Technical Note 47

Young Lives

Design of the Classroom Observation Sub-study in India, 2017–18

Ana Grijalva, Rhiannon Moore, P. Prudhvikar Reddy, Caine Rolleston, and Renu Singh

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About Young Lives

Young Lives is an international study of childhood poverty, following the lives of 12,000 children in four countries (Ethiopia, India, Peru and Vietnam) over 15 years. **www.younglives.org.uk**

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Contents

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Prudhvikar Reddy has been Senior Researcher and Survey Coordinator at Young Lives India since the project's inception in 2002. With the help of a dedicated team of fieldworkers he has kept the attrition of households at low levels, a crucial element of a longitudinal cohort study, and has published widely on poverty-related topics. He is also instrumental in the dissemination of Young Lives findings at district and local levels. His research interests include agriculture, poverty rural development, irrigation management, health, credit and the handloom sector.

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1. Context

1.1. Introduction

During 2017-18, Young Lives undertook a classroom observation study in Andhra Pradesh and Telangana, India. Building upon data from the Young Lives 2016-17 school effectiveness survey, the study offers the opportunity to understand more about what is happening in the classroom, and how this is associated with variation in student learning gain. Data collected through this sub-study can be used to address research questions with a great deal of policy relevance in Indian secondary education, such as:

- To what extent do teacher-student classroom interactions explain differences in student learning attainment in secondary classrooms?
- What in terms of observed interactions in the classroom explains higher and lower effectiveness (value-added)?
- What are the characteristics of classroom environments where students learn more?
- How do teacher-student interactions vary between different types of schools, and between schools in different localities?

The classroom observations were conducted using the CLASS-Secondary (Classroom Assessment Scoring System) tool for classroom observation. The comprehensive teacher-level data generated by use of the CLASS-S methodology provide detailed aggregate information of some of the teaching practices which make a difference to student learning – a considerable benefit of using this method of observation (Bruns et al. 2016). This technical note provides an overview of the sub-study design and implementation, including details of the validation of the CLASS instrument for use in the Indian context. A discussion of key findings from the study can be found in Grijalva et al. (2018).

1.2. Young Lives

Young Lives is an international study of childhood poverty that has followed the lives of 12,000 children in Ethiopia, India (the states of Andhra Pradesh and Telangana), Peru and Vietnam since 2002. Young Lives follows two groups of children in each country – the 'Younger Cohort' born in 2001-2, and the 'Older Cohort' born in 1994-95. This allows us to compare the same children at different ages to see how their lives are changing, as well as different children at the same age, to see how communities have changed over time. A sentinel site sampling design is employed in all four countries. The Young Lives sample is not nationally representative; in each country, 20 purposively selected sites were chosen at the beginning of the study to represent national diversity, with a pro-poor bias (Rolleston et al. 2013).

The household survey has been conducted with Young Lives children and their families every three years since 2002, with Round 5 (the latest round) conducted in 2016-17. Child questionnaires, household questionnaires and community questionnaires gather data on household composition, livelihood and assets, household expenditure, child health, access to basic services, and education.[1]

