

Remedial teaching in Indian under-resourced communities:

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RESEARCH ARTICLE

Summative evaluation of an on going professional development program for para-teacher to strengthen remedial teaching in Indian slums

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Abstract: This paper presents a summative evaluation of a professional development program for para-teachers within an Indian NGO. The program aimed to support para-teachers in well-structured learner-centered enactment by introducing planning and reflection of daily lessons. The study investigated lesson plans, enactment and pupil outcomes to assess the extent to which para-teachers could plan and enact well-structured learner centered lessons. The study suggests strong evidence that the program was successful in helping para-teachers achieve greater quality of lesson planning, enactment and pupil learning.

Remedial teaching in Indian under-resourced communities: Professional development of para-teachers

1. Introduction

The employment of para-teachers in place of qualified teachers has proliferated in India and internationally, especially as NGOs and governments struggle to achieve universal education against the odds of teacher shortage and limited finances (c.f. Pandey, 2009; Jagannathan, 2003). In India, the induction of para-teachers has been highly debated. Para-educators are

valued for their commitment, insider insights and ability to relate to the unique needs of children in difficult circumstances, and their access to poorer areas (Desai, 2003; Pandey, 2006; Sharma & Mallick, 2009; Ramchandra, 2008). Besides the economic benefits of employing para-teachers, they have earned much credit because of their enthusiasm and regularity (Govinda & Josephine, 2004). However, concerns exist about the lack of basic education and professional teacher training of the para-educators, which threatens to dilute the quality of teaching and learning (Pandey, 2009; Govinda & Josephine, 2004).

Unlike professional teachers, pre-service training for para-educators is not mandatory. Para-educator training is extremely limited, in comparison to teacher training; whereas teacher training programs generally take 4 years to complete and are at the bachelor level. Para-teaching training programs are known to be as short as 5 days of induction training (Ramachandran, Bhattacharia & Sheshagiri, 2008). Increasingly, calls are being made for the professional development (PD) of para-educators in India (Jagannathan, 2003; Sharma & Mallick, 2009) and elsewhere. A recent study (Raval, Mckenney, & Pieters, 2012) highlighted that because of their lack of professional teacher training and cultural context; para-educators working in India (and developing countries) require tailor-made professional development support which is compatible with their unique learning needs and context. While there is considerable documentation of the benefits and challenges of employing para-teachers, the research-base for designing tailor-made professional development for para-educators is limited.

This article contributes to the limited research base on para-teacher professional development by describing an evaluation of a professional development (PD) program for para-teachers. The development of the para-teacher PD program, flanked by a research study took place within an Indian educational NGO, Maitri. It developed over three iterative phases of design plus implementation and two formative evaluation studies. A summative study which is reported in this paper marked the end of three phases. The following describes Maitri's organizational context along with research and development activities that led up to the summative evaluation.

1.1 Context of the PD program and the study

1.1.1 The organizational setting: Maitri, a western Indian city with a population of about 4 million people, provides educational support to slum children through learning centers within their residential communities. Each center has a para-teacher recruited from the local area on a small honorarium, with qualifications ranging from 12th grade to bachelor's degree. 30-40

centers are evenly distributed over 3 clusters, each run by a senior teacher called the cluster head. The cluster-heads report to a program-leader from the management team.

Originally, the centers had been providing free remedial services to public school children in reading and basic math. Later, with the objective of supporting these clusters towards becoming self-sustaining learner-centered community learning institutions, Maitri modified its strategy to teach additional subjects including Gujarati (first language), English, Math, Science, History, Geography and Civics up to grade 7 in a learner centered way and charge fees. Maitri mandated the development of a professional development program to enable the para-teachers to implement learner-centered remedial teaching. A limited base of scientific literature and comparable field practices on para-teacher professional development provided the impetus for a systematic research and development approach for shaping the PD program.

1.1.2 Needs and context analysis: A needs and context analysis (Raval, McKenney & Pieters, 2012-a) was conducted at the onset to determine the learning requirements of para-teachers and contextual influences that would foster or hinder the professional development. The study revealed that para-teachers had high level of commitment and motivation which could play a crucial role in fostering professional development. The study also revealed substantial gaps in basic teaching skills that are required to make enactment well-structured and coherent. The study highlighted characteristics of institutional factors, especially the classroom; organizational factors and policy factors which posed potential challenges to the design and implementation of the PD program. Based on a thorough understanding of the para-teachers' learning requirements and the context drawn from the needs and context analysis, a professional development objective was framed. This objective was in terms of supporting para-teachers to design and implement systematically structured lesson plans with teaching strategies that had a learner centered orientation.

