

Non-learner 0%	2.31	1.89	3.77	7.16	6.33	10.32	6.93	8.63	7.06	10.53	63.02	61.47	34.85	40.44
Emergent learner 1-40%	24.57	25.89	27.86	24.42	41.12	43.79	53.89	59.16	57.06	63.16	20.07	24.21	38.53	42.28
Established learner 41-80%	39.54	43.16	40.15	38.53	33.45	31.58	38.44	31.37	35.16	26.32	11.8	11.79	20.35	15.44
Proficient learner 81-100%	33.58	29.05	28.22	29.89	19.1	14.32	0.73	0.84	0.73	0	5.11	2.53	6.28	1.84
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Although girls in primary school grades are predominantly non-learners in word problems, by grade 7 CBE girls have achieved proficient learner status (Table 25). In contrast, girls in government schools are still struggling with word problems and are predominantly emergent in this subtask. The pattern shifts for the SEGMA 2 subtask. Much like for primary grades, girls in CBE have maintained an emergent learner status for SEGMA 2; however, we see government school girls crossing into the established learner band of achievement. For SEGMA 2, both CBE and government school girls are non-learners, which may be due to algebra and more complex maths only beginning to be introduced in lower-secondary school grades.

Categories	CBE			GOV		
	EGMA 6	SEGMA 1	SEGMA 2	EGMA 6	SEGMA 1	SEGMA 2
	Word problems	Advanced multiplication, division etc.	More complex equations (incl. algebra)	Word problems	Advanced multiplication, division etc.	More complex equations (incl. algebra)
Non-learner 0%	10.71	8.33	64.29	2.17	17.39	67.39
Emergent learner 1%-40%	28.57	46.43	22.62	45.65	30.43	23.91
Established learner 41%-80%	27.38	23.81	9.52	36.96	43.48	8.7
Proficient learner 81%-100%	33.33	21.43	3.57	15.22	8.7	0
	100%	100%	100%	100%	100%	100%

In higher grades, there are more variations in achievements between CBE and government schools. CBE girls in grade 5 are struggling as non-learners with word problems and government school girls have crossed into the emergent band of achievement for this subtask; however, by grade 7, CBE girls have become proficient in word problems with no movement into upper bands of achievement for government school girls. Grade 7 government school girls are, however, more established in advanced multiplication and division. These results may indicate that different approaches to teaching maths are being used in CBE and government schools, with higher achievement in word problems but lower achievement in advanced multiplication for CBE girls perhaps an indication that CBE teachers are relying less on more structured equations. Although this may be evidence of more interactive CBE teaching, it may also indicate that CBE lower-secondary school teachers are struggling with more complex and structured maths equations. However, the overall results suggest that teachers teaching lower-secondary grades are struggling more with teacher competencies and with maths in particular.

When questioned in focus groups and interviews, 66.7% of girls noted that maths was an area they particularly struggled with. 13.3% of parents also noted that they had seen their children struggling with

maths. The majority of girls described methods which their teacher used to help them with maths, but 20% of girls reported that their teachers did not do enough to help them. These cases were concentrated among government intervention communities. Numeracy outcomes are strongly linked with all six teaching competency standards, indicating that teaching ability is a strong predictor for students' uptake of numeracy skills.

Province-wise, the lowest numeracy scores in grade 1 can be found in Badakhshan, particularly in the most remote districts. This also holds for literacy skills. Given that teacher competencies are also the lowest in the most remote districts of Badakhshan, we can hypothesise that girls' low numeracy skills in Badakhshan can be linked to low teacher competencies which can be linked to the lower supporting resources available to teachers and students in these deprived communities, as well as partner staff's difficulties in reaching those communities on a regular basis to provide tailored mentoring support to teachers (even remotely, as border communities often have no phone or internet connectivity at all). In grade 4 and 5 the lowest scores are in Ghor and Badakhshan for both literacy and numeracy. However, due to issues with data in Ghor results for Ghor may not be reliable. At grade 7, lowest numeracy scores are in Kabul and Faryab.

Highest numeracy scores for grade 1 are in Ghazni, Paktiya and Parwan, although small sample sizes in Ghazni and Paktiya make it difficult to draw conclusions for the lower grades. However, high scores for Ghazni, Paktiya and Parwan persist into grade 4 and 5, in addition to Khost. In grade 7, numeracy scores are substantially higher in Khost than in other provinces.

