Oxford Policy Management

ESSPIN Composite Survey 2

Enugu State report

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Acknowledgements

Executive summary

This report presents findings for Enugu State from the first and second rounds of the Education Sector Support Programme in Nigeria (ESSPIN) Composite Survey (CS1 and CS2), conducted in 2012 and 2014 respectively. The survey covered a wide range of indicators at the teacher, head teacher, school-based management committee (SBMC) and pupil levels, in an attempt to understand how schools in Enugu are changing over time and whether schools which receive ESSPIN interventions are working better than those which do not.

The ESSPIN model involves training for teachers, head teachers and community members on SBMCs. In Enugu, the first phase of ESSPIN began in 2011/12, and in 2012/13 and 2013/14 the interventions were rolled out to two more groups of schools. This expansion involved a changed model for delivering training, which made the scale-up possible and located training closer or within the schools. By the time of the CS2 fieldwork, 45% of Enugu's primary schools had benefited from at least one year of ESSPIN support. Schools which only benefited from ESSPIN in 2013/14 are treated as non-ESSPIN, since the support is not expected to have taken effect yet.

The main findings from the composite surveys are as follows:

Teacher competence: In Enugu there was a significant improvement in the proportion of teachers meeting the competence standard, from around half in CS1 to three-quarters in CS2. Results from CS2 show that teachers who received ESSPIN training were more likely to pass the literacy and numeracy tests. ESSPIN-trained teachers were significantly more likely to meet the overall competency standard defined for CS2 than teachers in schools not supported by ESSPIN (77% and 55% respectively). Analysis of change over time suggests that teachers in non-ESSPIN schools actually improved faster than ESSPIN-trained teachers, perhaps because their lower score in 2012 gave more room for improvement.

Head teacher effectiveness: The proportion of head teachers who are effective increased between 2012 and 2014 overall, although the change was not statistically significant. In 2014 those heads who had received leadership training were significantly more effective than those who had not. On average, all head teachers appear to have improved at the same rate between 2012 and 2014.

School development planning: The number of schools meeting criteria for effective school development planning increased significantly between CS1 and CS2, such that on average a quarter of schools meet the overall standard. In 2014, ESSPIN schools were significantly better at planning than non-ESSPIN schools. ESSPIN intervention schools were already better in 2012, and little additional improvement in these schools was apparent between 2012 and 2014. By contrast, the non-ESSPIN schools appeared to be catching up from a low baseline.

School inclusiveness: In Enugu there was a significant improvement in the proportion of schools meeting the inclusiveness standard between 2012 and 2014, increasing from around 10% to around 33%. In 2014, more ESSPIN schools met the school inclusiveness standard (46%) compared with other schools (32%). Both ESSPIN and non-ESSPIN schools appear to have become more inclusive between 2012 and 2014, with no significant difference in terms of the change over time.

SBMCs: SBMCs were working better in Enugu in 2014 than in 2012, with a significant increase in the total proportion of schools meeting the SBMC functionality standards, from 9% to 23%. SBMCs were more inclusive of women and children in 2014 and more likely to have taken action on commonly excluded groups or to have raised issues around children's exclusion with the school. Schools receiving ESSPIN intervention were more likely to have functional and inclusive SBMCs

than those that did not. However, non-ESSPIN schools appear to be catching up from a much lower base, and had significantly faster improvement over time in measures of SBMC functionality and inclusiveness than the ESSPIN schools.

School quality: School quality is improving over time in Enugu. We measure overall school quality using a combination of our indicators on teacher competence, head teacher effectiveness, school development planning, and SBMC functionality. The proportion of Enugu's schools that met our overall standard rose from 7% to 18%. A higher proportion of ESSPIN schools (35%) met this standard in 2014. Again, however, ESSPIN schools were already better in 2012 and most of the improvement is found in the non-ESSPIN schools, which improved rapidly and narrowed the gap with the schools that had received interventions.

Pupil learning: Pupil test results have been improving over time in Enugu's schools, with significant improvements in literacy in both grade 2 and grade 4, as well as in grade 4 numeracy. Looking at the CS2 results, pupils in ESSPIN schools perform better than pupils in non-ESSPIN schools. A higher proportion of pupils from ESSPIN schools scored above 75% in the test than from non-ESSPIN schools, and this was true for all four tests. Between 2012 and 2014 there were improvements (except in grade 2 numeracy) in both ESSPIN and non-ESSPIN schools, and suggestive evidence that the non-ESSPIN schools are catching up from a lower base.