1.1.3 Evolution of the PD program:

a) After the professional development objective was framed a conceptual model was developed to implement the professional development. This model (extensively discussed in Raval, Mckenney, & Pieters, 2010) applies relevant insights about (mostly western) professional development literature to the contextual realities that emerged in this study. It leads to a tailored set of feasible and meaningful professional development activities for the para-teachers. The model entails, (i) three core activities within a cycle, (ii) supportive strategies outside the cycle and, (iii) organizational conditions in the backdrop. The core

activities are: lesson planning, lesson enactment and lesson reflection which serve as the main on-the-job PD activities. When these activities are embedded into the daily work routine of para-teachers, work and learning can be integrated effectively. Support for these daily PD activities is also provided through workshops, micro-teaching sessions and coaching support. The model also highlights that all this happens within an organizational context where the conditions for fostering the core activities must be created (e.g. support of leaders, sufficient time to prepare for lessons). The conceptual model guided the development of the three phased PD program, each of which was evaluated by a research study.

b) Pilot Phase of the PD Program: During this phase, the main researcher piloted the program (in consultation with the management). For the first time, on-the-job PD activities of daily lesson planning before enactment and reflection after enactment were introduced as a part of the daily routine of teachers. Templates were designed to scaffold lesson planning and reflection on daily lessons in which learner-centered ideas were to be enacted. Supportive strategies were also implemented. A workshop was implemented to help teachers understand how to use the templates for planning learner-centered lesson plans for concepts that they were to teach in that academic term. Micro teaching sessions supported the teachers in practicing the ideas in their lesson plans, and on site coaching by the cluster-heads helped them reflect on the actual enactment. The researcher-facilitator supported the cluster-heads through intensive weekly meetings in improving their coaching strategies. Minimal organizational changes were required as the study took place in the summer vacation, during which para-teachers taught an optional subject. Research carried out during the pilot phase (Raval, Mckenney& Pieters, 2012-b) helped to conclude that the core routine of planning, enactment and reflection activities successfully supported para-teachers to gain proficiency in designing well-structured lessons with a learner-centered orientation. After the success of the pilot, the NGO decided to invest in the organizational changes necessary to allow these PD processes to continue when para-teachers had to teach regular academic subjects.

c) Formative phase of the PD Program: This phase of the PD program continued the on-the-job PD activities, but involved substantial changes in the organizational conditions necessary for the PD activities to flourish. For example through a bottom up process, policy changes were introduced that led to improved working conditions for teachers by means of realistic well-planned curricular targets, stable classroom population, reduced class size and increased class heterogeneity. Research conducted during this phase concluded that:

(1) successful adoption of learner-centered strategies in lesson planning and enactment had been achieved (2) due to the nature of the on-the-job learning activities, para-teachers experienced enhanced autonomy and collaborative relationships (3) organizational changes had contributed substantially towards the success of the PD program (Raval, Mckenney & Pieters, 2011). The bottom-up manner through which the organizational changes had been introduced, had contributed to a high level of ownership even on the part of cluster-heads. This encouraged them to take up an educational leadership rather than administrative role within their clusters.

d) Institutionalization phase of the PD program: ~~While~~ Studies during the pilot and the formative phases of the PD program yielded conclusive evidence that participants gained proficiency in planning and enacting lessons with learner-centered strategies. ~~these~~ **These** phases were centrally facilitated by a management member in consultation with the cluster heads. During the institutionalization phase, the central facilitation role was withdrawn and the implementation of the core PD activities was left to the cluster heads and para-teachers. The study reported here evaluates the PD program in the institutionalization phase with a view to examining whether it yielded desired results without intensive central support under completely natural, and sustainable conditions. The following sections provide the theoretical framework and the research design for the study.