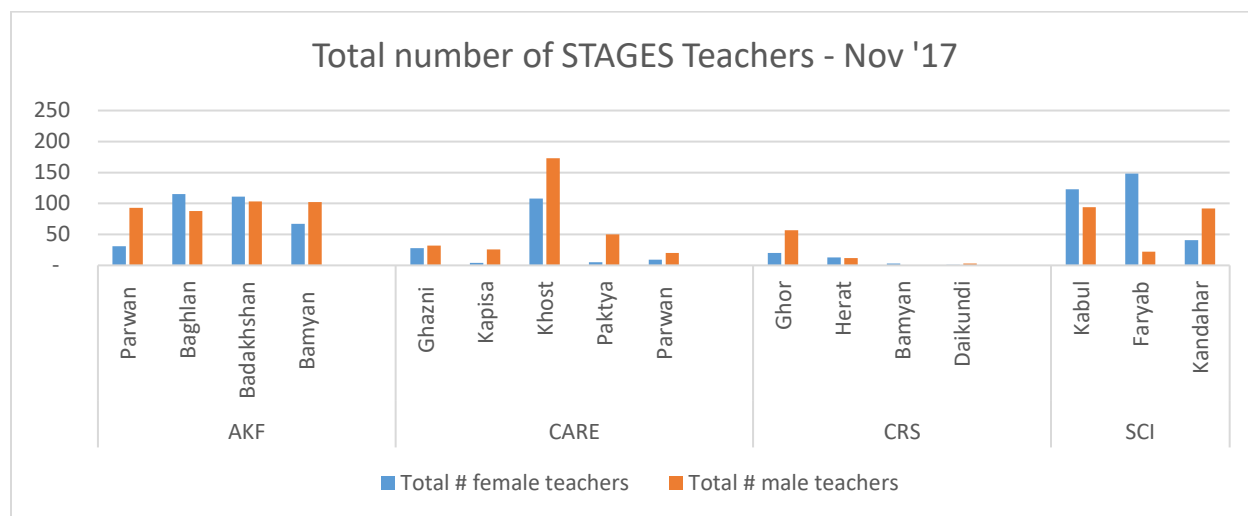
Province	n (mean)				
	Gr 1	Gr 2	Gr 4	Gr 5	Gr 7
Badakhshan	78 (19.7)	12 (56.1)	72 (30.9)	51 (17.6)	8 (41.7)
Baghlan	76 (32.5)	---	53 (45.5)	34 (47.6)	7 (35.1)
Bamyan	49 (35.7)	12 (38.7)	42 (51.3)	56 (56.6)	19 (29.7)
Fayrab	87 (26.2)	---	23 (28)	10 (47.8)	16 (19.2)
Ghazni	4 (43.3)	---	2 (49.5)	31 (63.5)	1 (25)
Ghor	28 (29.3)	---	11 (16.1)	18 (42.6)	1 (4.2)
Hirat	16 (35.8)	---	14 (38.9)	3 (51.8)	1 (15)
Kabul	55 (30.9)	---	48 (31)	15 (38.8)	29 (20.4)
Kandahar	84 (29.4)	---	4 (44)	3 (56.1)	14 (42.9)
Kapisa	12 (35.4)	---	6 (44.9)	33 (36.4)	3 (46.4)
Khost	19 (38)	---	12 (59.6)	86 (67.8)	29 (70.3)
Paktia	4 (39.6)	---	14 (43.8)	27 (45.3)	1 (60.8)
Parwan (CARE)	3 (47.5)	---	3 (63.2)	27 (67.1)	1 (59.2)
Parwan (AKF)	24 (37.5)	---	12 (57.6)	24 (58)	---
Overall n (mean)	539 (29.9)	24 (47.4)	316 (39.2)	418 (55.2)	130 (38.4)

Given that CARE is the implementer in all the highest scoring provinces (which are relatively contextually diverse), we can theorise that CARE staff may be the most successful in providing training and ongoing professional support relating to maths to teachers. This would be particularly logical for grade 7, since CARE has been implemented lower secondary CBE in Khost for several years and so teacher trainers and

project-supported teachers have likely both received training on lower secondary grade maths for a longer period of time. An analysis of CBE teacher types and qualification levels in these provinces also shows that in contrast to other provinces which have a high number of teachers with below grade 12 qualifications, only 16 teachers in these four provinces have qualifications below grade 12, with the vast majority of teachers having at least grade 12 education or higher (university or TTC graduates). Therefore, students' higher numeracy scores may also be linked to their teachers' higher qualifications.

