International Practices in K-12 Mathematics Education:

Technology Tools and Frameworks

Mathematics Learning in Brazil: The Challenge

5.2%

Math proficiency

Critical gap by final year of secondary education *(SAEB 2023)*

33.4%

Mathematics teachers

in upper grades lack specialized training in the subject *(Censo 2025)*

National Strategies for Mathematics Education

Brazil is pursuing parallel strategies: strengthening traditional educational foundations while piloting cutting -edge AI and computational thinking approaches. The contrast highlights opportunities for integration.

Traditional Approach

National Mathematics Commitment

- Focuses on governance and policy
- Teacher professional development
- Curriculum standards and materials
- Assessment frameworks

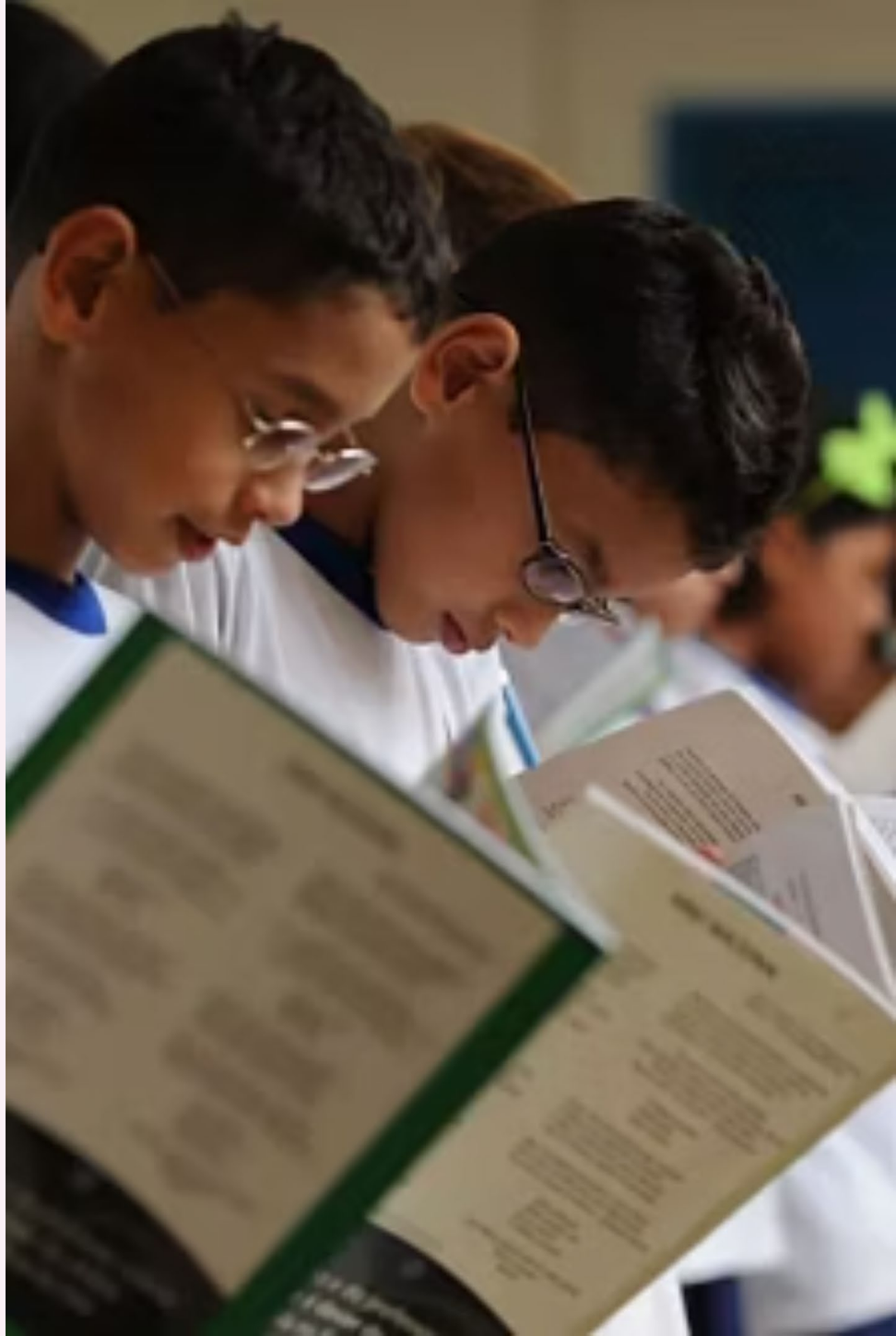
Does not intentionally incorporate technology into instruction