1.2 Theoretical Framework:

Across all three phases, evaluation of the PD program was inspired by Guskey's model of professional development (Guskey, 2000). The model elaborates five levels of parameters that can be studied to evaluate professional development. These include a) reactions of teachers: focusing on participants' perceptions about factors like relevance, timeliness of program content as well as about the process of the program; b) participants learning: focusing on their newly gained knowledge, attitudes and skills; c) organizational support and change: focusing on the organizational factors that can impede or foster the eventual success of the professional development program, d) use of knowledge and skills: referring to the actual implementation of newly gained information or skills into daily teaching; and finally e) student learning outcomes. While all the above are important in professional development and influence the eventual success of the professional development activity, literature supports the idea that the ultimate test of professional development of teachers is their ability to transfer new

knowledge and skills successfully in to actual teaching in a way that leads to improved student learning (Ball & Cohen, 1999; Guskey, 2002).

Based on these ideas, the professional development program evaluation adopted some of these parameters for evaluation purposes. In the pilot phase, data were collected on a) the perceptions of the participants towards the PD activities (reactions); b) extent of learner-centered approach in lesson planning (learning: skills); c) para-teachers perceptions about changes (towards learner-centeredness) in their enactment. The formative phase again focused on examining participant learning in terms of the learner-centered lesson planning skills; enactment changes towards a learner-centered approach as well as role (and support) of organizational conditions in promoting the PD program. Since learner-centered lesson planning and enactment were the main focus of the professional development, the institutionalization phase again examined the quality of lesson planning and enactment. In addition to these two parameters, it also focused on improvement in learning gains of pupils.

2. Methods

This study, investigating the institutionalization phase, sought to examine if the PD program yielded desired results even in absence of any central support in natural circumstances. This study sought to answer the following three research question related to the parameters of learning, use of knowledge and skill and pupil learning respectively:

- To what extent did the participants retain or improve the previously gained skill of designing well-structured lesson plans with learner-centered strategies?
The first question compared the quality of lesson planning achieved during the institutionalization phase with those that were achieved during the pilot phase.
- To what extent did participants retain or improve in the use of a well-structured learner-centered approach during enactment?
The second question compared the quality of enactment achieved in the institutionalization phase with the enactment scores evidenced in the formative phase (enactment was not observed in the pilot phase).
- What kinds of pupil learning outcomes have been achieved?

The third question analyzed the learning outcomes of pupils, which were only collected in the institutionalization phase.

2.1 Participants

Of the 25 para-teachers in Maitri, nine para-teachers, three from each cluster, participated in this study (as well as in the study of the pilot and formative phase). These para-teachers were informed about the goals of the study, according to the rules of the Ethical Committee of the University of Twente.

2.2 Procedure

The design of well-structured lesson plans (first research question) was studied through a document review of the lesson plans prepared by the participants. These lesson plans were prepared using planning templates provided during the PD program. Out of the 20 lesson plans developed over 4 weeks by each participant, we selected three per week. Over all, with 12 lesson plans for each participant, 108 lesson plans were selected for document review.

The use of lesson plans during enactment (second research question) was studied through classroom observations of para-teachers enactment conducted over a month. Four observations were conducted for each participant, with a total of 36 observations in all over 4 weeks.

The third research question was investigated by comparing pre-test and post-test scores in Environmental Science for the entire population of 141 pupils across each of the nine participants. Pre and post test scores were also collected for the remaining population of 213 pupils **who** of para-teachers who participated in the PD program but were not tracked across the three studies.

2.3 Instruments

Classroom observations were conducted with the help of a curriculum profile. The use of curriculum profiles in classroom observations for formative as well as summative purposes has been successfully used in several studies (Ottevanger, 2001; van den Akker & Voogt, 1994). Van den Akker and Voogt explained the use of curriculum profiles in classroom observations and described it as a set of statements

about activities and intended behavior of the teachers during the observed lesson (c.f. Motswiri, 2004). The extent to which teachers realize these intentions is established by crediting scores based on classroom observations, which results in the actual practice profile of the teacher (van den Akker & Voogt, 1994). Such a curriculum profile was used to explore the nature of enactment practices. The curriculum profile instrument used in the sub-study discussed here was adapted from other studies (Ottevanger, 2001; Thijs, 1999).

The curriculum profile comprised of 39 items, each one representing a desirable practice. It was divided into four main phases, presented in this order: (1) Preparation for the class; (2) Introduction of the main lesson; (3) Lesson Body: (a) para-educator's role in facilitating the group activity; (b) Pupil's role in the group activity and (4) Conclusion of the lesson. For each item, the observer could put a 'yes', 'no' or 'not applicable'. Inter-observer reliability was established through an intra-class correlation coefficient measure. Three observers observed three classes each. The intra-class correlation coefficient value achieved was .95 which indicates a strong inter-observer reliability.