1 See Boyden and James (2014) for further details of the different types of data collected by Young Lives.

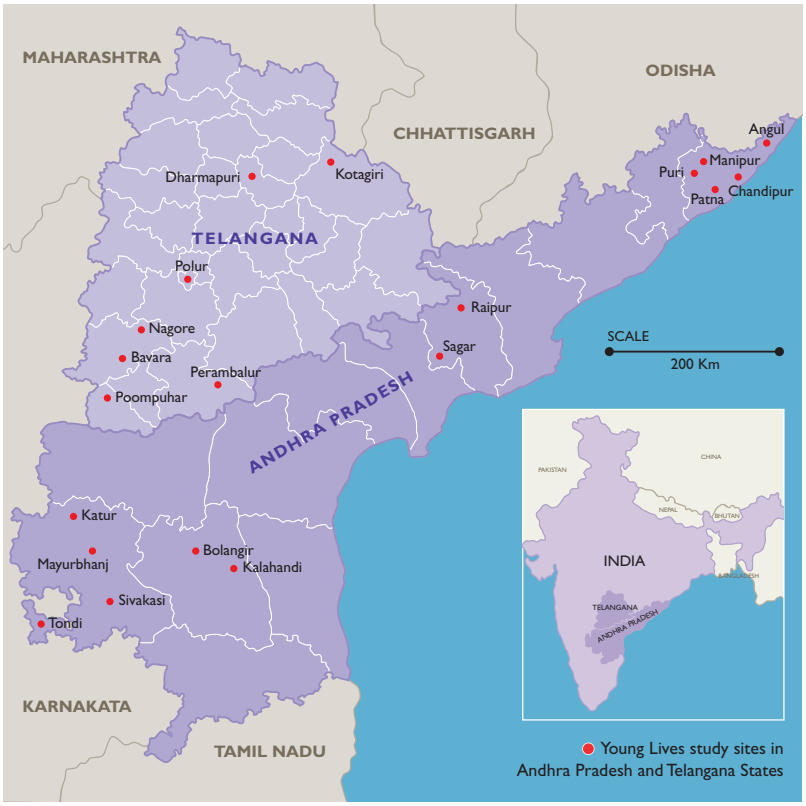
In 2010, a school component was introduced to explore Young Lives children's experiences of schooling and education in depth. Primary school surveys were conducted in India (2010), Peru (2011), Vietnam (2011-12) and Ethiopia (2012-13), and in 2016-17, a further round of school surveys was conducted at upper primary level (in Ethiopia) and secondary level (in India, Peru and Vietnam).

1.3. Secondary school survey in India, 2016-17

Young Lives conducted a secondary school effectiveness survey in India in 2016-17. This survey examined school effectiveness through three outcome measures: students' performance in maths; functional English; and transferable skills. Student performance in maths and functional English was assessed using repeated measures, with linked cognitive tests administered at the beginning and end of Grade 9. This allows students' progress over the course of one year of secondary schooling to be considered in relation to their background, and individual, class, teacher and school factors.

The design of the 2016-17 school survey focused on the quality and effectiveness of secondary education in different school management types found within the diverse Indian educational context: State Government; Private Unaided; Private Aided; and Tribal/Social Welfare. For this reason, the sample was stratified by school management type (see Moore et al. (2017) for more detail). Overall, the school survey included 205 schools, 519 teachers and 8,355 students across 20 Young Lives sites in Andhra Pradesh and Telangana (see Figure 1).[2]

Figure 1. *Young Lives study sites in Andhra Pradesh and Telangana*



2 In India, Young Lives sites are at the *mandal* level. A mandal is an administrative unit below district level.

Following the school effectiveness survey, in 2017-18 Young Lives undertook a classroom observation sub-study in India. The research design of this study allows it to augment key findings from the school effectiveness survey, creating a unique dataset which links teacher classroom practices to student learning outcomes. This can be used to understand what effective teachers *do* in the classroom and how teachers and students *interact with* and *relate to* each other, helping to unlock the 'black box' of the education production function and explore some of the classroom factors associated with differences in student learning outcomes.

2. Classroom observation sub-study

2.1. Classroom observation using CLASS

There are many different methods available for undertaking classroom observation, built on different theoretical frameworks and with different aims and objectives. The main focus of this sub-study was to explore interactions between teachers and students, and the extent to which these are associated with student learning. For this reason, we have undertaken observations in reference to the conceptual framework of 'teaching through interactions', which is based on theories such as effective teaching, attachment, self-determination, responsivity and scaffolding (Bornstein et al. 2008; Bronfenbrenner and Morris 1998). Above all, this framework posits daily teacher-student interactions in the classroom as the primary engine through which children learn (Pianta and Hamre 2009). The observations were undertaken using the observational tool associated with this conceptual framework: Classroom Assessment Scoring System-Secondary (CLASS-S).

The CLASS-S tool was developed in the USA using pre-kindergarten data, and was later improved and extended to cover other age groups (Hamre et al. 2013). CLASS has been developed and refined using both theory and empirical evidence, and has been used for teacher professional development, educational research, and as a quality rating benchmark to improve the education system (Leyva et al. 2015). Several studies undertaken in the USA suggest that higher scores on the CLASS-S tool are positively associated with student academic performance and positive academic attitudes (Hamre et al. 2013). Although originally developed for use with teachers and students in the USA, CLASS has been used to measure effective learning interactions between teachers and students in a number of other sociocultural contexts, and with evidence of consistent and rigorous results.[3]

CLASS-S identifies three domains of teacher-student interaction as relevant to student learning: emotional support, classroom organisation, and instructional support (Pianta et al. 2012). Eleven dimensions sit within these domains, as shown in Table 1.