Innovation Focus example

Piauí State AI Curriculum

- Mandatory for 9th grade and high school students
- 130,000 students and 900 educators engaged
- Based on AI@School framework and UNESCO's AI Competency Framework

Emphasizes artificial intelligence and computational thinking skills



Nova Escola: Empowering Teachers Daily

"Every teacher evolving and every student learning, day after day"

40 Years of Impact

Four decades serving Brazil's educational community with trusted resources and professional development

1.3M Monthly Visitors

Teachers accessing lesson plans, teaching strategies, and classroom materials through the website

133K AI Assistant Users

Educators leveraging WhatsApp -based AI support for personalized teaching assistance

436K Lesson Plans

AI-generated lesson plans created in 2025 alone, streamlining teacher preparation

Have you heard about Artificial Intelligence?

53% of teachers say they have already used AI

	2023	2024	2025
Heard of and used	23%	38%	**53%**
Heard of, but not yet used	66%	56%	41%
Not heard of	11%	6%	6%

Sample: 845 responses (Pop. 1.8M, 95% confidence level). Last collected between 05/15 and 05/19/25

How often have you used Artificial Intelligence?

61% of the public that uses AI does so frequently

	2023	2024	2025
Practically every day	12%	22%	**32%**
At least once a week	27%	32%	**29%**
At least once a month	20%	16%	13%
Rarely use	27%	25%	18%
Only tried and didn't use again	14%	5%	8%

Sample: 845 responses (Pop. 1.8M, 95% confidence level). Last collected between 05/15/25 and 05/19/25

What do you consider the biggest benefit that Artificial Intelligence tools can bring to your daily life as a teacher?

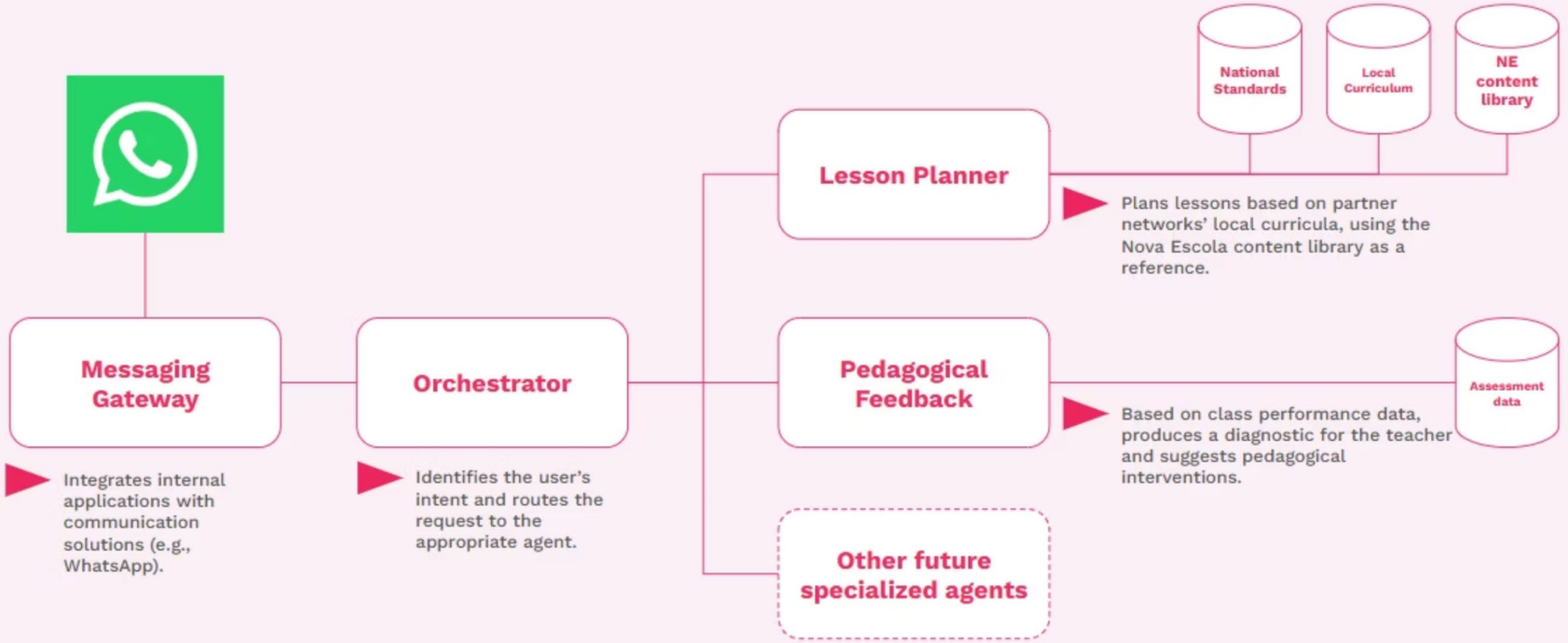
Time saving is the main benefit perceived by teachers when using AI tools

