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Teacher Professional Development Effectiveness Study Report

July 2023

UZBEKISTAN EDUCATION for EXCELLENCE PROGRAM

FLORIDA STATE UNIVERSITY 1851

STATE MISSISSIPPI STATE UNIVERSITY

Uzbekistan Education for Excellence Program

Teacher Professional Development Effectiveness Study
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LIST OF ACRONYMS

CLA	collaborating, learning, and adapting
FA	Field Assistant
MD	Methodological Day
MoPSE	Ministry of Pre-school and School Education
MT	Master Trainer
RQ	Research Question
SME	subject matter expert
STB	student textbook
TG	teacher's guide
TPD	teacher professional development
ULA	Uzbek Language Arts
USAID	United States Agency for International Development

INTRODUCTION

CONTEXT

The Uzbekistan Ministry of Preschool and School Education (MoPSE) has embarked upon an ambitious reform agenda to bring the Uzbek public education system in line with twenty-first century international standards and skills. This agenda is enshrined in several presidential decrees.[1] The reform agenda includes numerous initiatives, including developing a new national curriculum framework and a laser focus on increasing information and communication technology and English as a foreign language skills through the IT Nation and English-Speaking Nation initiatives. Reform efforts also include participating for the first time in the Progress in International Reading Literacy Study (PIRLS) in 2021 and in the Program for International Student Assessment in 2022 (PISA). MoPSE has committed to reaching a PIRLS ranking of 30 or higher by 2030, but reform takes time and challenges persist. At the onset of the Uzbekistan Education for Excellence Program (UEEP), the teaching culture in many schools in Uzbekistan was still quite teacher-centric, with only a modicum of observable student-centered instructional strategies promoting critical thinking, creativity, communication, and collaboration. Basic reading and mathematics scores were within the international mean, but students struggled with reading comprehension and more complex mathematics.

At the level of teacher professional development (TPD), MoPSE has transformed its in-service system of schoolteachers and principals from a periodic trainings-based model to a continuous professional development model whereby teachers can participate in TPD as needed through a national Learning Management System, 14 regional teacher training institutions, private centers, and/or universities. However, the content of in-service TPD can still be overly theoretical and trainer-centric, offering insufficient practice for teachers to effectively develop student-centered instruction skills. Moreover, MoPSE teachers remain confronted with a lack of in-service supportive supervision and on-the-job methodical support.[2]

To improve the quality of instruction and learning, a challenge that many ministries must confront is the need to provide TPD at scale. Uzbekistan has approximately 10,100 schools, 509,000 teachers, and 6,340,000 students.[3] In 2022, when MoPSE rolled out new English as a foreign language teacher and student books, it struggled to reach and train all teachers in their use.[4] Moreover, conducting training at scale often entails a cascade model, which has weaknesses in the quality of knowledge transfer and training delivery. This is especially the case when the training objective is to introduce and strengthen teaching strategies that are student-centered and promote students' critical, independent thinking, and creative skills. These teaching strategies can be challenging to master and require changes in teachers'

[1] Presidential Decrees No. PF-05538 and No. PQ-3931 dated 05.09.2018; and No. PF-5712 dated 29.04.2019.
[2] Uzbekistan Compact for Education Reform, Ministry of Preschool and School Education, Global Partnership for Education, Tashkent, Uzbekistan, March 2023.
[3] www.uzedu.uz
[4] https://data.egov.uz/eng/data/61151682114fbfdc20c35af7

behaviors, beliefs, and attitudes, which can be achieved most commonly through continued practice and reflection.[5]

PROGRAM BACKGROUND

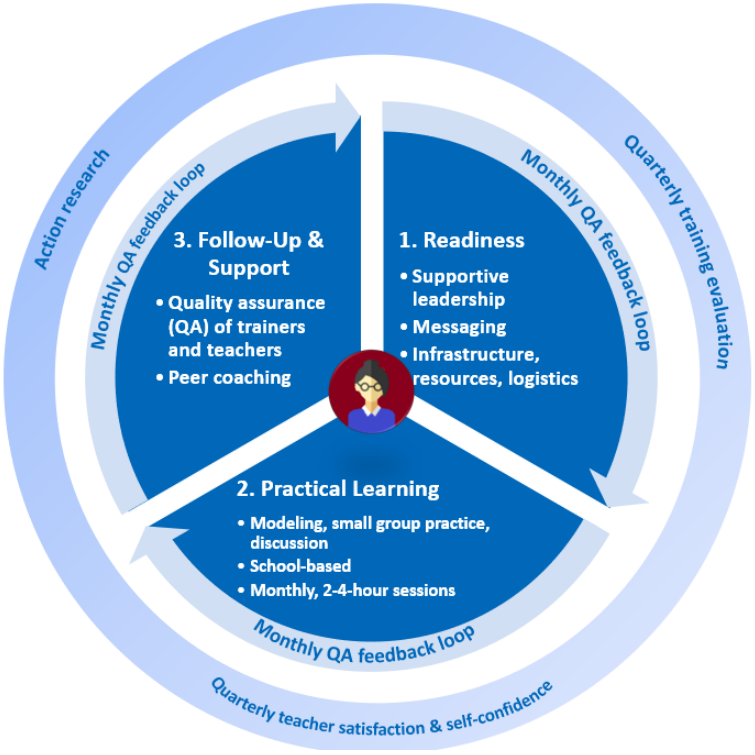
The UEEP theory of change states that improvements in curriculum products combined with TPD will translate into improvements in student achievement over time. The Program also focused on implementation science to look closely at what works, how and why, and what effect the changes are having on improving teaching and learning. As such, the Program designed studies to (1) monitor the uptake of the teacher's guides (TGs) and student textbooks (STBs) and new student-centered methodologies provided by the Program; (2) evaluate the accompanying TPD approach; and (3) assess the effect on student learning.

The objective of this study is to evaluate and analyze the effectiveness of the Program's TPD approach.

AN EVIDENCE-BASED CONTINUOUS APPROACH AND PROCESS TO TPD

The Program designed and piloted an in-service, evidence-based,[6] continuous TPD (approach (***Error! Reference source not found.***) that sought to improve classroom instruction for Uzbek Language Arts (ULA) and Mathematics teachers via the effective implementation of TGs and the student-centered strategies therein.

Figure 1: TPD approach



[5] Garet, M., Porter, A., Desimone, L., Birman, B., Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915–945.

[6] Clark, D., & H. Hollingsworth. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education 18*, 947–967.
Jordan, R., Pouezevara, S., & Strigel, C. (2022). *A monitoring, evaluation, and learning framework for technology-supported remote trainings*. Research Triangle Park, NC: RTI International.

The approach consisted of a three-tiered cascade training model where a total of 80 Tier 1 Master Trainers (MTs) trained 752 Tier 2 trainers, who in turn trained over 8,386 Tier 3 teachers. Teachers and trainers completed one training session per month for a total of eight sessions between August 2022 and April 2023.[7] Training sessions were 2 to 4 hours long. Over 95 percent of participants completed 75 percent or more of the training sessions, thereby meeting the Program targets (see box).

Training sessions included evidence-based practical instructional techniques such as modeling, role-playing, small group practice, and discussion. The continuous TPD approach used Methodological Days[8] (MDs) already existing within the Uzbek education system to conduct the monthly sessions rather than one-off, multiday training events. The Program provided all trainers with facilitator guides, slides, and scripts.

TPD Completion rates

- Tier 1 completion rate: 100%
- Tier 2 completion rate: 96%
- Tier 3 completion rate: 79%

The Program initiated each TPD learning event with the implementation of a series of readiness steps, such as ensuring correct administrative documentation was in place; informing and engaging Ministry leadership at national, regional, district, and school levels; and providing teachers with informative messages in the weeks leading up to the first trainings.

To minimize the dilution effects of the cascade process and to ensure that all teachers at all levels could shift their teaching strategies toward a more practical and student-centered approach, the Program undergirded the pilot with a robust quality assurance instructional feedback loop. As part of this feedback loop, Program staff observed trainers conducting learning events and teachers applying their new skills each month. The Program collected these monthly training data and applied findings to inform future learning events and content. For example, if trainers were struggling to conduct role playing activities, those activities were reinforced in the following training session.