Province	Sum of Female # <Grade 12	Sum of Male # <Grade 12
Badakhshan	1	16
Baghlan	0	4
Bamyn	22	26
Faryab	0	0
Ghazni	1	0
Ghor	7	10
Herat	3	8
Kabul	10	4
Kandahar	9	30
Kapisa	0	0
Khost	2	8
Paktya	3	0
Parwan	2	0
OVERALL TOTAL	60	106

Khost, Paktya and Parwan provinces are also categorised by the low proportions of female teachers as compared to other provinces.



By sub-group, the only significant link with lower numeracy skills is not being able to speak the language of instruction. This may partially explain the low numeracy scores in remote regions of Badakhshan, where girls speak minority languages like Shughni and Wakhi for which no learning materials exist and classes are taught in Dari. By barriers, girls' numeracy scores are lower if they are poor, if they don't feel safe at school and if their teacher doesn't make them feel welcome. The same patterns hold for literacy scores.

Girls' only classes and time spent reading are significant enablers of both literacy and numeracy skill uptake. Peer mentoring as an enabler of numeracy skill uptake only. Qualitative data suggests that teacher-organised, structured peer mentoring is used much more frequently in government school classes than in CBE classes, likely due to the much larger class sizes in government schools.

Conclusions

There are a number of factors which may have an impact on the uptake of numeracy skills. Some of these are already addressed through planned project activities, some require more information and some can be further addressed through tailoring activities.

Factor	Potential impact	Action
Teacher education level and teaching competency level <ul style="list-style-type: none"> Maths content knowledge and knowledge of maths teaching strategies 	<p>Teachers with lower education levels may struggle with their own maths knowledge and how to teach it.</p> <p>Teachers with lower competencies may lack teaching strategies relating to numeracy skill uptake.</p>	<p>Assess a sample of teachers' maths skills to understand their own knowledge levels.</p> <p>Embed maths teaching strategies into planned TPD cycles including coaching, mentoring, TLCs and workshops.</p>
Time spent reading	More time spent reading books has a positive effect on cognitive function relating to both literacy and numeracy skill uptake.	Continue to provide library books and community campaigns focused on increasing interest in reading.
Peer mentoring	Structured peer mentoring embedded into lesson planning helps students who are strong in maths help those who are weaker.	Include peer mentoring as a maths teaching strategy to be included in TPD activities.
Teacher behaviour and class safety	Girls who feel unsafe and unwelcome at school struggle to learn well, impacting both literacy and numeracy skill uptake.	Continue to address issues around school safety such as corporal punishment, verbal intimidation and harassment through shura and teacher training.
Language of instruction	Girls who do not speak the language of instruction struggle to understand class content, impacting literacy and numeracy skill uptake.	Provide supplementary first language materials where possible and embed dual language teaching strategies into TPD cycles.
Partner experience/expertise	CARE partner staff may be particularly skilled in training teachers on maths teaching strategies, resulting in higher numeracy skill uptake in CARE provinces.	Interrogate CARE training methodology to understand if they are using particularly useful strategies.

Assessment of maths knowledge level

In order to tailor TPD materials and approaches to improve teachers' ability to teach maths, STAGES suggests the following methodology.

1. Selection of a sample of EGMA papers from the baseline evaluation of varying levels and containing students' correct answers and incorrect answers.
2. Random sampling of CBE and government school teachers across project areas, and containing a balance of female and male teachers and varying qualification levels.
3. Teachers will be asked to mark the EGMA papers including identifying incorrect answers and providing corrections.
4. The marked papers will be sent back to the PMU to be assessed and an analysis produced. The resulting analysis will give the project greater understanding as to (1) teachers' knowledge of maths subject content and (2) teachers' ability to assess students' maths skills.

The above methodology is recommended as an alternative to asking teachers to complete the EGMA tests themselves as it will (a) avoid demoralising teachers by asking them to complete the same testing as the students and (b) provide an additional layer in understanding teachers' ability to *teach* maths, rather than simply complete maths problems themselves.

Timeline

	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Development of tools (students' EGMA papers)							
Sampling of teachers for assessment							
Assessment							
Analysis							
Presentation of results							
Workshop on development of materials/approach for TPD							
Incorporation of materials into TPD cycles							