	2023	2024	2025
Save time	46%	54%	**51%**
Expand repertoire	26%	24%	30%
Personalize teaching	10%	14%	18%
Other benefit	18%	8%	1%

Sample: 845 responses (Pop. 1.8M, 95% confidence level). Last collection between 05/15/25 and 05/19/25

AI assistant on WhatsApp to support teachers in generating lesson plans and activities contextualized to their reality

Multi -Agent System Architecture



AI Evaluation Framework (Evals)

Nova Escola implements a comprehensive evaluation process (evals) to ensure AI -generated content meets high quality standards before reaching teachers. This systematic approach validates accuracy, pedagogical soundness, and curriculum alignment.

1

Content Generation

AI creates lesson plans and teaching materials based on teacher requests and curriculum frameworks

Key practices:

- Generates structured pedagogical content (introduction, activities, assessment)
- Personalizes based on teacher context (preferences, past interactions, classroom resources)
- Adapts to regional curricula and student performance data (local materials, assessment results)

2

Human Labeling

Expert educators evaluate AI -generated content against predefined quality criteria (rubrics)

Key practices:

- Inter -rater agreement analysis to ensure consistency among human evaluators
- Multiple evaluators per content piece to establish ground truth
- Regular calibration sessions to align evaluation standards

3

Automated Evaluation

Custom LLM -based evaluators assess content against the same quality criteria used by humans

Key practices:

- Careful calibration using human -labeled data (train/dev/test split)
- Target metrics: TPR/TNR > 85 -90% to ensure automated evaluators replicate human judgment
- Continuous validation against new human evaluations

4

Continuous Improvement

Ongoing monitoring and refinement cycle to maintain and enhance quality

Key practices:

- Regular audits of automated evaluator performance
- Analysis of systematic errors and edge cases
- Iterative updates to prompts, rubrics, and evaluation criteria
- Continuous vigilance over content quality through production monitoring

Impact Evaluation

Ongoing RCT conducted in partnership with the World Bank to evaluate whether the AI -powered WhatsApp lesson planning assistant can improve teaching quality, reduce teacher workload and stress, and enhance student learning outcomes in public schools in São Luís - MA, Brazil

1

Teachers report saving time with each lesson plan generated:

- 47% from 10 to 30 min
- 36% from 1 to 2h
- 12% more than 2h

2

96% of teachers report that the generated lesson plans are applicable in the classroom

Final results and recommendations expected August 2026

Thank You!

We deeply appreciate your time and interest in Nova Escola's mission to transform mathematics education in Brazil through innovative AI solutions.

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Nova Escola

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