The Program implemented the TPD approach using three concurrent processes of (1) readiness and training, (2) follow-up and quality assurance, and (3) action research. These three processes are described in greater detail in the **Annex** and are organized in terms of what steps needed to be completed before, during, and after training. The Program's ambitious action research agenda aimed to determine the degree to which teachers were applying new techniques[9] and whether the TPD approach was effective.

PURPOSE

The goal of this study was to assess the *effectiveness* of the Program's TPD approach in terms of teachers' satisfaction of learning events, their acquisition of knowledge and skills, their shift in self-efficacy, possible changes in teacher beliefs about new teaching approaches, and to what extent teachers received the necessary support at the administrative and school levels.

[7] Due to severe weather conditions and power outages, the Program did not offer training sessions in December 2022 and January 2023.
[8] Methodological Days occur once a week and were established by MoPSE to provide primary teachers with dedicated time for class preparation and professional development.
[9] UEEP Teaching and Learning Materials Uptake Study.

RESEARCH QUESTIONS

This was a mixed methods, longitudinal study that drew on quantitative and qualitative data and sought to answer the following research questions (RQ):

RQ1: What is teachers' level of satisfaction regarding TPD learning activities?

RQ2: To what extent do TPD learning activities improve teachers' content knowledge and pedagogical skills embedded in the TG?

RQ3: To what extent does teachers' self-efficacy about teaching ULA and Mathematics improve by attending TPD learning events?

RQ4: What are teachers' beliefs and attitudes regarding the TPD approach and content?

RQ5: To what extent are teachers receiving sufficient administrative support to attend learning events at the school level?

GUIDING CONCEPTUAL FRAMEWORK

In addition to the Program's evidence-based TPD approach described above, this study used an adapted version of Kirkpatrick's training evaluation model[10] as the guiding framework for this TPD effectiveness study, described in ***Error! Reference source not found.*** below.

Table 1: Levels of TPD effectiveness

Level		Description
1.	Satisfaction	▪ Are teachers satisfied with trainings?
2.	Learning	▪ Are teachers learning?
3.	Self-Efficacy	▪ Do teachers have the self-confidence, attitudes, and beliefs to implement new skills?
4.	System Support	▪ Do teachers perceive receiving adequate school support to their learning?
5.	Application	▪ Are teachers applying what they are learning?
6.	Impact	▪ Are students' benefiting from teachers' new skills, knowledge, and beliefs?

This study focused on the above Levels 1–4. Levels 5–6 are addressed through the Program's accompanying Teaching and Learning Materials Uptake Study and the Early Grade Reading and Mathematics endline assessments.

[10] Kirkpatrick, D. L. (1994). *Evaluating training programs: the four levels*. San Francisco: Emeryville, CA: Berrett-Koehler; Publishers Group West.

METHODOLOGY

DATA COLLECTION METHODS

Data collection methods (***Error! Reference source not found.***) for this study were informed by the above frameworks. The Program collected data either quarterly in August 2022, November 2022, and March 2023 or monthly (through quality assurance tools).

Table 2: Research questions, timing, and tools

Research questions	Timing	Tools	Qualitative follow-up
Participant satisfaction (RQ1)	Quarterly (August, November 2022, and March 2023)	Trainer and teacher satisfaction survey	Collaborating, learning, and adapting (CLA) event, May 2023
Participant learning (RQ2)	Quarterly (August, November 2022, and March 2023)	Trainer and teacher post-test	CLA event, May 2023
Training quality assurance (RQ2)	Monthly (October 2022 through April 2023)	Trainer quality assurance tool	-
Participant self-efficacy (RQ3)	November 2022 and March 2023	Self-efficacy tool	-
Participant beliefs and attitudes, (RQ4)	March 2023	Trainer and teacher satisfaction survey	-
System support to participants (RQ5)	Quarterly (August 2022, November 2022, and March 2023)	Satisfaction survey	CLA event, May 2023

The Program administered an electronic satisfaction survey to all trainers and teacher participants to determine their level of satisfaction (RQ1) with TPD offerings (for more details please refer to **Table 3**).

To determine participants' acquisition of content knowledge (RQ2), the Program administered post-tests. The Program adjusted this tool to reflect the knowledge or methodological approaches being modeled or practiced in the TPD event.

In addition, to mitigate the dilution effects of cascade training, the Program also developed and implemented a rigorous learning quality assurance feedback loop that included the deployment of quality assurance observation tools. Program Field Assistants (FAs) administered these tools monthly during and after each training session to ensure quality of training by trainers. The Program analyzed the trainer quality assurance data and incorporated relevant adjustments to future training sessions.

To answer RQ3, the Program administered an electronic self-efficacy tool, which included specific questions to determine teachers' perceived self-confidence in the teaching of the ULA and Mathematics subjects.

RQ4 examined teachers' belief and attitudes about the Program's TPD approach and content through the administration of a training satisfaction survey (see RQ1 above).

In answer to RQ5, the electronic training satisfaction survey also included questions on perceived support received from school administrations to attend and complete training events.

Lastly, the Program gathered qualitative data at the end of the training cycle, during a CLA event in May 2023, to delve deeper into final survey findings. During this event, which was conducted with 80 MTs, the Program shared quantitative findings from the satisfaction and post-test surveys to discuss those findings with MTs in terms of explanations and ensuing recommendations (see CLA section below).

TOOL DEVELOPMENT

The Program developed and deployed four electronic tools for this study and are described briefly in **Table 3** .

Table 3: Tool details

Tool Title	Data collection platform	Total number of questions in the tool	Type of questions
Training satisfaction survey	Tangerine Online survey	41	7 qualitative 34 quantitative
Post-test	Tangerine Online survey	14	Only quantitative (multiple choice)
Training quality assurance tool	Tangerine tablet application	40	2 qualitative 38 quantitative
ULA and Mathematics self-efficacy tools	Tangerine Online survey	26	Only quantitative (multiple choice)

Program TPD experts adapted the training satisfaction survey and customized it to meet the TPD needs of the Program. The Program had used the anonymous training satisfaction survey informally in prior teacher trainings conducted during the 2021–2022 school year. To ensure the survey's validity, in November 2022, statisticians conducted a spot check of the survey and concluded that it exhibited confirmation bias. The Program subsequently revised and tested the questions within the tool to minimize the confirmation bias for the remaining part of the study.

TPD experts also developed and deployed post-tests for both subjects, based on the content of the quarterly training sessions. The Program did not deem it necessary to test these post-test tools, as they were informal tests designed to determine whether participants had grasped the main points of the training content and to inform future training sessions.

SMEs developed a quality assurance tool designed to observe Tier 2 trainers training Tier 3 teachers. The content of this trainer quality assurance tool was based on each month's training or MD and was adapted every month. The Program trained and conducted internal testing of this quality assurance tool with Program SMEs.

Prior to their first deployment in November 2022, the Program tested the ULA and Mathematics self-efficacy tools[11] with trainers and teachers. After the questions of the ULA

[11] Enochs, L., & P.L. Smith, D. Huinker. (2000). Establishing factorial validity of the mathematics teaching efficacy beliefs instrument. *School Science and Mathematics 100(4)*, 194–202.

self-efficacy tool were translated, the Program found that the questions were too complicated and difficult for teacher/trainer respondents to grasp. Respondents assessing the Mathematics tool, on the other hand, found all but three Mathematics self-efficacy questions easy to understand. Based on this, the Program eliminated these three unclear mathematics questions and adapted the ULA tool to match the revised Mathematics tool. The Program piloted the two tools again and found that participants considered all questions clear enough to understand and respond.

