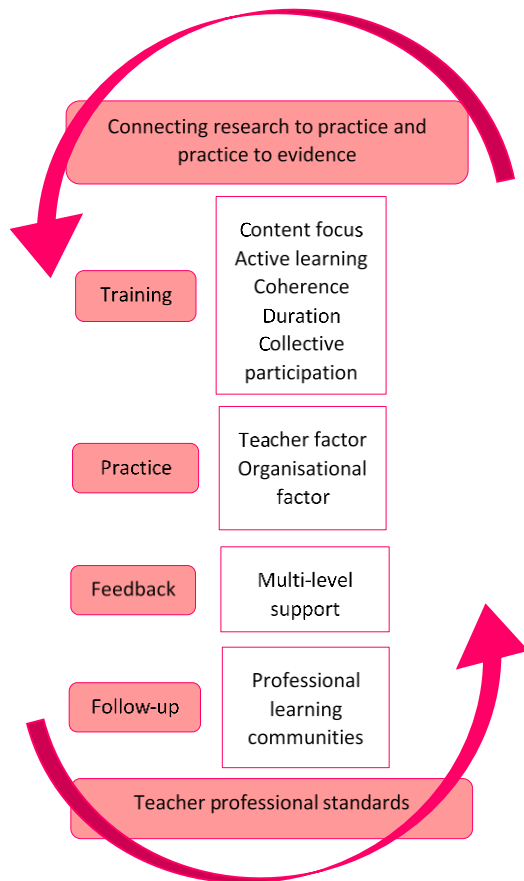


A model for national teacher professional development

The Teacher Education programme has paved the way for a model of teacher professional development in FYR Macedonia.

It has included training, application in practice, regular feedback and continuous follow-up support to encourage gradual change and overcome fears associated with change. It has also addressed both teacher and organisational factors by working on teacher motivation (open call for National Trainers, selection of School Trainers, Teacher Certification) and on schools (teacher collaboration, involvement of management and support staff), although the latter could have tackled school leadership earlier on in the project and more systematically. The programme has also partially demonstrated the needs for teacher standards to anchor both teacher training and professional development in an overall framework supporting professionalisation, staff empowerment and quality education provision. Lastly the programme has created a feedback loop whereby change in instructional practices are monitored and documented to sustain the professional learning process.

Model of teacher professional development



Lessons learned

The experience of FYR Macedonia has generated a number of lessons learned that are useful to inform future national programmes as well as programmes in other countries.

1. Involve school directors and support staff in training from the start.
2. Support change simultaneously at classroom and school level so that: (i) teachers get greater support from management when introducing innovation, (ii) schools develop a collective responsibility for the learning of all children and allocate financial and human resources effectively, (iii) schools inform their planning with sound monitoring of students' learning.
3. Embed professional development with teacher standards, promotion and advancement to support motivation and instil a degree of pressure.

4. Build in an understanding of the learning needs of Students with Special Educational Needs (SEN) from the outset and equip teachers with techniques to ensure learning for ALL children.
5. Develop teachers' subject knowledge in parallel with subject pedagogical approaches.
6. Encourage reflection, self-assessment and challenging of personal perceptions and attitudes.
7. Anchor the training and professional development approach in existing research.
8. Link teacher professional development with pre-service training.
9. Identify factors underlying resistance to change from the start to address them at different stage of implementation. Model lessons through open classes.
10. Embed a research component in the programme in order to: (i) gather evidence to build a case for future activities, (ii) strengthen ownership and (iii) support collective action based on common situation analyses.

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