The test administered by para-educators was a 25-mark test on environmental science (EVS) relating to concepts like food, water, planets and nature. The test was designed by several para-educators and approved by the remaining para-educators. It had a mixed set of objective (e.g. fill-in-the-blank) and short-answer questions (e.g. give reasons in one line). The internal consistency of the test was considered acceptable (Cronbach's alpha = 0.74).

2.4 Analysis

Lesson plans were analyzed using a simple coding scheme comprising of five quality parameters: *completeness*, *accuracy*, *appropriateness and detail*, *internal consistency*, and *new ideas*. Each question in the lesson plan was examined using these parameters one by one. A code "yes (y)" was allotted when a question fulfilled a parameter and "no (n)" when it did not fulfill a parameter. In this way, each question was coded six times. The table below shows how each of the parameters was defined, and offers a sample from a reviewed lesson plan.

For quantifying the quality of the lesson plans based on the parameters, a score of “1” and “0” were used for ‘y’ and ‘n’ respectively. Total percentage scores were calculated for each participant on each parameter and each question. Scores between 0 to 33 percent were categorized as low, 34 to 66 percent as moderate and scores above 66 percent as high. These scores were then compared with the scores obtained in the pilot study, which was when the participants had designed lesson plans for the first time. Parameter wise scores and question wise scores from both the studies were compared for each participant, to assess the extent of retention or improvement in lesson planning.

----- Insert table 2 about here-----

Classroom enactment was analyzed by first scoring all the items with a ‘yes’ as 1 (implying that a desirable practices was fulfilled) and those with ‘no’ as 0. Mean percentage scores for each of the four lesson phases of the lesson, and for each week, were calculated. Total Percentage scores were also obtained per lesson phase. Performance scores between 0 to 33 percent were categorized as low, 34 to 66 percent categorized as moderate and scores above 66 percent were categorized as high. These scores were compared with the enactment scores from the study of the formative phase (classroom observation data was not collected in the pilot study) to assess the extent of improvements in enactment.

Test scores were analyzed in terms of the difference between the pre-test and post-test scores. Effect size was calculated for each class. Through linear regression, the predictive value of pre-test over post-test scores was measured. Correlation of pre-test scores with learning gain was also calculated. Pupil learning outcomes of the nine (observed) teachers were also compared through a T-test with the pupil learning outcomes of the remaining 16 teachers who participated in the professional development but were not tracked. This was done to examine any potential influence of a Hawthorne effect on the performance of the nine teachers who were aware that work was being appraised.

3. Results

3.1 To what extent did the participants retain or improve the previously gained skill of designing well-structured lesson plans with learner-centered strategies?

a) Scores on parameters of quality: The document reviews of lesson plans revealed that for the first three parameters of completeness, accuracy and appropriateness, all participants retained a high score from the pilot to the summative phase. On the parameter of detailing, seven participants reflect an improvement from moderate (in the pilot phase) to high (in the institutionalization phase) and two from low to high. The pilot study, which focused on basic developments in lesson planning, used only the first four parameters. This study looked at two new parameters: on internal consistency, all participants scored an extreme high at 100 percent; and eight participants scored a high rank on 'new ideas'. Overall, this implies that the para-educators continued to address questions for each lesson planning component completely, accurately and appropriately in terms of the subject matter and learner-centered orientation. Also, the participants improved in the extent to which their responses were well-detailed. Finally, each component of their lesson plans was internally consistent, and often they were able to integrate new ideas into their planning.

b) Scores for individual questions in the lesson plan: Lesson plans were also scored for individual questions, each of which reflected an important component of a lesson plan. The scores reflected that for all participants had secured a high score for the first four questions where they had to plan for the classroom grouping, learning objective, learning activity and directions to pupils for the group activity. Amongst these there was one participant who had gained a high score across all the four questions even in the pilot phase, whereas the other eight participants had improved from either a moderate or a low score in the pilot phase to a high score in the institutionalization phase.

A similar trend was reflected in Question 7 used for planning how to conclude the lesson. All the participants gained a high score for this question in the institutionalization phase. Six of them had retained this score from the pilot phase, whereas the remaining three had progressed from a moderate score in the pilot phase.

All the participants secured a high score for Q5 which required the participants to outline steps for reviewing the group activity. It was not possible to compare the institutionalization phase scores on this question with the pilot phase, because this question was introduced after the pilot phase while refining the lesson planning template.

Question 6, which had to do with forming and reinforcing norms of classroom conduct was interestingly different from the other questions. Four participants had not addressed the question at all. Two participants retained a moderate score from the pilot to the institutionalization phase while two dropped from a high score in the pilot phase to moderate in the institutionalization phase. Only one participant improved from moderate to high. When para-teachers were asked to explain why they consistently left that question unanswered or partially answered; they explained that they did not feel the need to think of that question everyday as they were able to help students think of appropriate conduct norms, and reinforce them spontaneously without much prior planning. This implies that they did not leave the question unanswered because they did not know how to address the question but as a conscious choice to address that aspect spontaneously in class.

3.2 To what extent did participant retain or improve in the use of a well-structured learner-centered approach during enactment?

a) Scores on various stages of the lesson body: Classroom observations provided information on the extent to which enactment was systematic and learner-centered in the institutionalization phase. Mean percentage scores were calculated for different stages of the lesson body. These scores were compared enactment scores obtained during the study of the formative phase. (Enactment was not examined during the pilot phase). The main lesson stages were *preparation for class, introduction to the lesson, teacher's role in facilitating group activity, students' role during group activity, and conclusion of the lesson*.

Data reflects that in the institutionalization phase, all participants gained a very high score for all the different stages of the lesson body. For the first four stages, about three to four participants had a high score even in the formative phase, which means they had retained their scores in the institutionalization phase. The remaining participants had moved from a low or moderate score in the formative phase to a high score in the institutionalization phase. For the conclusion of the lesson plan, all five participants had progressed from a low score to a high score, and remaining from a moderate to a high score.

b) Scores over four weeks: Enactment scores were also calculated over four weeks in the institutionalization phase and the data suggested that all the participants had a high scores throughout the four weeks in the institutionalization phase. Six participants already had a

high score across the four weeks in the formative phase. The week wise score of remaining three participants across the four weeks were either high or moderate but had moved to a consistent high in the institutionalization phase.

3.3 What kinds of pupil learning outcomes have been achieved?

a) Learning gains of pupils between pretest and post test : As discussed in the methods, pupil learning outcomes of 141 pupils across the nine para-teachers were analyzed. The mean difference between post-test and pre-test was calculated for each para-teacher's class and the effect sizes were obtained (Table 2). While the para-teachers differed substantially in terms of the mean learning gains achieved by their class, it was notable that the effect size (above 0.8) for each class was strong. This indicates that pupils in learning in the institutionalization phase had improved substantially.

-----Insert table 2 about here -----

The mean pre-test scores of pupils were substantially different across para-teachers, which may have resulted in very different mean pupil learning gains. In order to understand the predictive influence of the pretests on the post-test scores of 141 pupils of the nine para-teachers, a linear regression was undertaken. The linear regression analysis revealed an R square value of .298 (Sig.-.000). The Pearson Correlation between pre-test, post-test and learning gain for all the 141 pupil scores together (Table3) revealed a negative correlation between pupil pre-test scores and learning gain, and a positive correlation between pupil pre-test and post-test scores. This indicates that when the pretest was higher the learning gains were lower, thus leading to the varying levels of learning gains amongst the pupils.

-----Insert table 3 about here -----

b) Comparing mean pupil learning gains of the nine para-teachers with the remaining teachers: The mean pupil learning outcome of the nine para-teachers who were tracked throughout the three phases of the PD program (N=141) was also compared with that of the pupils of the remaining 16 para-teachers (=213) who participated in the PD program but whose progress was not tracked (Table 4). This was done to establish whether the 'treatment' of tracking the progress for the nine teachers had any distinctive influence upon their

performance. The table below shows the mean learning gain of both groups, that is pupils of nine tracked teachers (T) and pupils of 16 non-tracked teachers (NT). The mean pupil learning gain of the tracked group (T) was 9.11 and that of the non-tracked group (NT) was 8.27. A T-test revealed that the difference between the mean learning gain scores was not significant indicating no major differences between the tracked and the non-tracked teachers.

-----Insert table 4 about here -----

4. Discussion and Conclusion

The findings presented in this evaluation of the institutionalization phase demonstrate that the professional development program has been successful in helping the participants develop a learner-centered approach in lesson planning and enactment. The core component of the PD program was the on-the-job learning activities of lesson planning, enactment and reflection that para-teachers had to undertake themselves on a daily basis. In the pilot and formative phases this ongoing on-the-job learning was centrally facilitated by a management member. This support was withdrawn during the institutionalization phase, and the study discussed in this paper assessed whether the gains were sustained in the institutionalization phase without central support.

The lesson planning and enactment scores in the institutionalization phase were high across the nine participants. Comparisons of these scores with the scores of the pilot and formative phase support the conclusion that in the absence of central facilitation the lesson planning and enactment skills gained in the earlier phases did not diminish. Where high scores were obtained in earlier phases, the status was retained, and low or moderate scores obtained in earlier phases improved to a high score in the institutionalization phase. The pupil learning gains seen in phase three serve as another evidence for the effectiveness of the PD program. This clearly concludes that PD program yielded the desired lesson planning and enactment performance even in the absence of a central support.

Additionally, the data highlights that learning gains were also seen amongst pupils of those 16 para-teachers who participated in the same professional development program but whose progress had not been tracked throughout the studies investigating the three phases. This eliminates the possibility of a Hawthorne effect, or, in other words, the possibility that the achievements amongst the nine para-teachers seen in the institutionalization phase (and

earlier) were influenced because of the awareness of being tracked. The absence of a Hawthorne effect thus implies that the PD program yielded desired improvements for all the para-teachers in Maitri.

At the onset of this paper, we introduced the fact that para-teachers in India (and other developing countries) lack the professional teacher training that qualifies an individual to carry out basic teaching tasks. Also, their own cultural background (which is often hierarchical) (Sarangapanni, 2001), and their own traditional educational experiences, often present hurdles to taking up i) a learner-centered approach in teaching; as well as ii) cultivate the autonomy and collaborative approach which are considered integral to professional development (Raval, Mckenney, Pieters,2010). With this background, the PD program aimed for an ambitious agenda that had to help para-teachers simultaneously cultivate basic and learner-centered teaching skills. It is unlikely that teachers who are trained in a traditional expert-directed program will be able to provide a learner-centered approach in their own classrooms. The ambitiousness of the agenda was compounded therefore, when it was assumed that para-teacher learning in this NGO must replace the traditional one-time trainings and introduce a new professional learning process that asked for para-teachers to own their own learning. The on-the-job core activities of daily planning-enactment and reflection through templates was an attempt to scaffold para-teachers to own their daily classroom realities as starting points for learning, in order to discover learner-centered ways of addressing those realities.

This study yields important lessons have been learned about how to support para-teachers. First, it supports the stance that Sullivan (2004) asserts in her study in Namibia, highlighting the wisdom of using strategies which act as a milestone on a path towards fully learner-centered teaching. The study described in this article also found that when concrete strategies were used as starting points for discovering an alternative approach to a traditional and long-familiar teacher-directed approach, acquisition was rapid (as evidenced in the study conducted in the pilot phase) and it was sustained (improved over the second and the institutionalization phase, even without central facilitation). The role of this starting point, which may serve as a stepping stone approach, is valuable in a context where teachers are not only educationally under-qualified for a teaching role, but also where a learner-centered approach to teaching is not widespread at all, and thus learning through other role models is not an available route to learning. In this situation, the path to a learner-centered approach needs to be broken down

into what Sullivan (2004) describes as simple achievable learner-centered skills which would begin to lead teachers away from a traditional approach. Such approaches are not ideal learner-centered approaches, but could potentially lead to the successful development of teachers' capacities to implement learner-centered approaches in the future. The PD program described in this study used this stepping stone approach through strategies like a) moving from whole-class teaching to a combination of whole-class and grouped-class teaching, b) practical activities instead of rote activities, c) use of questions, d) engaging cooperation between students and, e) on-going assessment of student participation and progress.

Furthermore, this study revealed that there is reason to believe that the PD program had yielded benefits across the organization to all teachers even when the central facilitation was withdrawn. The point being made here is not that para-teachers do not require external support, but that for this specific set of competencies, they have reached self-sufficiency. This may be ascribed to the way the core activities were designed. The core activities of planning, enactment and reflection required substantial level of ownership amongst teachers for improving their own daily lessons and learning from them, and yet, it was not assumed that the teachers would bring this ownership and the skills for planning and reflection. The scaffolds to help build this capacity were inbuilt into the program through the templates and the supportive strategies. Results of the institutionalization phase which point towards their self-sufficiency in learner-centered planning and enactment, help conclude that para-teachers who are used to a traditional learning culture, when appropriately supported, are able to move from being passive learners to actively owning their own professional development.

Reflections on the data collection experience also point towards the contribution of Guskey's parameters for evaluating professional development. The value of this model was in the wide range of measures that it offers. It helps assess the benefits of professional development right from participants' subjective reactions to their own learning and application, and to pupil outcomes, as also the institutional role of the organization which is vital for sustaining any long term professional support intervention. However, some constraints were experienced in using this model. This model refers to the parameters being at levels, in the sense that they are hierarchical. From this point of view, reactions are immediately after a PD event, and so is learning, and application. This kind of a hierarchical development of capacity is easily measurable when a PD event like a workshop is implemented. It is then possible to measure participants' reactions post-workshop, the learning acquired at the end of the workshop and

then the application. However, in this PD model, every day is a PD event, with learning being an ongoing part of the PD process. In this context, it becomes difficult to isolate what knowledge was acquired daily, whether it was first acquired in a workshop and applied in daily classroom, or was it accidentally first experienced in the classroom and then discussed and got consolidated as learning at a reflection session.

This article speaks to researchers and practitioners who are studying and creating professional development for para-teachers working in under-resourced environments. It demonstrates that appropriate preparation for para-teachers through adequate professional development can lead to positive learning experiences and new skills. This approach may address criticism about the low level of training of these highly-motivated, much-needed teachers.

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Table 1: Example of the coding of the lesson plan using the parameters

Document analysis coding			Excerpt from completed lesson plan
Para-meters	Indicators	Code given	How will you review what the group has learnt (at the end of the activity? (for the learning objective : help students understand different properties of solids liquids and gases)
Completeness	Logical beginning and end to the answer; each question answered	y	<i>Ask the group the following questions : Name five things around you right now that you would call solid. Why? Name five things around you right now that you would call liquid. Why?</i>
Accuracy	Question understood correctly	y	
Appropriateness (subject matter and/or learner-centered orientation)	Activity / question framed are: i) clear (e.g. Questions asked are concrete and not ambiguous), ii) authentic (no cued responses that hint towards an answer). If the question is too broad, it should be specified how the teacher will assess pupil learning related to the concept	y	
Detail	Answer in detail , making each step possible transparent	y	
Internal consistency	Is consistent with the learning objective and activity	Y	
New ideas	Has ideas other than those mentioned in the teacher	Y	

	guide.		
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Table 2: Mean class learning gain per class for each para-teacher

Teacher name	N	Mean	Effect size (value of Cohen's d)	Std. Deviation
Meera	18	11.3611	2.99	2.16119
Harsha	18	9.8611	3.10	3.13334
Varuna	14	6.0000	1.78	2.48843
Sarojini	19	10.4737	2.14	4.41108
Avnita	13	16.0769	4.18	3.72965
Shubhlaxmi	16	4.2812	0.98	3.68768
Mital	18	3.9722	1.02	3.43200
Chanda	9	16.7222	6.50	2.48886
Sanjana	16	7.5312	1.41	3.06305
Total	141	9.1135	-	5.17631

Table 3: Correlation between pre-test, post-test and pupil learning gains

		Pre25	Post25	Learning gain
Pretest	Pearson Correlation	1,000	,434	-,402
	Sig. (2-tailed)		,000	,000
	N	141	141	141
Posttest	Pearson Correlation	,434	1,000	,650
	Sig. (2-tailed)	,000		,000
	N	141	141	141
Learning gain	Pearson Correlation	-,402	,650	1,000
	Sig. (2-tailed)	,000	,000	
	N	141	141	141

Table 4: Mean class learning gain of the tracked (T) and non-tracked (NT) participants.

	Status	N	Mean	Std. Deviation	Std. Error Mean
Pupil learning gain (class)	NT	213	8.2742	4.19476	.28742
	T	141	9.1135	5.17631	.43592