3 In the Americas, CLASS has been used in Canada, Chile, Costa Rica, Colombia, Brazil, Ecuador, Jamaica and Mexico; while in Europe, it has been used in Denmark, Belgium, England, Finland, Germany, Greece, Italy, Netherlands, Norway, Portugal, Poland, Spain and Switzerland. In Asia, it has been used in China, Kyrgyzstan, Lebanon, Saudi Arabia, South Korea, Turkey, United Arab Emirates, and Vietnam. It has also been used in Australia and Tanzania (Teachstone 2018).

Table 1. *CLASS domains and dimensions*

Domain	Dimension
Emotional support	Positive climate
	Teacher sensitivity
	Regard for student perspectives
Classroom organisation	Behaviour management
	Productivity
	Negative climate
Instructional support	Instructional learning formats
	Content understanding
	Analysis and inquiry
	Quality of feedback
	Instructional dialogue
Student engagement	

The domain of emotional support involves a teacher's warmth and sensitivity toward children, which allows children to be more engaged with the lesson, and consequently more likely to benefit from it (Landry et al. 2009). There are three dimensions of emotional support in the classroom: positive climate (levels of warmth and respect between teacher and student); teacher sensitivity (teacher responsiveness to students' academic and emotional needs); and regard for student perspectives (how teachers support students' interests and opinions) (Pianta et al. 2012).

The domain of classroom organisation involves the management and organisation of student behaviour, time and attention in the classroom to improve children's self-regulatory skills and maximise 'opportunity for learning' (Raver 2004). There are three dimensions of classroom organisation: behaviour management (how a teacher sets clear behavioural expectations and prevents and redirects misbehaviour); productivity (how time and routine are managed to maximise instructional time); and lack of negative climate (levels of hostility and aggression between teacher and students) (Pianta et al. 2012).

The domain of instructional support involves the promotion of meaningful conversation between a teacher and their class, to encourage students to analyse and reason through the provision of 'scaffolding' and in-depth explanations. Children with the opportunity to practice existing skills enhance their cognitive and language development (Pianta et al. 2002). There are five dimensions of instructional support: instructional learning formats (how a teacher facilitates activities and engages students in them); content understanding (approaches used to help students understand the lesson); analysis and inquiry (how a teacher promotes higher-order thinking skills); quality of feedback (how a teacher expands student learning through 'feedback loops'); and instructional dialogue (how a teacher uses cumulative questioning and discussion to guide and prompt student understanding) (Pianta et al. 2012).

In addition to these domains addressing teacher-level support, CLASS-S also assesses student engagement by scoring the level of students' academic engagement and motivation in the classroom (Pianta et al. 2012).

2.2. Study design

The classroom observation study comprised three elements of data collection: the CLASS-S standardised classroom observation tool; an open-ended teacher questionnaire; and videos of teacher-student interactions. An overview of each element is given below.

2.2.1. Classroom observation

Sampled teachers were observed and scored using the CLASS-S tool described above. In line with CLASS guidelines, observers were trained and certified in use of the CLASS-S tool to ensure observation validity and reliability.[4] For this study, ten observers took part in a three-day training course in Hyderabad, Telangana, and then passed a certification test.

During fieldwork, each teacher was simultaneously observed by a team of two certified observers. Each observer assessed the teacher individually, and each pair of observers then agreed a joint assessment score based on their individual assessments. This 'double assessment' increases the validity of scores. Teachers were observed for four 'cycles', with each cycle lasting 30 minutes (15 minutes for observation and 15 minutes for assessment). This means that each teacher was observed for two full lessons on the same day. In small schools with just one Class 9 section, it was not possible to observe a teacher teaching Class 9 on two occasions in one day; in these cases, the teacher was observed teaching Class 9 for one lesson and Class 10 for the second lesson.