Overall, the results are in the expected direction for Enugu at the state level—most indicators have seen an improvement between CS1 and CS2, suggesting the quality of teaching, school management and level of learning have all improved. As anticipated, schools and teachers benefiting from ESSPIN activities do tend to have better results in terms of output, outcome and impact indicators than schools that did not receive intervention. However, we hypothesised that schools receiving ESSPIN intervention between 2011 and 2013 would see more rapid improvements than those that did not. This hypothesis was not confirmed. For several aspects of how teachers and schools work, the schools that did not receive the interventions improved more rapidly, from a lower baseline. The schools selected for ESSPIN intervention, starting in 2011/12, were already better in 2012. Our results suggest that something is happening in the state as a whole to bring all schools closer to the schools receiving ESSPIN intervention.

Box 1. The good and bad news from the composite surveys in Enugu

Positive results in this report include:

- Children are learning more in 2014 than in 2012. Average pupil test scores increased in grade 2 and 4 literacy and grade 4 numeracy, in both ESSPIN and non-ESSPIN schools.

- The proportion of Enugu's schools meeting the overall school quality standard has more than doubled, rising from 7% in 2012 to 18% in 2014.

- SBMC functionality greatly improved in Enugu between 2012 and 2014. In 2012, schools met on average 0.9 of the nine criteria and in 2014 this had increased to 3.4.

- Across all the indicators measured, we find that schools which had benefited from ESSPIN had higher performance in 2014 than schools which had not benefited. For example:

    ο 35% of ESSPIN schools meet the school quality standard, more than double the proportion of control schools (14%).

    ο 77% of teachers trained by ESSPIN met the competent teacher standard, compared with 55% of teachers in non-ESSPIN schools.

Some challenges identified in the report include:

- Children's learning outcomes in lower grade mathematics appear to be stagnating. While results in the other three tests increased between 2012 and 2014, there was no significant change in grade 2 numeracy.

- We find little sign of improvement between 2012 and 2014 in school management or teaching in schools that received ESSPIN intervention. These schools were already doing relatively well in 2012, compared to other schools in Enugu and elsewhere, and remained around the same level, or even slightly worsened, in 2014.

- Schools which did not receive ESSPIN intervention have improved faster (from a lower baseline) in many ways during 2012 to 2014, which makes it difficult to argue that the improvements seen in Enugu can be attributed to ESSPIN school-level interventions.

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List of abbreviations

ACLED	Armed Conflict Location & Event Data Project
CBO	Community-Based Organisation
CS1	Composite Survey 1
CS2	Composite Survey 2
ESSPIN	Education Sector Support Programme in Nigeria
LGA	Local Government Area
LGEA	Local Government Education Authority
L2	Grade 2 literacy test
L4	Grade 4 literacy test
N2	Grade 2 numeracy test
N4	Grade 4 numeracy test
OPM	Oxford Policy Management
SBMC	School-based management committee
SDP	School Development Plan
SIP	School Improvement Programme

1 Introduction

The aims of the ESSPIN composite surveys are to assess the effects of ESSPIN's integrated School Improvement Programme (SIP) and report on the quality of education in the six ESSPIN-supported states. This report focuses on the key findings for Enugu State. The surveys address five output indicators: teacher competence, head teacher effectiveness, school development planning, school-based management committee functionality, and inclusive practices in schools. It also addresses one outcome indicator—school quality—and one impact indicator—pupil learning achievement.

The second round of the Composite Survey (CS2), conducted in 2014, aims to provide post-intervention data that can be compared to data from the first round of the survey (CS1) collected in 2012, in order to evaluate the extent of improvements in key indicators and gauge programme success. A further survey will be conducted in 2016 to again assess the impact of the interventions.

This report, focusing on Enugu State, presents findings from CS2 and comparisons between CS1 and CS2, covering all of ESSPIN's output, outcome and impact indicators.

1.1 ESSPIN's SIP

The ESSPIN programme aims to bring about better learning outcomes for children of basic education school age in six states, with a range of activities at the national, state, local and school levels. It has four output streams: (i) strengthening federal government systems; (ii) increasing the capability of state and local governments for governance and management of schools; (iii) strengthened capability of primary schools to provide improved learning outcomes; (iv) and improved inclusion policies and practices in basic education (ESSPIN, 2013c).