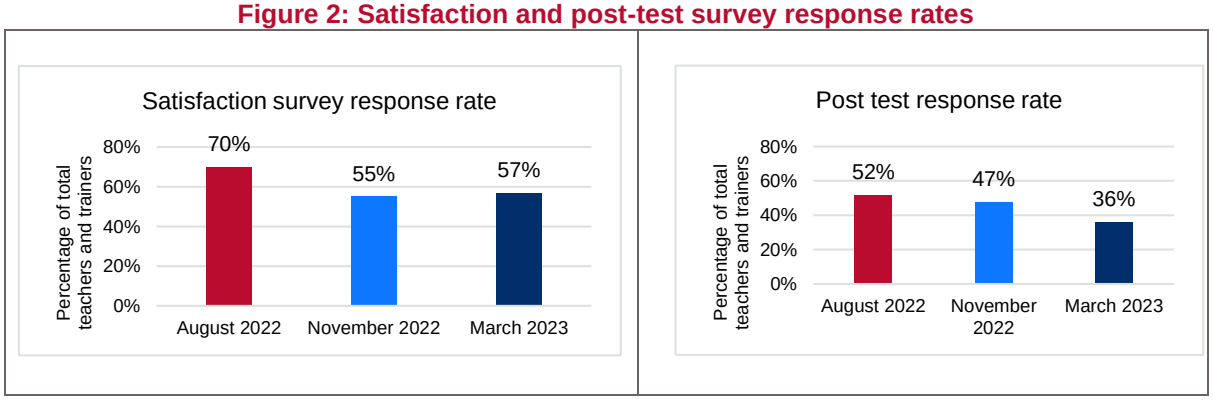
TRAINING ON INSTRUMENTS

The Program introduced the electronic self-administered satisfaction, post-test, and self-efficacy surveys to teacher and trainer respondents as part of the August/November 2022 and March 2023 training sessions. Program FAs who were tasked to administer the electronic trainer and teacher quality assurance classroom observation tools received online orientations on these tools from the Program's SMEs. Each orientation was an hour long, and the content of each monthly orientation changed depending on that month's training content.

SAMPLING

All teachers and trainers who attended a TPD training session were administered the tools. A total sample of 8,383 individual teachers attended one or more training sessions. Of the total sample, 6,426 (70 percent), 5,060 (55 percent), and 5,231 (57 percent) participants responded to the satisfaction survey in August 2022, November 2023, and March 2023, respectively. During the same respective time periods, 4,770 (52 percent), 4,370 (47 percent), and 3,300 (36 percent) participants responded to the post-test **(**Error! Reference source not found.**).**

Figure 2: Satisfaction and post-test survey response rates

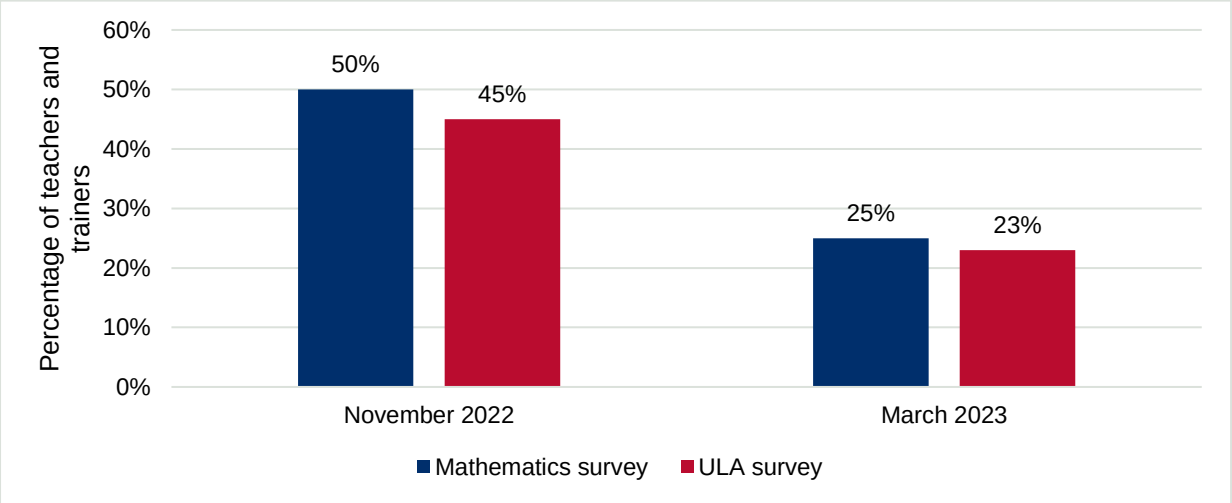


The Program administered the self-efficacy survey **(Figure 3)** twice (in November 2022 and in March 2023) and registered a lower response rate than for the satisfaction and post-test surveys. This could in part be explained by the novelty of this type of survey. This is not a common type of survey in the Uzbekistan education system and required a lot of explanation to participants. The self-efficacy survey was comprised of two separate electronic forms, one for Mathematics and one for ULA and was administered to the same teachers.[12]

[12] in Uzbekistan, primary grade teachers teach both ULA and Mathematics.

The response rates for the first round of self-efficacy data collection were 4,628 (50 percent) and 4,153 (45 percent), for Mathematics and ULA, respectively. In the second round, however, the response rate was much lower, with only 2,281 (25 percent) and 2,157 (23 percent) of participants responding to the Mathematics and ULA surveys. The overall lower response rate for ULA could be explained by the fact that the instrument was divided into two forms, one for Mathematics and one for ULA, and teachers might have skipped answering the second form once they provided responses to one of the subjects.

Figure 3: Self-efficacy response rate



Using the trainer quality assurance tool, the Program's 46 FAs observed 825 training sessions between October 2022 and April 2023, during a total of 5 training sessions.

DATA ANALYSIS

The Program compiled quantitative data from satisfaction and post-test surveys and analyzed those data for patterns and trends over time. The Program focused on the degree to which there were downward trends in the data between time points to determine any dilution effect of the cascade approach. Program staff summarized and used qualitative data from the end-of-program CLA event to further clarify the quantitative findings and trends. When analyzing trainer quality assurance data, Program staff analyzed trends and patterns to determine the extent to which the main elements of each training session were being effectively applied. Program staff cross-tabulated self-efficacy data with attendance data to determine any correlation between training attendance and teacher self-efficacy, also over time.

STUDY LIMITATIONS

As stated above, Program staff determined a certain degree of confirmation bias in the initial satisfaction survey, which was reviewed in time for the third round of data collection. However, even with the confirmation bias, data still yielded interesting insights with regard to cascade dilution effects. There were also notable differences in survey response rates across time points. Specifically, response rates for the post-test and self-efficacy surveys of March 2023 were quite low, thereby affecting analysis and potentially adding bias to the results for this time point.

FINDINGS

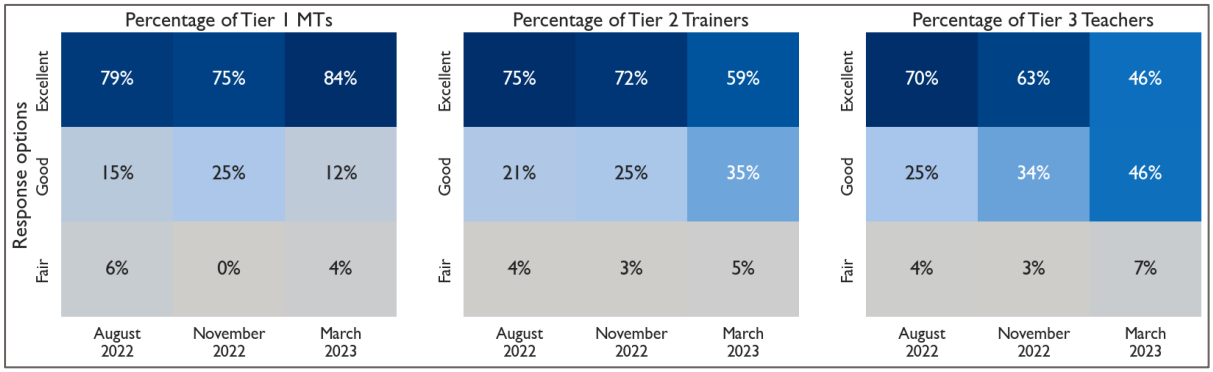
The findings of the TPD Effectiveness Study are presented below and are organized by RQ.

RQ1: WHAT IS TEACHERS' LEVEL OF SATISFACTION REGARDING TPD LEARNING EVENTS?

Teachers and trainers were very satisfied with the Program's training. On average, across all three satisfaction surveys, using a five-point scale, 97 percent of MTs (Tier 1), 96 percent of trainers (Tier 2), and 95 percent of teacher respondents rated the trainings as 'excellent' or 'good'.[13] **Figure 4** illustrates the satisfaction survey scores over the three data collection points. In general, the Program found the following:

- Respondents predominately rated the training as 'excellent'.
- There were slightly higher levels of satisfaction by MTs and trainers, compared to teachers across training sessions.
- There was an overall reduction in satisfaction in the March 2023 training compared to the two previous trainings.

Figure 4: Level of participant satisfaction by level over time



Moreover, close to 100 percent of respondents stated that they would recommend the Program's training to colleagues. In the March 2023 survey, around 94 percent of respondents indicated that the Program's training was better than other trainings that they had attended.

The Program aimed to minimize the dilution effects of the cascade model through the implementation of a rigorous quality assurance process. We can see in Figure 4, for example, that although there was some dilution effect between tiers of training, the dilution effect was not as significant as could have been expected.[14] Tier 3 levels of satisfaction were still over 90 percent 'excellent' and 'good' across the three time points.

During the March 2023 trainings, Tier 2 and Tier 3 participant ratings dropped from mostly 'excellent' to 'good'. Specifically, while in November 2022, 72 percent and 63 percent of Tier

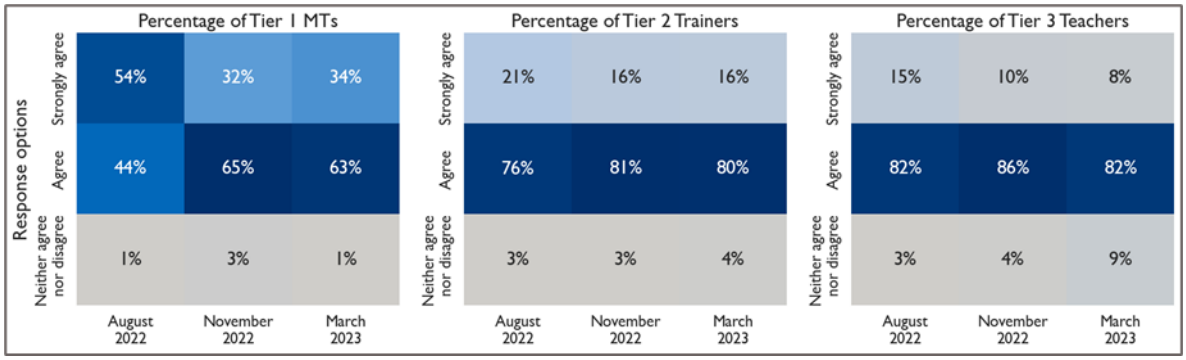
[13] The 5-point scale is Excellent, Good, Fair, Poor, and Very Poor. In Figure 4, Poor and Very Poor are not presented because close to zero percent of respondents chose this ranking.
[14] Dichaba, M. M. & Mokhele M.L (2012). Does the cascade model work for teacher training? Analysis of teachers' experiences. *International Journal Educational Science* 4/3: pp249 - 254.

2 and Tier 3 participants, respectively, indicated an 'excellent' rating, only 59 percent and 46 percent gave a similar rating in March 2023.

During the May CLA activity (see below), the Program asked Tier 1 participants for their opinion on why this rating dropped from 'excellent' to 'good'. Participants indicated possible explanations such as participant demotivation due to MoPSE's announcement that it would be rolling out a different set of materials for the next academic year.

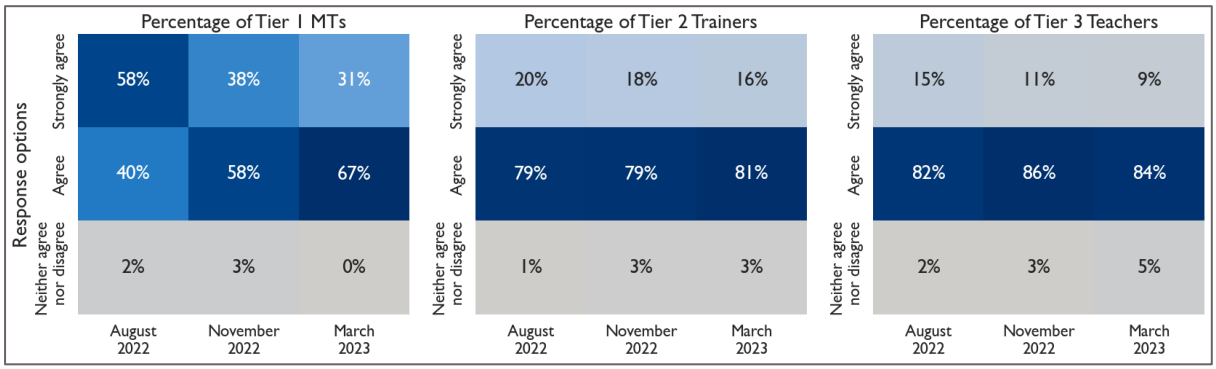
Participants were satisfied with trainers' preparedness. An average of 97 percent of MTs, 97 percent of trainers, and 94 percent of teachers 'strongly agreed' or 'agreed' that their trainers were prepared. However, the variation between tiers between 'strongly agree' and "agree' is significant. Depending on the tier and time point, between 44 and 86 percent of participants 'agreed' that the trainers were well prepared and the percentage of participants who 'strongly agreed' ranged from 8 to 54 percent across all three time points and all three tiers (**Figure 5**).

Figure 5: Level of satisfaction with trainer preparation



Teachers and trainers were satisfied with the level of engagement and participation during learning events. Over 90 percent of teacher participants, across all tiers and three survey time points, indicated that they 'agreed' or 'strongly agreed' that trainers asked questions that encouraged participants to think and reflect (**Figure 6**). However, relatively fewer Tier 3 teachers selected 'strongly agreed' compared to other tier trainers.

Figure 6: How trainers engaged participants and whether trainers asked questions that encouraged participants to think and reflect



RQ2: TO WHAT EXTENT DO TPD LEARNING EVENTS IMPROVE TEACHERS' CONTENT KNOWLEDGE AND PEDAGOGICAL SKILLS EMBEDDED IN THE TG?

The Program administered content-related tests to all trainers and teachers. **Study findings show that teachers have a high level of TG content knowledge after training events**. **Figure 7** indicates that for each of the post-tests, participants, on average, answered at least 79 percent or six out of seven subject-specific questions correctly. The scores per training highlight the content shift from easier to more complex teaching strategies between August 2022 and March 2023 (for example, toward differentiated instruction, the writing process, mathematics conceptualization, formative assessment, etc.).

Figure 7: Average post-test results by subject

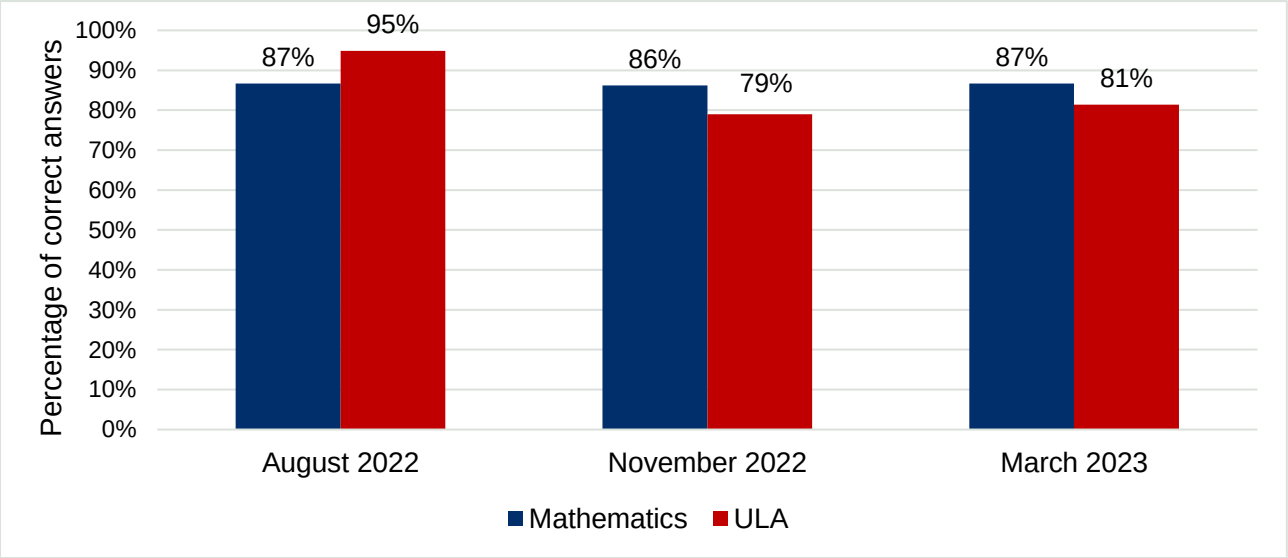
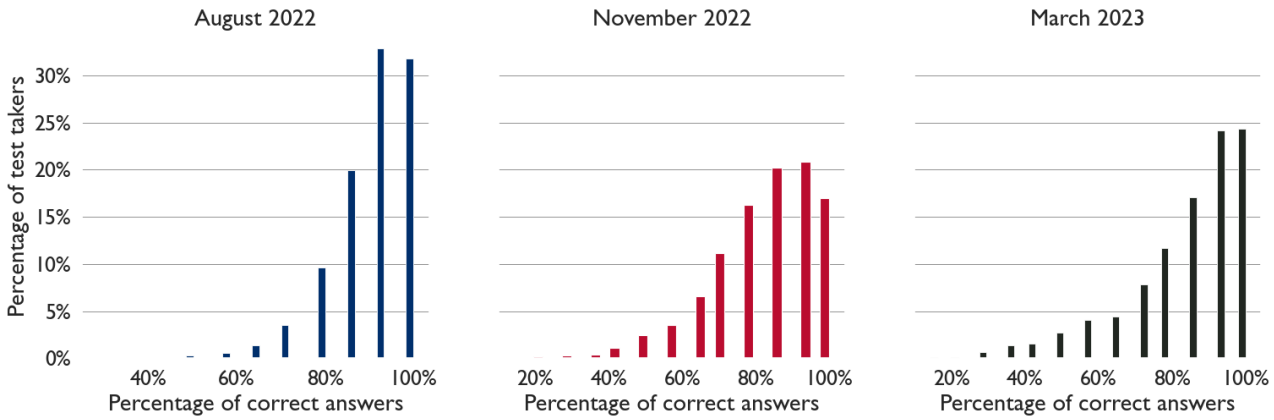


Figure 8 provides a breakdown of the training content knowledge scores. The distribution reaffirms that most participants scored at or above 80 percent in the content post-tests in August, November, and March.

Figure 8: Distribution of teachers' post-test results across three time points

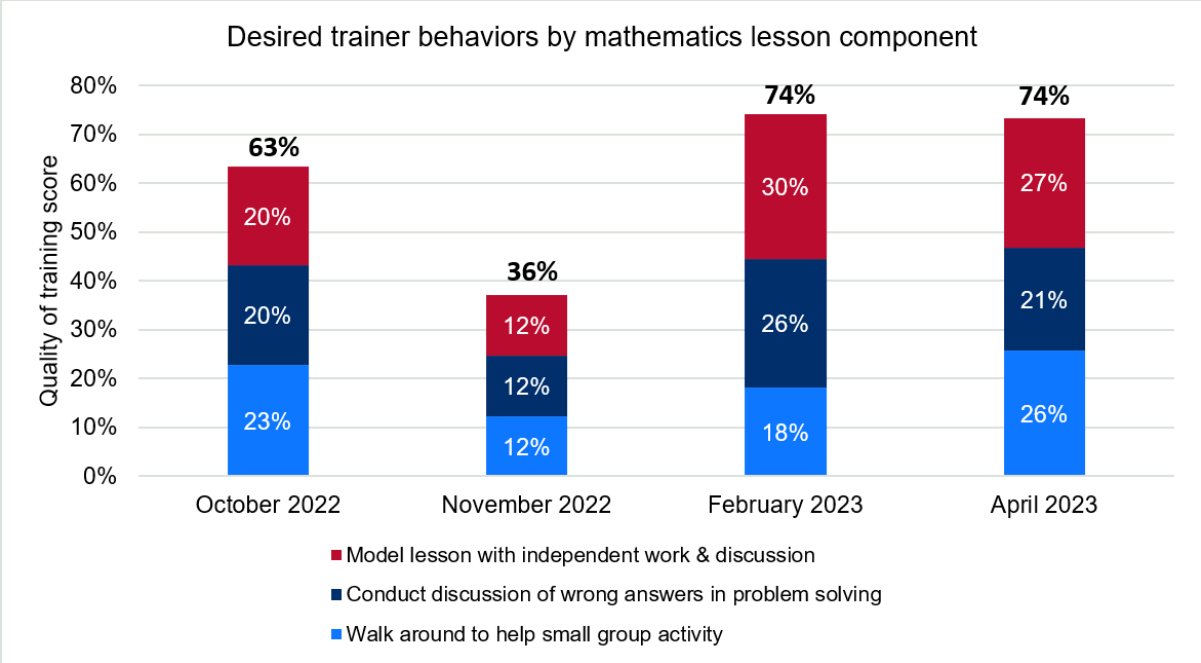


The Program collected and analyzed the trainer quality assurance data from 825 observations during training sessions.[15] FAs observed Tier 2 trainers' application of new knowledge and skills in their training sessions with Tier 3 teachers. FAs recorded their findings using the open-source Tangerine:Coach tool. Observation items changed depending on the content of the training sessions.

The large majority of trainers were consistently able to model Mathematics lessons, support group work and practice, and facilitate discussion in Mathematics training sessions. Figure 9 highlights the data on trainers' demonstrating three desired behaviors (walking around supporting groups, discussing incorrect mathematical answers, and modeling with independent work). The number of trainers exhibiting all three practices improved by 11 percentage points over the school year, with around 74 percent of trainers demonstrating the desired behaviors of an ideal mathematics[16] training sessions by February 2023[17].

FAs provided structured feedback to teachers as part of the quality assurance process. The Program also used these data to inform subsequent training sessions.

Figure 9: Observed desired trainer behaviors by lesson (for quality assurance)



[15] Trainings and quality assurance observations did not take place in December 2022 and January 2023 due to severe weather and nationwide power outages. In March, observance of Ramadan also prevented quality assurance observations from taking place.

[16] Given the different nature of the ULA materials, quality assurance trainer observations changed for each training time period, and thus no comparisons of ULA quality assurance data over time are possible.

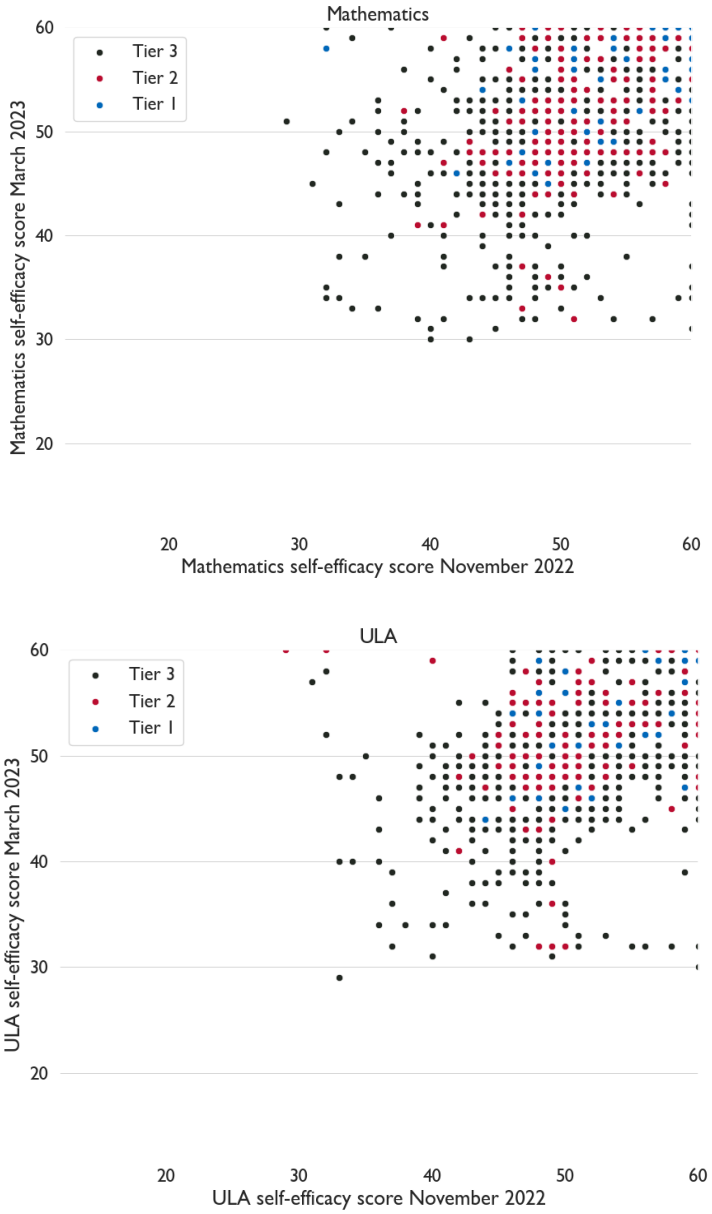
[17] The quality of training score for Mathematics trainings was calculated by equally weighting three desired observed behaviors. A quality of training score of 100 percent indicates that the trainings were conducted in the desired manner with each component equaling a maximum of 33 percent.

RQ3: TO WHAT EXTENT DOES TEACHERS' SELF-EFFICACY ABOUT TEACHING ULA AND MATHEMATICS IMPROVE BY ATTENDING TPD LEARNING EVENTS?

Overall teacher self-confidence (self-efficacy) to teach ULA and Mathematics remained at a flat and high rate. The self-efficacy survey consisted of 12 items on a 5-point scale, with a score range from 12–60 points. A score of 40 represents a good level of confidence. Teachers maintained high self-efficacy scores, with an average score of around 50 out of maximum of 60 for both Mathematics and ULA between two timepoints November 2022 and March 2023 (**Figure 10)**.

As can be seen from **Figure 10** also, the average self-efficacy scores of Tier 1 participants was slightly higher than for Tier 2 participants, and similarly Tier 2 participants had slightly higher self-efficacy scores than Tier 3 participants in both subjects with scores of 53, 51, and 49 respectively.

Figure 10: Scatter plot of self-efficacy scores by time point, tier, and subject



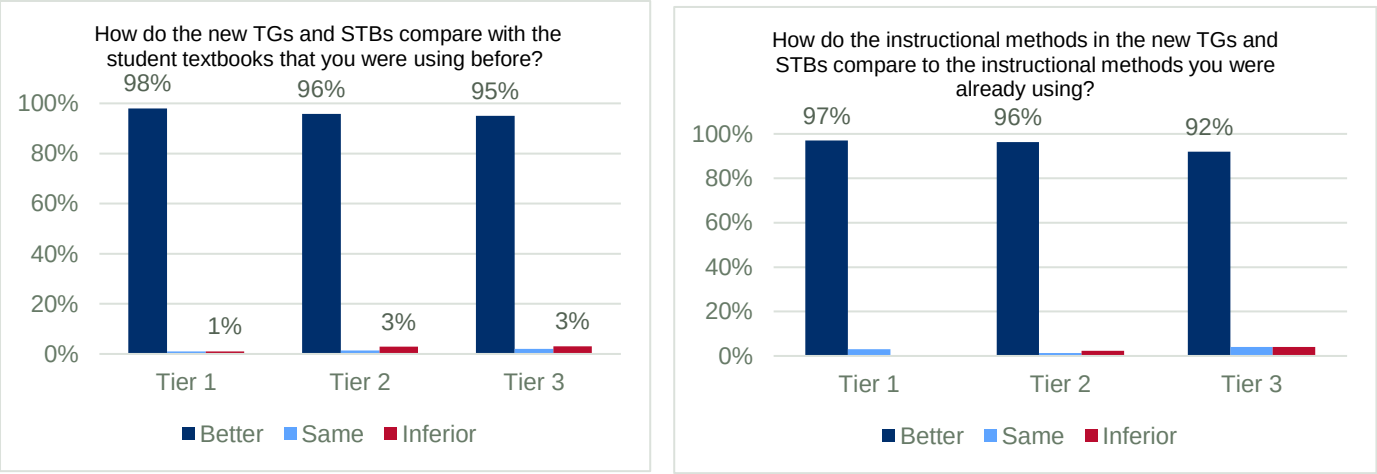
An analysis of the relationship between self-efficacy scores and levels of participation (or attendance) in Program trainings did not yield a statistically significant correlation of significant magnitude. However, the Program found a moderate magnitude level of correlation between participation and Tier 1 self-efficacy scores.

RQ4: WHAT ARE TEACHERS' BELIEFS AND ATTITUDES REGARDING THE TPD PILOT APPROACH AND CONTENT?

In March 2023, the Program included some additional questions to the satisfaction survey to delve deeper into teacher beliefs and attitudes regarding the effectiveness of the TPD pilot. **Overall, teachers were very satisfied with the content and training approach as compared to those of previous trainings they attended.**

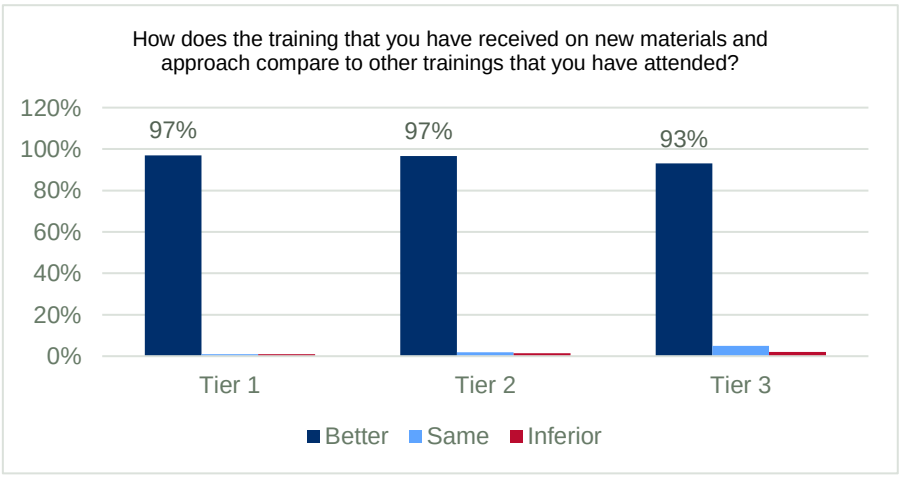
Over 95 percent of trainers and teachers at all three levels of the cascade approach stated that the new materials on which they were being trained were better than the materials they were using before. Similarly, over 90 percent of respondents indicated that the instructional methods in the new materials were better than those in the materials teachers were already using **(Figure 11).**

Figure 11: Teacher perceptions of new materials and instructional methods



Over 90 percent of teachers were also overwhelmingly satisfied with the trainings as compared to other, prior trainings they had attended (**Figure 12**).

Figure 12: Teacher perceptions of current training compared to prior trainings



Teachers' satisfaction with the pilot content and methodology as described above can explain, in part, teachers' reasoning for attending the trainings. Specifically, most teachers stated that the main reason for attending the trainings was an interest in learning about new materials. Fewer teachers stated an interest in receiving a certificate of participation as a motivating factor for attending training sessions, thereby demonstrating a stronger intrinsic motivation to learn than might have been expected (**Figure 13**).

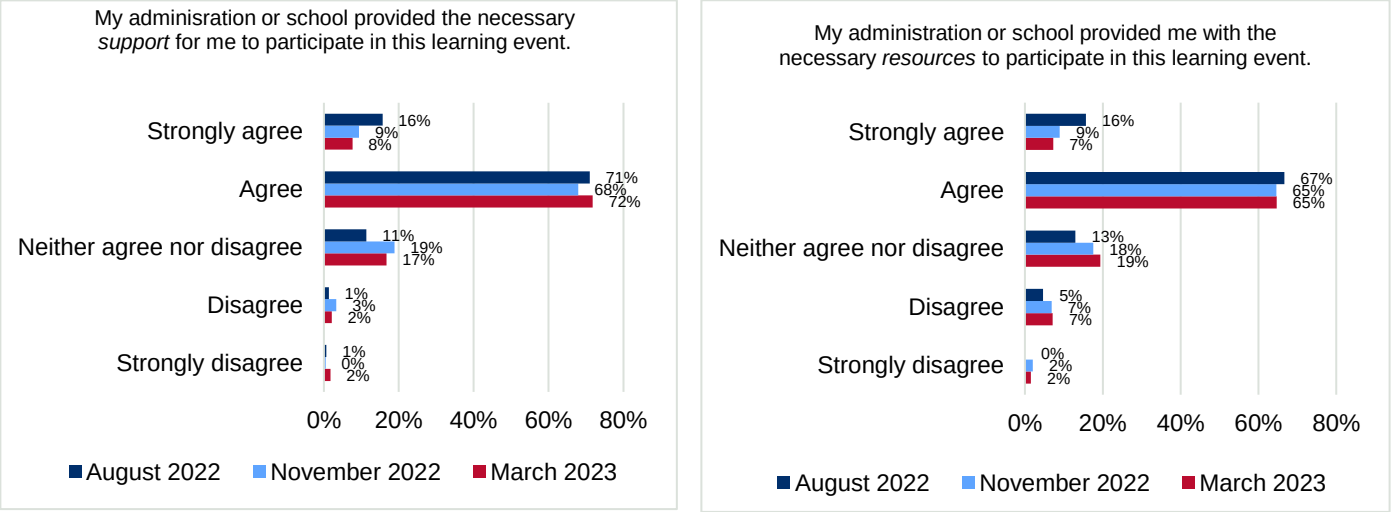
Figure 13: Participant reasons for attending trainings

RQ5: TO WHAT EXTENT ARE TEACHERS RECEIVING SUFFICIENT ADMINISTRATIVE SUPPORT TO ATTEND LEARNING EVENTS AT THE SCHOOL LEVEL?

The majority of trainers and teachers enjoyed the support of their school administration to participate in TPD activities. In answer to the last RQ of the study and depending on the point in time, between 68 and 72 percent of participants 'agreed' that their administration or school provided the necessary *support* for them to participate in the TPD training sessions offered by the Program. During the same time periods, between 65 and 67 percent of participants also 'agreed' that their administration or school provided them with the necessary *resources* to participate in all TPD training sessions (**Figure 14**)[18].

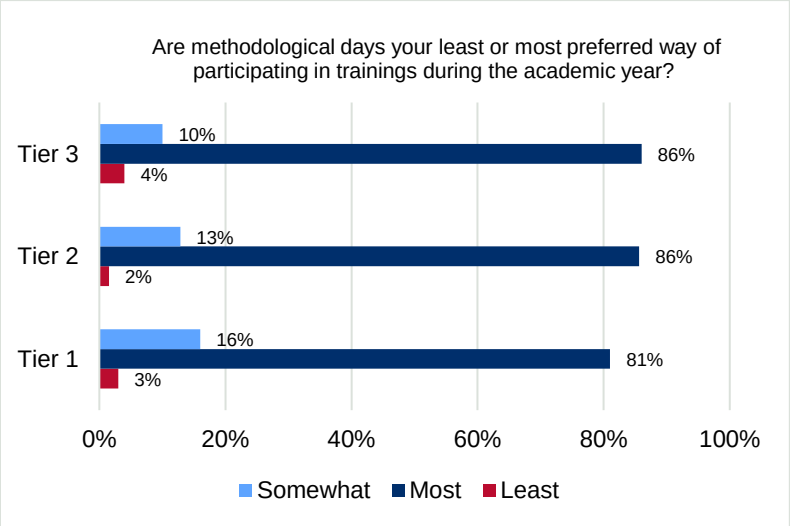
[18] An example of administrative support includes support and encouragement from the Principal to conduct and attend trainings. Examples of necessary resources include access to classrooms with working laptops, whiteboards and internet.

Figure 14: Support and resources from administration to attend learning events



When the Program learned that MoPSE was intending to cancel MDs, researchers included a question in the March 2023 satisfaction survey on whether participating in training events on MDs was their least or most preferred way of participating in training events. Depending on the tier, between 81 and 86 percent of participants indicated that participating in training events during MDs was their most preferred means (**Figure 15**).

Figure 15: Participant perception of MD as means of participating in training



COLLABORATING, LEARNING, AND ADAPTING

In May 2023, the Program held a CLA event with 80 Tier 1 MTs. During the event, some of the TPD Effectiveness Study findings were presented to the MTs. The purpose of the event was to analyze and interpret the data. Program event facilitators showed MTs data and asked how more favorable outcomes could be achieved. Discussions provided further insight on future TPD approaches. Questions and answers are summarized below.

- How can teacher satisfaction with training events be increased?

  - Ensure school principals are better informed of professional development activities.
  - Ensure a reliable Internet connection and a stable Learning Management System to mitigate trainer frustration with electronic attendance issues.
  - Reinstate the district methodologist position that had been eliminated by MoPSE. Eliminating this position led to low quality organizational and methodological support. This was because methodologists were instrumental in ensuring that teachers were aware of upcoming trainings and overall field-based coordination.

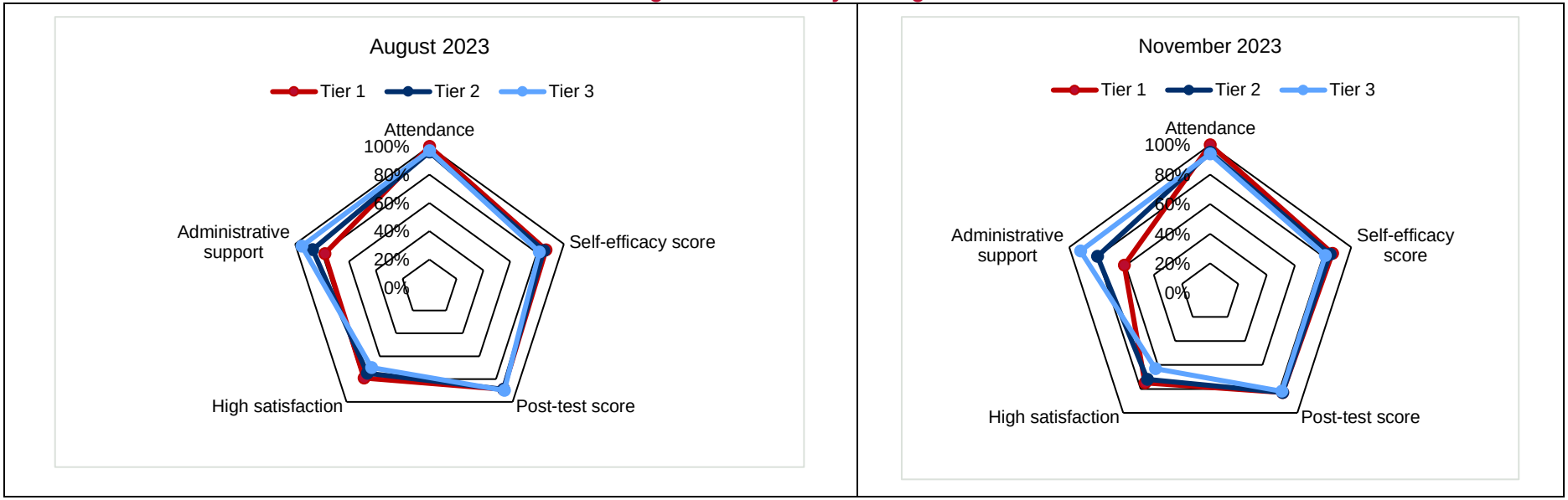
- How can MTs better engage Tier 2 trainers, and how can Tier 2 trainers better engage teachers?
  - Remunerate MTs and trainers when conducting trainings.
  - Ensure greater adherence to training protocols, such as having participants turn off or silence mobile phones, respecting break times, following the schedule more closely, and being more actively engaged.
  - Ensure a more rigorous selection process of Tier 2 trainers such as through an interview process, via pre-testing, or by developing more demanding selection criteria.
- What were the reasons that content knowledge for ULA dropped and remained lower after August 2022?
  - ULA questions were long and somewhat difficult to answer, and thus led respondents to answer randomly.
  - In comparison with Mathematics, the ULA material content was more complex and harder to understand.

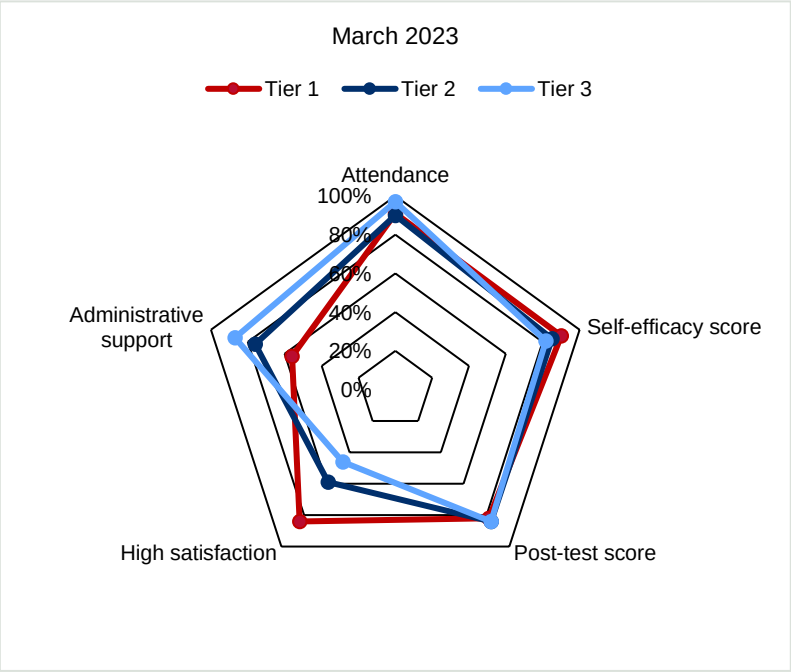
SUMMARY FINDINGS THROUGH THE LENS OF THE GUIDING FRAMEWORK

The study's RQs emanated from the study's guiding framework (see Table 1 above) and are reflective of four of the main factors that are critical to effective training. The study's findings are summarized in **Figure 16** and indicate that **the Program's TPD approach was effective in terms of the following factors:**

- *Satisfaction* with the Program's training content and methodology
- *Learning of relevant*, applicable skills and knowledge
- *Positive attitudes* and beliefs to implement new skills
- *Perception of education system* support to attend training and to use newly acquired skills and knowledge in the classroom

Figure 16: Summary findings




March 2023
Tier 1
Tier 2
Tier 3
Attendance
100%
80%
60%
40%
20%
0%
Self-efficacy score
Post-test score
High satisfaction
Administrative support

In addition, the Program monitored attendance closely, and the strong teacher and trainer attendance rates (**Figure 16)** also contributed to the effectiveness of the approach. Attendance was high and teachers commented that in-person training was preferred over virtual training. However, the cold weather in December and January prevented teachers from traveling to training venues. In addition, the Program noted that attendance declined during Ramadan in March and the Referendum[19] in April. In response, the Program offered catch-up events to support teacher completion of training sessions and awards of TPD credit.

[19] Government of Uzbekistan held a constitutional referendum on April 30, 2023 which was conducted in public schools throughout the country.

CONCLUSIONS AND RECOMMENDATIONS

This section provides an overview of the main conclusions and recommendations drawn from the above findings.

CONCLUSIONS

- Trainers and teachers participated in most of the TPD in-person offerings.
- Teachers and trainers were very satisfied with the Program's training content and approach.
- Teachers were pleased with the level of preparedness of the trainers and their level of engagement and participation during training sessions.
- Teachers and trainers demonstrated a high-level of knowledge about the newly introduced TG subject-matter content and instructional strategies after training events.
- Most teachers expressed a high level of confidence to teach Mathematics and ULA.
- Most trainers were consistently able to model lessons, support group work and practice, and facilitate discussions in training sessions.
- Most trainers and teachers enjoyed the support of the school administration to participate in TPD activities.
- Most participants indicated that they received sufficient administrative support and resources to attend learning events. Interestingly, however, when Tier 1 participants provided explanations of barriers to higher levels of training quality, they listed mostly system administrative reasons such as a need for methodological support; more reliable Internet; better process for selecting trainers, with better remuneration; and better communication with school principals.
- The TPD approach demonstrated the successful application of four critical factors to effective training: satisfaction, learning, self-efficacy, and system support.

Based on these findings it is possible to conclude that the Uzbekistan Education for Excellence Program TPD approach was indeed effective. Moreover, the data point to minimal dilution effects of the cascade model that was part of the TPD approach. It is also possible to conclude that this can be attributed to the continuous trainer quality assurance observations conducted throughout the training cycle.

RECOMMENDATIONS

Based on the above study findings, the Program offers the following recommendations for the MoPSE to consider in future TPD initiatives.

- Ensure all teacher training is student-centered and practical and includes modeling, role playing, small group practice, discussion, and reflection.
- Conduct shorter trainings but on a regular, monthly basis and effectively utilize MDs.
- Reinstate MDs to offer practical, school-based training to teachers.

- Establish a ‘feed-forward’ information loop to effectively inform future trainings.
- Conduct trainer and teacher quality assurance classroom observations to inform trainings.

REFERENCES

Clark, D., & H. Hollingsworth. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education 18*, 947–967.

Dichaba, M. M. & M.L Mokhele. (2012). Does the cascade model work for teacher training? Analysis of teachers' experiences. *International Journal Educational Science* 4/3: pp249 - 254.

Enochs, L., Smith, P.L, & Huinker, D. (2000). Establishing factorial validity of the mathematics teaching efficacy beliefs instrument. *School Science and Mathematics 100(4)*, 194–202.

Garet, M., Porter, A., Desimone, L., Birman, B., Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. American Educational Research Journal, 38(4), 915–945.

Jordan, R., Pouezevara, S., & Strigel, C. (2022). *A monitoring, evaluation, and learning framework for technology-supported remote trainings*. Research Triangle Park, NC: RTI International. Retrieved from https://ierc-publicfiles.s3.amazonaws.com/public/resources/MEL_Framework_FINAL.pdf

Kirkpatrick, D. L. (1994). *Evaluating training programs: the four levels*. San Francisco: Emeryville, CA: Berrett-Koehler; Publishers Group West.

ANNEX

TPD IMPLEMENTATION PROCESS

Table 1-1: Implementation process

Readiness and practical training	Follow-up and support with quality assurance and peer coaching	Action research to inform quality training
Before training: ▪ Determine participants' existing knowledge, skills, and beliefs about new content. ▪ Establish practical learning goals and objectives for all content. ▪ Design and develop practical content that includes student-centered strategies with modeling, small group practice, and discussion. ▪ Design and develop training plan, guides, slide decks, and scripts. ▪ Ensure permissions, support, and engagement of leadership at all levels, including supervisors and administrators. ▪ Ensure all logistical inputs are in place, including electronic participant lists and groups. ▪ Ensure participant readiness through messaging. **During training:** ▪ Implement training. ▪ Monitor attendance. ▪ Administer formative tests and surveys. **After Training:** ▪ Conduct post-training meetings with trainers for lessons learned and action items for following training.	**Before training:** ▪ With training subject matter experts (SME), design and develop classroom observation tool and question items for trainers. ▪ With training SMEs, design and develop observation tool and question items for teachers and participants. ▪ Based on the tool, develop and test an electronic quality assurance tool for trainers and teachers and participants. ▪ Develop a peer coaching tool. ▪ Confirm method of deployment for all tools. ▪ Ensure all logistical inputs are in place. ▪ Ensure the support of supervisors and administrators. ▪ Develop and implement training on electronic tools and tablets for quality assurance assessors. **During training:** ▪ Deploy trainer quality assurance tool throughout cascade levels. ▪ Monitor quality assurance process. **After training:** ▪ Deploy teacher observation quality assurance tool at the classroom level. ▪ Facilitate peer coaching. ▪ Monitor classroom observations and peer coaching. ▪ Collect, scrub, analyze quality assurance data. ▪ Share quality assurance finding with SMEs. ▪ SMEs use quality assurance findings to inform the next round of training.	Confirm action research agenda and questions that answer the following: ▪ Are participants satisfied with the training? ▪ Are participants learning the content of the training? ▪ Are participants' self-confidence, beliefs, and attitudes shifting with the new content? ▪ Are participants receiving the necessary support from supervisors and administrators? ▪ Are participants applying new knowledge and skills in the classroom? ▪ Are students' learning outcomes improving? ▪ Develop concept note and analysis plan. ▪ Develop and pilot qualitative and quantitative tools. ▪ Train assessors. ▪ Collect, scrub, code, and analyze data. ▪ Write and disseminate findings and report.