Each teacher was scored using the CLASS-S 'guiding rubric' for each dimension, which uses a seven-point scale. A 'low' score ranges from 1-2, and a 'high' score ranges from 6-7. Scores for the dimensions in each domain (see Table 1) are combined to give each teacher an average score out of seven for that domain.[5]

2.2.2. Open-ended teacher questionnaire

The selected teachers were asked to fill out a questionnaire comprising 13 open-ended questions. The questionnaire was provided in a bilingual format (English/Telugu) and teachers were able to answer questions in whichever language they felt most comfortable. The questionnaire complements the information collected by the CLASS-S tool, with questions on topics such as teachers' opinions and perspectives on the curriculum used to teach Class 9, lesson preparation, and on the mechanisms used to offer support to students. An open-ended questionnaire format was used to allow teachers to 'explain and qualify their responses' (Cohen et al. 2000: 248), enabling the questionnaire to follow a set agenda on topics of interest without presupposing the nature of the response.

2.2.3. Classroom observation videos

Alongside the collection of live observation data, a sub-sample of the observed teachers was also filmed.[6] The resulting video data have been used to create a set of clips illustrating one example of each dimension of the CLASS-S tool within the Indian educational context.[7]

4 Training and certification was provided by Teachstone, the institution in charge of implementing CLASS worldwide. Teachstone assists other organisations in conducting classroom observations, offers training and certification of observers, and provides professional development for teachers (Teachstone 2018).

5 Simple average scores are calculated based on the CLASS-S methodology.

6 For logistical reasons, observation and filming did not take place at the same time. Live observations took place in November and December 2017, while filming took place in January 2018.

2.3. Sampling strategy

2.3.1. Sampling of teachers for observation

The design of the classroom observation sub-study focused on understanding more about the effects of the classroom environment, and of teacher-student interactions, on student learning. It was therefore important to be able to identify those schools and teachers which added more or less 'value' to student learning over the course of one school year.[8] For this reason, the study took place with a sub-sample of the teachers who participated in the Young Lives 2016-17 school survey, which allowed existing data on teacher value-added to be used in the sampling design, along with background information on schools, teachers and students.

The sampling strategy used was purposive, to ensure that it included a mixture of more and less 'effective' teachers, as well as schools in both urban and rural areas, and with different types of school management. For logistical reasons, it focused on schools within four districts: two in Andhra Pradesh and two in Telangana. Table 2 details the purposive sampling process used, while Table 3 provides an overview of the final sample.

Table 2. *Steps for drawing purposive sample for classroom observation sub-study*

	Steps for drawing classroom observation sub-study purposive sample
Step 1	Using data from the Young Lives 2016-17 school survey, estimate school and section level value-added for English and maths for all of the schools in the sample list.
Step 2	Classify sections as 'high value-added', 'low value-added' and 'average value-added' based on the quartile distribution of value-added scores.
Step 3	Drop schools from districts other than Anantapur, Srikakulam, Karimnagar and Mahbubnagar. Drop schools with fewer than 20 students in each section to ensure more reliable value-added estimates.
Step 4	Purposively select sections with high value-added for both maths and English, sections with low value-added for both maths and English, sections with average value-added, and sections with a mixture (e.g. high value-added for maths and low for English).
Step 5	Review suggested sample to ensure that it includes a combination of different school management types, and is distributed evenly across the four districts in both urban and rural areas. Also, consider mean school wealth index and contextual value-added scores so that differences in student background are also taken into account in the sampling. Finalise sample of schools and sections, taking these considerations into account.
Step 6	Identify teachers who taught the selected sections in 2016-17. Contact schools to confirm whether this teacher is still employed at this school teaching Class 9 in the 2017-18 academic year. Where necessary, draw replacement schools and teachers from replacement list.

Table 3. *Classroom observation sample by district*

State	District	Number of schools	Number of maths teachers	Number of English teachers
Andhra Pradesh	Anantapur sites	5	4	5
	Srikakulam sites	7	7	7
Telangana	Karimnagar sites	4	4	4
	Mahbubnagar sites	7	7	7
Total		**23**	**22**	**23**

7 Given that the CLASS-S tool was developed in the United States, it is relevant to explore how the conceptual framework holds across populations with different sociocultural conditions. To view the video clips, visit https://www.youtube.com/playlist?list=PLSfJoEGwxmnYWBTjN0lvwGywI6zELiAo6.

8 See Rolleston and Moore (2018) for more information about value-added estimates using Young Lives data.

The classroom observation study included close to 10 per cent of the teachers who took part in the school effectiveness survey which took place one year prior. Teachers who took part in the classroom observation sub-study were largely similar to the population of teachers included in the school survey, although a slightly larger proportion were male and had a B.Ed degree or higher (see Table 4). Most taught within State Government schools, with a smaller proportion in Private Unaided, Private Aided and Tribal/Social Welfare schools. This largely reflected the teacher sample from the larger survey, with slightly more teachers from State Government schools to reflect stakeholder interest in understanding more about what is taking place in government school classrooms.

Table 4. *Comparing teacher characteristics: 2016-17 school survey and 2017-18 classroom observation sub-study*

		School effectiveness survey (2016-17)	Classroom observation sub-study (2017-18)
Number of teachers by subject	Maths teachers	273	22
	English teachers	246	23
	Total teachers	519	45
Percentage of teachers by school type	Private Aided (%)	14	11
	Private Unaided (%)	23	18
	State Government (%)	49	58
	Tribal/Social Welfare (%)	13	13
Selected teacher background characteristics	Mean teacher age	41	38
	Male teachers (%)	54	63
	Mean years of experience as a teacher	13	13
	Teacher has a B.Ed degree or higher (%)	81	95

Within each school, the classroom observation study observed the selected maths and English teachers teaching Class 9 students (see Section 2.2.1 for details of implementation in each school). As this study took place in the academic year after the secondary school survey, the Class 9 students participating in the observed lessons are not the same students included in the school survey. However, we anticipate that teacher-student interactions will remain fairly constant over time (Pianta et al. 2012) and so here we link teacher value-added estimates from 2016-17 with teacher observation data from 2017-18.

2.3.2. Sampling of teachers for the classroom observation video

Following the live classroom observations, a sub-sample of teachers was filmed to capture 'good' examples of each of the CLASS-S dimensions being demonstrated in the Indian context. For this purpose, six teachers were selected based on having high CLASS-S scores from the live observations: three from Telangana and three from Andhra Pradesh. The main criteria for selection was that the teacher should have an above-average score for each of the three CLASS-S domains, plus a 'high' score (a CLASS-S score of 6 or 7) for at least one dimension. The subject taught, school management type, and school location were also taken into account, although were not directly used as selection parameters. Table 5 provides an overview of the sample of teachers who participated in filming.

Table 5. *Videoing sub-sample by district*

State	District	Number of schools	Number of maths teachers	Number of English teachers	Total number of teachers
Andhra Pradesh	Srikakulam sites	2	1	2	3
Telangana	Karimnagar sites	2	1	2	3
Total		**4**	**2**	**4**	**6**

3. Validation of CLASS in the Indian context

3.1. Internal validity of the CLASS framework

As the CLASS-S classroom observation tool has not previously been used in India, it was important to conduct validation exercises prior to beginning analysis to explore how the CLASS conceptual framework holds across the Indian social and cultural context. The first validation exercise carried out was a confirmatory factor analysis (CFA). This was conducted to determine the structural validity of the CLASS tool in this context. In literature relating to the USA, both theory and empirical data provide support to the three-factor structure of CLASS-S (Pianta et al. 2008). For this reason, the exploratory CFA for this report aimed to ascertain the factor structure of CLASS-S given the data from Indian classrooms.

A review of the goodness-of-fit statistics suggested that a three-factor model does not fit the data well in the Indian sample (see Table 6). We therefore proposed using an alternative model which allows the residuals of certain observed variables to be correlated, as this appears to fit the data better. The correlations between the different CLASS dimensions were analysed to identify which covariances should be allowed. The dimensions of different domains were revealed to be highly correlated (see the correlation matrices in Appendix 1). To improve the fit of the model, we allowed the residuals of the following variables to be correlated: 'positive climate' and 'instructional learning formats' (ρ=0.87); 'regard for adolescent perspectives' and 'analysis and inquiry' (ρ=0.89); 'regard for adolescent perspectives' and 'quality of feedback' (ρ=0.78); and 'analysis and inquiry' and 'instructional dialogue' (ρ=0.90). After including these correlations, the three-factor model has an acceptable fit (see Table 6).

Table 6. *Comparison of goodness-of-fit statistics between the two models*

Goodness-of-fit statistics	Initial model	Alternative model	Cut-off criterion
CFI	0.80	0.94	CFI > 0.90 acceptable fit
TLI	0.74	0.92	TLI > 0.90 acceptable fit
RMSEA	0.26	0.14	RMSEA < 0.08 acceptable fit
SRMSR	0.09	0.06	SRMR < 0.08 acceptable fit

Notes: CFI (comparative fit index); TLI (Tucker-Lewis reliability index); RMSEA (root mean square error approximation; and SRMSR (standardised root mean square residual).

Table 6 shows that the RMSEA of the alternative model is not above the cut-off criteria, indicating that the model does not have an acceptable fit based; however, the other three goodness-of-fit statistics, CFI, TLI and SRMSR, point out that the alternative model has an acceptable fit. Thus, it can be concluded that the alternative model fits the data better than the initial model and has an acceptable fit.

Overall, the factor loadings for a three-factor model of the CLASS data in the Indian context are high and significant (Appendix 2). Furthermore, they are similar to those found in literature relating to the use of CLASS in the USA (see Hamre et al. 2013). Only three factors had a factor loading of less than 0.80, with the lowest factor loading found for negative climate (-0.51). Cronbach's Alpha coefficients for this model are similarly high (Table 7), showing a high level of internal consistency which demonstrates that each set of items are closely related as a group in each domain.

Table 7. *Cronbach's Alpha coefficients by CLASS domain*

	Alpha
Emotional support	0.90
Classroom organisation	0.78
Instructional support	0.95
Overall (all dimensions)	0.96

These analyses suggest that there is a good level of internal validity for the use of CLASS in India, along with some evidence supporting the existence of three distinctive domains of teacher-student interactions. Given that the tool has not been used in this context before, this is a positive sign.

3.2. External validity of the CLASS tool

The external validity of the use of CLASS-S in India can also be explored by comparing data from the Young Lives study with that collected from the use of CLASS-S in other countries. Table 8 provides an overview of mean scores for each dimension, as well as an overall score for each domain, for this study and for four other studies conducted using CLASS-S.

Table 8. *CLASS-S descriptive statistics and differences between the Indian sample and samples from four other countries*

	India (2018) (N = 45)	Norway (2018) (N = 54)	Finland[a] (2017) (N = 46)	United States (2013) (N = 37)	England (2010) (N = 17)
Dimensions					
Positive climate	4.66 (0.99)	4.99 (0.89)	4.93 (0.45)	4.20 (0.74)	4.02 (1.13)
Teacher sensitivity	4.56 (0.95)	5.04 (0.93)	5.14 (0.42)	1.20 (0.35)	1.11 (0.45)
Regard for students perspectives	3.83 (0.94)	3.83 (0.76)	3.07 (0.76)	4.70 (0.81)	4.44 (0.98)
Behaviour management	4.96 (1)	6.05 (0.94)	5.79 (0.61)	3.40 (0.88)	3.20 (1.22)
Productivity	4.79 (0.87)	4.52 (0.89)	5.89 (0.38)	5.40 (0.76)	5.28 (0.95)
Negative climate[b]	6.7 (0.43)	6.65 (0.45)	6.78 (0.09)	5.30 (0.67)	5.11 (0.96)
Instructional learning formats	4.52 (1.07)	4.60 (0.94)	4.8 (0.31)	4.40 (0.71)	4.09 (1.03)
Content understanding	4.49 (1.07)	3.72 (0.90)	3.84 (0.62)	3.80 (0.73)	4.18 (0.96)
Analysis and inquiry	3.44 (1.10)	2.38 (0.79)	2.46 (0.40)	3.20 (0.92)	4.09 (1.09)
Quality of feedback	3.89 (1.19)	3.44 (0.83)	3.02 (0.51)	3.9 (0.82)	3.27 (1.11)
Instructional dialogue	3.73 (1.13)	2.66 (0.92)	2.73 (0.64)	-	4.07 (1.12)
Student engagement	5.03 (0.84)	-	-	-	4.95 (0.89)
Domains					
Emotional support	4.35 (0.88)	4.62 (0.78)	-	4.70 (5.60)	3.88 (0.86)
Classroom organisation	5.49 (0.67)	6.07 (0.70)	-	5.00 (0.61)	4.83 (0.77)
Instructional support	4.02 (1.02)	3.36 (0.75)	-	3.80 (0.63)	3.82 (0.85)

Notes: This table shows the mean with the standard deviation in parentheses.
[a] The variance is shown in parentheses. [b] These values are for reversed negative climate.

Sources: Data taken from the following studies: England (Malmberg et al. 2010); USA (Allen et al. 2013); Finland (Virtanen et al. 2017); Norway (Westergård et al. 2018).

As shown in Table 8, the results obtained for each dimension and domain from CLASS-S in the Indian context are relatively similar to those obtained in the other four studies. To some extent, this suggests that the results have some external validity. However, the cross-country comparisons in Table 8 should be reviewed with caution, due to differences in sampling and study design between the four studies. Moreover, the mean score for emotional support and classroom organisation are slightly lower in the Indian study than in the USA, while the mean score for instructional support is slightly higher, which is perhaps a little unexpected. This is a finding which merits further exploration so that its implications can be properly understood.

4. Next steps

This technical note presents an overview of the design of the classroom observation sub-study in India, along with details of validation exercises undertaken with the CLASS-S data collected in this study. Initial findings from the classroom observation sub-study are presented in Grijalva et al. (2018). Forthcoming Young Lives publications will discuss these validation exercises and key findings in further detail. Complementary video clips produced alongside the observation study provide an example of each domain in the context of lower secondary schools in Andhra Pradesh and Telangana. These clips can be accessed at the Young Lives YouTube channel.

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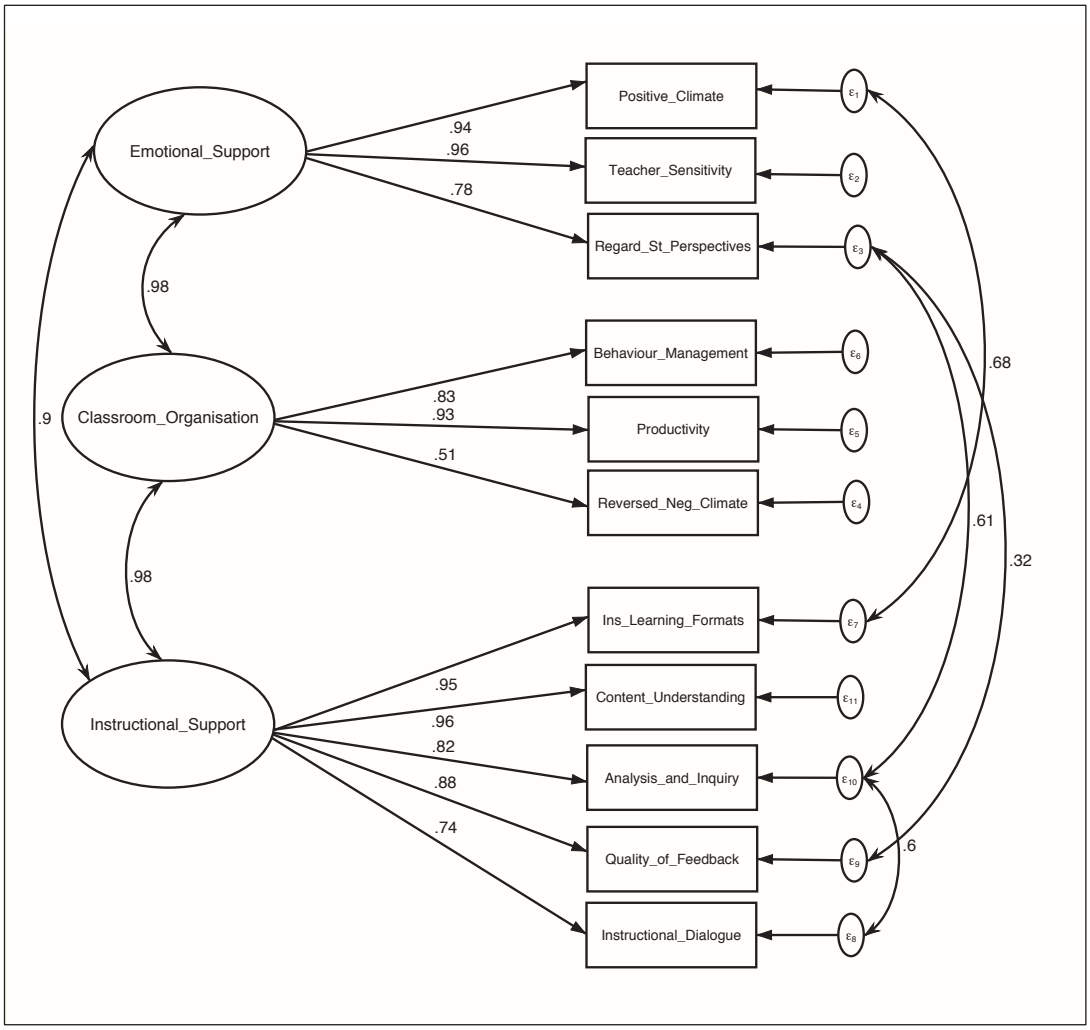
Appendices

Appendix 1. Correlation matrices among dimensions of teacher-student interactions assessed by CLASS

	PC	TS	RAP	BM	P	NC	ILF	CU	AI	QF	ID	SE
PC	1.00											
TS	0.91*†	1.00										
RAP	0.70*	0.67*	1.00									
BM	0.79*	0.82*	0.49*	1.00								
P	0.83*	0.88*	0.75*	0.76*	1.00							
NC	-0.42*	-0.55*	-0.34*	-0.45*	-0.50*	1.00						
ILF	0.87*	0.85*	0.67*	0.78*	0.88*	-0.44*	1.00					
CU	0.82*	0.85*	0.73*	0.79*	0.89*	-0.49*	0.92*	1.00				
AI	0.60*	0.62*	0.89*	0.49*	0.75*	-0.31*	0.72*	0.74*	1.00			
QF	0.67*	0.71*	0.78*	0.61*	0.77*	-0.36*	0.83*	0.86*	0.84*	1.00		
ID	0.57*	0.61*	0.75*	0.52*	0.68*	-0.20	0.71*	0.69*	0.90*	0.81*	1.00	
SE	0.77*	0.84*	0.82*	0.71*	0.87*	-0.45*	0.85*	0.87*	0.81*	0.85*	0.79*	1.00

Notes: N = 44. PC = positive climate; TS = teacher sensitivity; RAP = regard for student perspectives; BM = behaviour management; PD = productivity; NC = negative climate; ILF = instructional learning formats; CU = content understanding; AI = analysis and inquiry; QF = quality of feedback; ID = instructional dialogue; SE = student engagement. †p < .10. *p < .05. **p < .01. ***p < .001.

Appendix 2. Fitted confirmatory factor analyses model



Design of the Classroom Observation Sub-study in India, 2017-18

During 2017-18, Young Lives undertook a classroom observation study in Andhra Pradesh and Telangana, India. Building upon data from Young Lives' 2016-17 school effectiveness survey, the study offers the opportunity to understand more about what is happening in the classroom, and how this is associated with variation in student learning gain. Data collected through this sub-study can be used to address research questions with a great deal of policy relevance in Indian secondary education, such as:

- To what extent do teacher-student classroom interactions explain differences in student learning attainment in secondary classrooms?
- What in terms of observed interactions in the classroom explains higher and lower effectiveness (value-added)?
- What are the characteristics of classroom environments where students learn more?
- How do teacher-student interactions vary between different types of schools, and between schools in different localities?

The classroom observations were conducted using the CLASS-Secondary (Classroom Assessment Scoring System) tool for classroom observation. The comprehensive teacher-level data generated by use of the CLASS-S methodology provide detailed aggregate information of some of the teaching practices which make a difference to student learning. This technical note provides an overview of the sub-study design and implementation, including details of the validation of the CLASS instrument for use in the Indian context.

Young Lives

An International Study of Childhood Poverty

About Young Lives

Young Lives is an international study of childhood poverty, involving 12,000 children in four countries over 15 years. It is led by a team in the Department of International Development at the University of Oxford in association with research and policy partners in the four study countries: Ethiopia, India, Peru and Vietnam.

Through researching different aspects of children's lives, we seek to improve policies and programmes for children.

Young Lives Partners

Young Lives is coordinated by a small team based at the University of Oxford, led by Professor Jo Boyden.

- *Ethiopian Development Research Institute, Ethiopia*
- *Pankhurst Development Research and Consulting plc, Ethiopia*
- *Centre for Economic and Social Studies, Hyderabad, India*
- *Sri Padmavathi Mahila Visvavidyalayam (Women's University), Andhra Pradesh, India*
- *Grupo de Análisis para el Desarollo (GRADE), Peru*
- *Instituto de Investigación Nutricional (IIN), Peru*
- *Centre for Analysis and Forecasting, Vietnamese Academy of Social Sciences, Vietnam*
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