Under the third of these output streams, ESSPIN's SIP aims to provide and support the use of structured materials that ensure teachers can deliver quality instruction, to strengthen teachers' own understanding of literacy and numeracy concepts, and to improve academic leadership and school improvement planning by head teachers (USAID, 2014). It typically works through a two-year modular programme of workshops and school visits, after which schools continue to receive school visits from government officers to maintain and continue improving quality gains.

Under the fourth output stream, ESSPIN aims to improve inclusion practices and to strengthen community engagement in school improvement and wider access. In particular, output stream 4 seeks to ensure: that community members, including women and girls, influence the way schools are run; that community and government organisations are better able to press for school improvement; and that schools and communities ensure that needs of all children are met. These interventions to improve community participation through functioning SBMCs come within a challenging socio-cultural context. Qualitative research prior to the introduction of ESSPIN interventions (ESSPIN, 2009) found that SBMCs were often not known about (with sometimes even their members not being aware of them), lacked clarity on their roles and responsibilities, and lacked the resources to effectively contribute to school management. It was particularly difficult for women and students to participate, as this was a cultural taboo in many areas.

The programme's theory of change assumes the interventions will improve five pillars (or outputs) of school quality: head teacher effectiveness, teacher competence, adoption of inclusive practices to meet the needs of pupils, introduction of school development plans (SDPs), and establishment of functional school-based management. These pillars collectively contribute to an improvement in overall school quality (outcome), and this in turn increases pupil learning outcomes (impact).

Initially the programme was piloted in a sample of schools and managed by the ESSPIN infrastructure. As the programme was scaled up, management and delivery of the support (both

output streams 3 and 4) came under the state governments. The state infrastructure then provided the training and mentoring, using the ESSPIN model and under guidance from ESSPIN staff. We continue to call the beneficiary schools 'ESSPIN schools' to indicate that they received the ESSPIN delivery model.

1.2   ESSPIN in Enugu State

Since 2011, ESSPIN has worked with the government and Mission schools in Enugu State to deliver sustainable school improvement. The anticipated results are improved pupil learning achievement, teacher competence, and school leadership and governance.

The key school-level interventions for ESSPIN schools in Enugu State since 2011 (see ESSPIN, 2013b) are as follows:

- Head teachers received training on:
  - ο academic leadership;
  - ο school planning;
  - ο management of teachers; and
  - ο working with the community.
- Teachers received of training on:
  - ο basic literacy teaching (initial reading skills);
  - ο basic numeracy teaching (number concepts, addition and subtraction); and
  - ο use of teaching aids, classroom organisation and praise.
- The 2011/12 cohort of ESSPIN schools received one school grant at an average of NGN 150,000 (with the exact sum depending on school size) to be spent on activities agreed by the head teacher and SBMC as priorities for school improvement and included in the SDP based on a school self-evaluation.
- Twelve State School Improvement Team members (nine government officers and three from the Missions) received ongoing training and support over a two-year period to develop the capacity of 38 school support officers (32 from Udi Local Government Education Area (LGEA) and six from the Missions) to enable them to lead the school improvement process at school level.
- Twenty civil society members (five civil society organisations) and government officers from the Department of Social Mobilisation attended Training of Trainers workshops to enable them to work in partnership to activate, train and mentor SBMCs across a period of approximately 18 months. A wide range of other education stakeholders including SBMC state task teams participated in these workshops.
- Fifteen community members from each ESSPIN school received training on establishing an SBMC, which covered:
  - ο school planning and management;
  - ο SBMC roles and responsibilities; and
  - ο communication and leadership.

Annex A presents some descriptive statistics on the schools selected for ESSPIN and those not selected, while Annex B sets out the interventions under output stream 3 made in Enugu from 2009/10 through to 2013/14, indicating the number of days of training received by each head teacher, each teacher trained under ESSPIN, and the number of visits to the school. Annex C sets out the interventions under ESSPIN's output stream 4, indicating the number of days of training for SBMCs, training on participation by women and children, and mentoring visits.

1.3   Selection of ESSPIN beneficiary schools and expansion

The ESSPIN programme has been gradually rolled out to more public primary schools in Enugu, such that by time of the 2014 Composite Survey 45% of schools had benefited from the full package for at least one year (Table 1). The scale of the roll-out of output stream 3 consisted of the following stages:

- The schools to be included in the programme in 2011/12 were selected under two criteria (ESSPIN, 2013a):
  - ο Public primary schools in Udi local government area (LGA), which was selected in consultation with the state government, from three shortlisted LGAs identified by the 2009 annual school census as having the lowest education performance indicators.
  - ο 30 low-fee paying Mission schools were also selected on the basis of criteria that sought to address social exclusion issues. ESSPIN, supported by Enugu-based civil society organisations, worked with the three missions—Catholic, Anglican and Methodist—to agree on the number and identity of the schools.
- In 2012/13 and 2013/14 the programme was rolled out to two additional groups of schools.

The number of schools in each phase and the level of intervention received each year is given in Annex B. The schools have been categorised according to the amount of intervention they received and therefore the level of impact expected due to ESSPIN: none, minimum, medium and maximum.

Table 1. Proportion of schools receiving full package of ESSPIN output stream 3 interventions

%	2009/10	2010/11	2011/12	2012/13	2013/14	any year
Enugu	0	0	8	18	37	45

Source: Authors' calculations based on 2012/13 annual school census and intervention information provided by ESSPIN. Note: Proportions are calculated relative to the total number of schools in the 2012/13 annual school census, and so are not perfectly accurate for other years because the total number of schools changes slightly from year to year. Where census numbers are lower than ESSPIN's intervention tables, the information from ESSPIN is used on the assumption that there is some missing data in the school census

The expansion of the programme to more schools in phase 2 required a changed model for delivering training, with state governments taking on the management and the training located closer to schools. The change in model makes delivery cheaper per school and more sustainable for the states to run themselves, as well as enabling states to take control, all of which were necessary to allow scale-up. Programme staff argue that locating training closer to the schools has longer-term benefits. However, we might see that in the shorter term quality standards from the pilot programme are not fully upheld as the new, much larger numbers of trainers, who typically have lower qualifications than the first wave, develop competencies.

A summary of the characteristics of Enugu's schools according to the level of ESSPIN intervention is given in Annex A.

The school census in Enugu captured a different population of schools in 2013 than in 2009. The 2009 census captured only public primary schools, of which there were 1,188. In 2013, private schools (including Mission schools, some of which benefited from ESSPIN) were also included, and so the total primary schools increased to 2,349 (Table 2). Total reported enrolment increased by 38%, rising from 240,000 to 328,000. Enrolment in the schools captured in both censuses fell by 24%.

Reported pupil–teacher ratios (not shown in the table; see Annex A) are low in Enugu, at around 20, while pupil–classroom ratios were much higher in 2009 but have since fallen, from 66 pupils per classroom to 44. The first cohort of schools to receive ESSPIN intervention are marked by much lower pupil–teacher ratios (around 26 on average) and pupil–classroom ratios (only 13 on average). Although beyond the scope of this report, further investigation is needed into these changing patterns of enrolment and teacher numbers in Enugu. It is possible that there is movement of pupils from government to Mission and other private schools, which would account for falling enrolment numbers and falling pupil–classroom ratios in the government schools. Alternatively, it is possible that there were measurement errors during the early rounds of the school census, for example if census respondents (head teachers) thought they had some incentive to exaggerate enrolments.

Table 2. Number of schools and enrolment in the 2009 and 2013 school censuses

	2009		2013		Enrolment change (%)	Enrolment change (schools found in both censuses only, %)
State	Schools	Enrolment	Schools	Enrolment		
Enugu	1188	237,548	2349	327,834	38.0	-23.7

Note: Enrolment is for primary grades 1 to 6. The Enugu data for 2013 include both public and private schools, as ESSPIN interventions have also covered some private (Mission) schools; these schools were not captured in the 2009 census.

1.4   Conflict in Enugu

This report is written in the context of growing insecurity in Nigeria, particularly in but not limited to three states of the north east in which a state of emergency has been declared (Borno, Yobe and Adamawa). However, this conflict has not affected states in the southern sector, and so we see that the number of violent events, and the number of deaths associated with these events, has remained fairly low in Enugu in recent years (Table 3).

Table 3. Enugu: Political violence – incidents and fatalities, 2010 to 2014

Variable	2010	2011	2012	2013	2014
Events	14		15	10	9
Fatalities	2		11	11	8

Source: Armed Conflict Location & Event Data Project (ACLED), Version 5 (1997–2014). Note all events from ACLED are included except for those categorised as 'protests which did not involve a fatality'.

2 Methodology and analysis

2.1 Evaluation strategy

2.1.1 Classifying the amount of ESSPIN intervention

For the purposes of evaluation, ESSPIN was originally intended to be rolled out in a simple phased pattern across the six states, with schools falling into one of three groups: no intervention (control), phase 1 (roll-out prior to the 2012/13 school year) and phase 2 (roll-out in 2012/13 or 2013/14). In practice, Enugu State decided to extend the programme in three phases (a 2011/12 group, a 2012/13 group, and finally a 2013/14 group) based on the government's capacity and willingness, and also retained a control group.

For the purposes of evaluation, in Enugu we grouped schools according to the number of years of the 'full package' of output stream 3 support they received (see Annex B for full details).[1] We then have two main categories of schools: ESSPIN schools and non-ESSPIN schools. The non-ESSPIN schools, or 'control schools', include those which received no ESSPIN output stream 3 intervention at all as well as the 400 schools that had support only in 2013/14, considered as too recent for the intervention to take effect. Table 4 in the following subsection shows the number of schools in each of these categories. Note that 'ESSPIN schools' is used as shorthand for public (and in Enugu's case private Mission) schools that benefited from the ESSPIN model of school improvement, whether delivered by the State Government or by ESSPIN programme staff.

When we are looking at one point in time (cross-sectional analysis) the ESSPIN schools, or 'treatment schools', are *expected to be better* because of ESSPIN. When we are looking at change over time the ESSPIN schools are *expected to have improved faster* because of ESSPIN.

For individual outcome indicators, we alter the classification scheme slightly according to the purpose. For example, for examining teacher competence, we consider three different groups: teachers that have not been exposed to ESSPIN; teachers who are in schools that have received ESSPIN intervention but who have not themselves been trained through ESSPIN; and teachers who have been trained through ESSPIN. We also use continuous versions of the intervention measures—for example, the number of years that a pupil has been exposed to expected improved school quality as a result of ESSPIN intervention. While categorical measures are easier to use for tables of descriptive statistics, a continuous measure makes sense in regression analysis, makes the most use of the information, and helps us to avoid the risk that results might be altered by a slight change in the choice of categories.

2.1.2 Modes of analysis

The purpose of CS2 is to provide insight on the changes over time in the six states where ESSPIN works and to evaluate whether the ESSPIN model is having an effect in the specific schools where its school improvement and community inclusion interventions have operated. We are interested in a wide range of output indicators: teacher competence, head teacher effectiveness, school development planning, school inclusiveness, and the functionality and inclusiveness of SBMCs. Some of these same indicators are also combined to give an overall indicator of school quality. Finally, ESSPIN's impact is measured in terms of improved pupil learning outcomes, which we

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[1] A companion report, 'Composite Survey 2: Gender and Inclusion Report' (De and Cameron, 2015), focuses on ESSPIN's output stream 4 interventions, which run in parallel with output stream 3 and aim to improve inclusion and community participation in schools.

ascertain through test scores in numeracy and English literacy in grades 2 and 4. For each of these indicators, we present in the following chapter three main types of analysis:

1. **Change over time** between CS1 and CS2, for Enugu as a whole. These changes likely reflect changes that are beyond the control of ESSPIN. Although the recent expansion of ESSPIN interventions has meant that the programme now has direct links with a larger number of schools in Enugu, much of this roll-out happened in 2013/14 and so is unlikely to have started having a major impact by the time of our survey, near the end of the 2013/14 school year.

2. **Differences between ESSPIN and non-ESSPIN schools** within the CS2 results. In the ESSPIN schools we hypothesise that our output, outcome and impact measures will all be higher than in the control group. If this is the case, it provides good initial evidence that ESSPIN is effective, although it does not rule out the possibility that ESSPIN schools' better results could come from differences in school background characteristics pre-dating the ESSPIN intervention.

3. **Difference in differences** between ESSPIN and non-ESSPIN schools and over CS1 and CS2. We hypothesise that ESSPIN schools are expected to have improved faster than non-ESSPIN schools between 2012 and 2014 (see Box 2 below).

In each case we use statistical significance tests (t-tests or z-tests) to give an indication of whether a difference in results (over time or between intervention groups) is significant. This should not be taken as rigorous hypothesis testing (given the very large number of indicators tested) but provides a guide as to whether a difference between the weighted average results in two groups is large enough relative to the variance of the results to be able to provide us with a useful indication of likely differences in the population of schools in the six states. For analysing difference in differences we also use regression analyses; these are reported in Annex D.

Box 2. Difference in differences

The Composite Survey may reveal that ESSPIN schools have higher quality, or better learning outcomes, than other schools. But how do we know whether this can be attributed to ESSPIN and is not just because ESSPIN schools were better in the first place? One way is to focus on change over time using 'difference in differences' methods. The underlying idea is that schools which have had ESSPIN interventions between CS1 and CS2—that is, between 2012 and 2014—ought to have *improved faster* during that period than schools which did not have ESSPIN interventions.

We can measure this by comparing averages of the indicator of interest—school quality, say—during CS1 and CS2, in control schools and ESSPIN schools. Is the change over time greater in the ESSPIN schools than in non-ESSPIN schools? If so—and if statistical tests confirm that this result is unlikely to have occurred by chance—then this is considered good evidence that ESSPIN itself had an effect and was not just lucky in choosing schools that were good in the first place (selection bias).
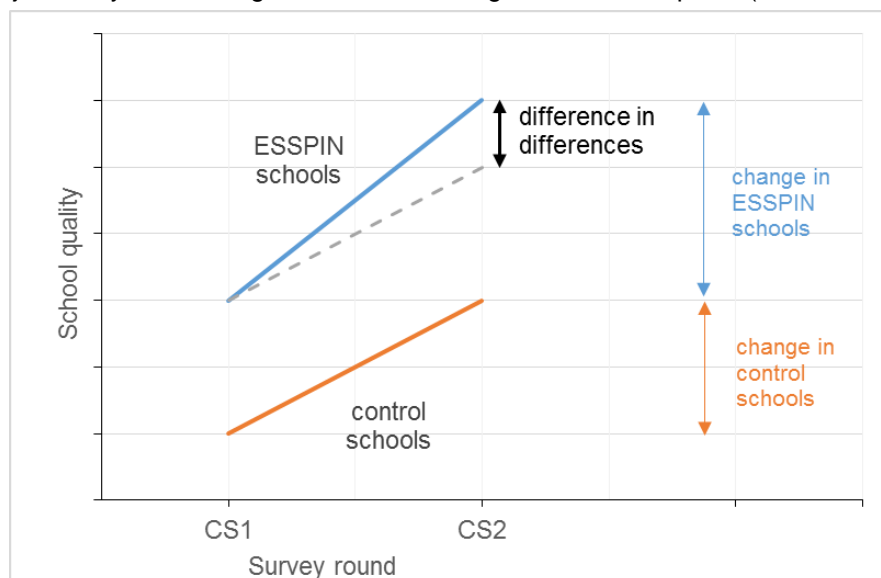
Does a significant difference in differences (or treatment effect) prove that the faster improvement in some schools can be attributed to ESSPIN? Not absolutely. It is still possible that there are other factors at play causing faster improvement in some schools than others. For this reason, in the overall CS2 report we use other statistical techniques to examine whether ESSPIN schools had different characteristics to start with, and to control for any such differences.

2.2   Sampling, coverage and weights

In Enugu, CS1 sampled 70 schools—35 in the control and 35 in the roll-out of ESSPIN. For CS2, the sample was increased to 105 in order to increase the effective sample size and give greater accuracy in the analysis of CS2 results (Megill, 2014). While the ESSPIN and related composite surveys generally focus on public primary schools, in Enugu some Mission schools were also included in the sampling frame as they were part of the 2011 roll-out of school improvement.[2] The number of schools sampled in each of the categories (as defined in CS2, so taking account of the full period of intervention) is shown in Table 4.

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[2] In Enugu, Mission schools are funded by the state.

Table 4. Sample in CS1 and CS2 and population of schools, by intervention groups

	Category for sampling purposes	CS1 sample	CS2 sample	Population	Categories for analysis	
					Expected to be better at CS2	Expected to have improved during CS1 to CS2
Enugu	None/minimum	35	70	1,220	No	No
	Medium	35	35	272	Yes	Yes

In each school the head teacher was interviewed, as was the SBMC chairperson.

Teachers within each school were sampled from the population present in the school on the day of the survey visit and who taught grade 1–6 in the present term, using the school's teacher attendance register. The sample was reduced from 10 teachers in CS1 to six teachers in CS2 in order to improve accuracy of the indicators.

Pupils were sampled from the pupil registers for grade 2 and 4 classes—four each for numeracy and literacy by grade.

Within the schools, it was not always possible to administer all of the intended instruments. This could happen because the school was very small and lacked a sufficient number of pupils and eligible teachers. It also sometimes happened that teachers and pupils were not present at 8am, when sampling was conducted, while occasionally pupils and teachers would leave the school after being sampled (for example, due to illness). In total, 91% of the intended sample of pupils was included, and 78% of teachers. The actual numbers of schools, teachers and students sampled is given in Table 5.

Table 5. Enugu: Sample coverage in CS2

	Schools		Teachers			Pupil tests			
	Intended sample	Actual	Interview	Lessons observed	Tests	L2	L4	N2	N4
Enugu	105	105	532	519	494	388	395	384	382

Note: Throughout this report, *L2* refers to the grade 2 literacy test, *L4* to the grade 4 literacy test, *N2* to the grade 2 numeracy test, and *N4* to the grade 4 numeracy test.

Simple averages of the results from the Composite Survey data would not be representative of what is happening across the state because (as Table 4 above shows), in terms of the proportion of schools in each of the roll-out phases, the profile of schools in the survey is not identical to the profile of schools in the state as a whole. We overcome this by applying sample weights, which give greater weight to the results in schools that are relatively under-represented in the survey. Sample weights were calculated for the CS1 and CS2 schools, teachers and pupils.

2.3   Fieldwork and instruments

Fieldwork for CS2, including the pupil tests, was conducted during May to July 2014. The following data collection was carried out:

(i)   Structured interviews were conducted with teachers, head teachers and SBMC chairpersons.

(ii)   A lesson observation was conducted for each teacher sampled.

(iii) Teacher tests were conducted at the end of the survey, in a number of testing centres in each state.

(iv) Pupils in primary grade 2 and grade 4 were given tests in either literacy or numeracy.

Two indicators of aggregate learning outcomes are used in this report. The first is the total mark achieved by the pupil in each test paper, expressed as a percentage score. The second is the proportion of tested pupils who successfully answer a subset of questions that aim to measure a specific field of learning, as described in ESSPIN's logframe. Although the latter may be important for assessing ESSPIN's success in improving specific types of learning (e.g. the ability to read with comprehension), their reliance on data from a small number of questions (i.e. 2–3) is problematic statistically. They are less reliable and sensitive indicators than the total mark, which uses all of the data available. Nevertheless, both types of indicator are used in this report.

3 Findings

Box 3. How to interpret the analysis and expected results

For each indicator, three types of analysis are presented:

- Comparison of averages between CS1 and CS2. Here the results are representative of all schools (or teachers, or pupils) in the state, as found in CS1 and then in CS2. This depends on both general trends at the state level and any improvements in ESSPIN schools depending on the scale of ESSPIN roll-out. The hope is that ESSPIN state-level interventions combined with the SIP will lead to an improvement in state-wide averages.
- Comparison of groups in CS2, according to whether they benefited from ESSPIN or did not. Here we expect the results to be better for schools which benefited from ESSPIN. If a school entered the programme in 2013/14 we count them as non-ESSPIN, as we would not expect the support to have impacted on the indicators yet.
- Comparison of schools which benefited from support in 2011/12 and 2012/13 with those which did not, to see whether they improved more or faster between 2012 and 2014. Here we expect the supported schools to improve relative to other schools over the two years.

3.1 Teacher competence

3.1.1 Main analysis

The ESSPIN logframe sets four criteria for judging competence of teachers (see Box 4). A teacher who teaches English or maths is defined as competent if he or she meets at least three of these, while teachers of other subjects are exempted from one of the four criteria (knowledge of the English or maths curriculum) and defined as competent if they meet two of the remaining three criteria.

For CS2, a fifth criterion was added, based on teacher test results. Teachers are defined as competent if they are competent according to the original criteria, and can also score at least 50% in primary school-level literacy and numeracy tests.

Box 4. Logframe standard for teacher competence

A teacher must meet three out of four of the following criteria to meet the competence standard if he/she teaches English and/or maths. Teachers of other subjects must meet two out of three criteria (excluding no. 1 below).

1) Knowledge of English or mathematics curriculum (based on interview)

2) Use of at least one teaching aid during lesson observation

3) Greater use of praise than reprimand during lesson observation

4) Class organisation: assigning individual or group tasks at least twice during lesson observation (or for two contiguous five-minute blocks)

For CS2, a new stricter indicator of teacher competence has been introduced. This excludes reading from or writing on, or having pupils copy from, the blackboard as use of a teaching aid, and adds a fifth criterion:

5) