Blended learning for teacher development: Evidence of impact

Introduction

This policy brief shows the positive but limited impacts of Anonde Ghonit Shikhi (AGS), a nationwide teacher professional development programme to 'make learning math fun' in Bangladesh. AGS is the most popular Teacher Professional Development (TPD) course on Muktopaath, the government's Bangla-language e-learning platform. Over 180,000 primary teachers have completed the initial online course. Nine online modules target grade 1-2 math skills. Each module contains three or more numeracy activities, explained through animated videos, and finishes with a quiz. Completion of the online course entitles teachers to participate in a week of face-to-face training. There is no follow-on support or monitoring for implementation in schools. AGS's approach to blended learning for TPD is aligned with Bangaldesh's 'Blended Education Framework for All' (Akturazzaman and Chowdhury, 2022) and is common to government led TPD programmes across Bangladesh. Mobile phones are by far the most common way for people to access the internet in Bangladesh and most teachers accessed AGS on their phones. Hence, AGS is an example of mobile learning and of blended learning for TPD.

Mobile Learning for the Empowerment of Marginalized Mathematics Educators (3Mpower) was a research project led by The Open University (UK) in partnership with the Institute of Education and Research (University of Dhaka, Bangladesh). 3MPower was funded through the EdTech Hub (2021-2025). The project sought to understand both the processes and outcomes of the AGS intervention among teachers and schools serving marginalised rural communities. 3MPower was designed and carried out in collaboration with education decision-makers and with rural educators and education officers.

The findings and recommendations have widespread significance for future blended TPD programmes in Bangladesh. The findings also address 'high potential evidence-gaps' in the global evidence-base, concerning the experiences and outcomes of technology-enhanced TPD among teachers and learners in marginalized rural communities. Further, the findings have implications for the teaching of foundation numeracy skills in Bangladesh's national planning, for example through the next Primary Education Development Program, (PEDP5).

Previous assessments of foundation numeracy skills in Bangladesh show that, nationwide, less than one-in-five children (18%) have the expected numeracy skills by Grade 3. The percentage is lower for children living in rural areas or from the poorest quintile. In general, numeracy skills lag behind literacy skills in all grades (see Bangladesh Education Fact Sheets, 2020).

Outline of 3MPower's research

The overarching research question underpinning the 3MPower study was: "How are primary numeracy teachers using mobile learning for teacher development in rural schools and, in what ways does this change learning and teaching?"

Comparing 'ongoing AGS users' with other teachers

Research participants were selected from ten marginalised rural upazilas (local administrative areas) across four geographic regions in Bangladesh, namely Chittagong Hill Tracts, Hoar, Coastal and Char.

Local teacher-researchers from these upazilas initially found that even in marginalised areas almost all teachers had been able to access and complete the online course, usually using a smartphone and mobile internet. (This is not to say accessing online learning on mobile phones was unproblematic, but most rural teachers overcame the challenges). However, accounts suggested that few (estimated <10%) were putting AGS into practice in the classroom in an 'ongoing' manner (Kukulska-Hulme et al. 2024).

In the second cycle of research, teacher-researchers deliberately set out to find two or three teachers in their upazila who were continuing to use AGS activities in class (at least occasionally). We call these teachers 'ongoing users'. Teacher-researchers found it challenging to find such teachers, again suggesting they may represent <10% or possibly <5% of all teachers who completed AGS. However, after six weeks, almost all managed to find three such teachers in their upazila. Most ongoing users said they had been encouraged to put AGS activities into practice by their head teachers and other teachers in their schools (and sometimes local teachers from other schools).

This policy brief presents evidence of changes in teaching and learning associated with the 118 teachers who were 'ongoing users' of AGS. For comparative purposes,

each of these 'ongoing users' were matched (1:1) to another teacher who was not an 'ongoing user' of AGS and who:

- Taught in a similar location (a rural or town school in the same upazila)
- Taught learners of the same grade
- Was the same gender as the 'ongoing user'

Methodology for studying impact on teaching

(1) Independent lesson observations (quantitative)—of 218 teachers from 207 schools (from a planned sample of 236 teachers and schools). Half (47%) were associated with ongoing AGS use, the others were matched to these 1:1 for gender, geography, and grades taught. 42% of the teachers were female.
(2) Photo elicitation and periodic interviews (qualitative)—with 20 ongoing AGS users from 10 schools, talking about photographs they had taken of their mathematics teaching.

Methodology for studying impact on learning

Evidence is drawn from foundation numeracy skills assessments of 2,129 learners (from a planned sample of ten learners from each of the teachers whose lessons were observed, above).

The assessments were adapted from the FLN Hub 'formative assessment in numeracy' (FLN Hub, N.D.). The questions become progressively more difficult and the assessment stops when the child can no longer complete them correctly, at which point the child's highest level of success is recorded. Most learners (82%) were aged 7-10 and half (55%) were female. Most (89%) spoke Bangla as their mother tongue.

Findings—Summary

Impact on teaching

1. **'Ongoing AGS users' said there had been important changes in their understanding and practice, and lesson observations showed several modest but significant improvements in teaching practice, compared to other teachers.**

- 'Ongoing AGS users' represented numbers in different ways (e.g. with objects and images) more than other teachers (observed in 86% of ongoing users' lessons, compared to 74% of other teachers' lessons). Similarly, learners whose teachers were ongoing users also represented numbers in different ways more often than others (observed in 70% of ongoing users lessons, compared to 57% of other teachers' lessons).

"Previously, we used to conduct a lot of complicated lessons without proper use of the teaching materials. In that case, even if the children didn't understand, they would say, 'Ma'am, I understand.' But now, due to the hands-on approach, I can better assess that many children have weaknesses in certain areas. These hands-on activities have been selected by getting the training experiences from AGS Modules." (School 2, T1, Int 1).

- 'Ongoing AGS users' call on a range of different learners (i.e. not just learners sat at the front of the class) more than other teachers (observed in 85% of ongoing users' lessons, compared to 73% of other teachers' lessons).

- ‘Ongoing AGS users’ organise their classrooms for pair or group work more than other teachers (observed in 42% of ongoing users’ lessons, compared to 29% of other teachers’ lessons).

- ‘Ongoing AGS users’ observe and assess learning during activities, more than other teachers (observed in 94% of ongoing users’ lessons, compared to 83% of other teachers’ lessons). In talking about changes in their teaching, teachers often refer to informally assessing learners while they participate in numeracy activities.

  “I achieved the learning outcome as expected. Approximately 90% of the assessed students met the goal” (School 6, T2 Int3)

- ‘Ongoing AGS users’ say fear of math is reduced and learning math is now enjoyable: *“I think this method has successfully removed the fear of math from the children” (School 2, T1, Int 2). “AGS creates a joyful atmosphere in the class” (School 4, T5, Int 2)*

- ‘Ongoing AGS users’ say AGS developed their understanding and practice—so they encourage others: **“***My newer colleagues often seek advice on enhancing the productivity of their classroom activities. I consistently encourage them to incorporate AGS into their teaching methods and invite them to observe my classes (School 5, T1, Int 2).”*

2. **There was little or no change in some important areas of teaching, limiting learners’ abilities to develop their understanding of numeracy through talking about their ideas**

   There were no significant differences between ongoing users and other teachers in relation to the following classroom behaviours:

- Teachers rarely asked or invited open questions, limiting discussion
    - In 9-in-10 lessons (87%), teachers did not ask any open questions
    - In around half of the observed lessons (47%), teachers asked questions without allowing learners time to think
    - In 4-in-5 lessons (79%), teachers didn't encourage learners to ask their own questions

- Learners had little opportunity to ask their own questions or explain their thinking
    - Learners only asked questions in around 1-in-10 lessons (12%) observed
    - Learners only made extended unpredictable utterances in 1-in-20 (5%) lessons

- Few lessons included opportunities for pair work
    - Learners were only observed working in pairs in less than 1-in-5 (17%) of lessons

Impacts on learning

1. **Numeracy outcomes among rural learners remain low, regardless of whether teachers were 'ongoing AGS users' or not.** For example, less than half of all learners (48%) could recognise and compare two-digit numbers.

2. **At every level, learners whose teachers were 'ongoing AGS users' were more successful than the learners of other teachers.** But the differences were small (0.4 - 4.7 pts) and half (5 of 11) were statistically significant.

Percentage of learners (most aged 7-10) successful at each level and above					
Numeracy skills assessed	*All learners*	*Learners whose teachers are ongoing users of AGS*	*Learners with other teachers*	*% pts difference*	*Statistically significant (p <0.05)*
Q1 Number Knowledge (single digit)	89.3	89.5	89.1	0.4	
Q2 Number Knowledge (double digit)	47.6	49.7	45.7	4.0	yes
Q3 Addition (single digit)	43.1	44.1	42.3	1.8	
Q4 Subtraction (single digit)	36.9	38.7	35.4	3.3	
Q5 Addition (double digit, no carry)	31.9	34.4	29.7	4.7	yes
Q6 Subtraction (double digit, no carry)	28.7	30.9	26.8	4.1	yes
Q7 Addition (double digit, with carry)	22.9	24.3	21.6	2.7	
Q8 Subtraction (double digit, carry)	13.6	15.1	12.3	2.8	yes
Q9 Word Problem	6	6.9	5.2	1.7	
Q10 Multiplication (single digit)	5.6	6.7	4.6	2.1	yes
Q11 Division (single digit)	4.1	4.8	3.5	1.3	

Conclusions

- Without support for implementation in school, there is little impact on teaching and learning from the current blended learning approach to TPD in Bangladesh.
- With support for implementation in school, ongoing users of AGS saw significant changes in their teaching, which were confirmed by independent lesson observations.
- While learners whose teachers were ongoing users of AGS were more successful than other learners, numeracy outcomes remain low.

Improvements in teaching and learning among ongoing AGS users and their learners are helpful but not sufficient to enable learners to acquire the foundation skills they need to progress successfully in their education.

Recommendations

To strengthen teaching quality and improve learning outcomes in foundation numeracy, we recommend:

1. **Future teacher development programmes should build upon the progress made (by some teachers and schools) through AGS** and
    a. spread these gains more widely by promoting school-based support for putting the activities into practice in the classroom (see 3Mpower, 2025, policy brief below: How can headteachers help teachers put Continuous Professional Development into practice in their schools?);
    b. explore ways of encouraging further improvements in teaching practice—for example, promoting the use of pair work, open questions by teachers, and encouraging learners to talk about their ideas and understandings;
    c. provide diagnostic assessment tools so that teachers can easily assess learners' level of foundation numeracy skills on a regular (e.g., termly) basis;
    d. promote 'teaching according to skill level' rather than by grade-level (see GEEAP, 2023, p18).

2. **Future teacher development programmes should seek to provide teachers with a more comprehensive and 'structured pedagogy'** (see GEEAP, 2023, p16), which
    a. guides them how to teach foundation skills from beginning to end, and
    b. shifts from 'one-off' online and face to face training, to the provision of ongoing support and monitoring of application to practice in schools (see 3Mpower, 2025, policy brief below: Towards a pedagogic framework for Teacher Professional Development through blended learning).

Further reading

3MPower (2025) Policy brief: Towards a pedagogic framework for Teacher Professional Development through blended learning 3Mpower-Mobile Learning for Empowerments of Marginalised Mathematics Educators - EdTech Hub

3MPower (2025) Policy brief: How can headteachers help teachers put Continuous Professional Development into practice in their schools? 3Mpower-Mobile Learning for Empowerments of Marginalised Mathematics Educators - EdTech Hub

3MPower (2025) Policy brief: Designing blended learning programmes which impact teaching quality and learning outcomes 3Mpower-Mobile Learning for Empowerments of Marginalised Mathematics Educators - EdTech Hub

Bangladesh Education Fact Sheets (2020). Analysis for learning and equity using Bangladesh MICS 2019. Bangladesh Bureau of Statistics (BBS) and UNICEF. PDF Bangladesh Education Fact Sheets 2020 - UNICEF Data

Formative Assessments, Foundation Literacy and Numeracy Hub. https://www.flnhub.org/focus-area/formative-assessments

Kukulska-Hulme, A., Power, T., Dawadi, S., Rahman, S. M. H. and Parvin, T. (2024) 'Factors in mathematics teachers' access to digital technologies and their professional development through praxis in marginalised communities in Bangladesh', *Journal of Technology and Teacher Education*, p. (In press) [Online]. Available at https://oro.open.ac.uk/99490/ (Accessed 28 August 2024).

GEEAP (2023) [Smart Buys] — Akyeampong, K., Andrabi, T., Banerjee, A., Banerjee, R., Dynarski, S., Glennerster, R., Grantham-McGregor, S., Muralidharan, K., Piper, B., Ruto, S., Saavedra, J., Schmelkes, S. and Yoshikawa, H. (2023) Cost-effective approaches to improve global learning. What does recent evidence tell us are 'Smart Buys" for improving learning in low- and middle-income countries? Recommendations from

the Global Education Advisory Panel (GEEAP)., FCDO, the World Bank, UNICEF, and USAID [Online].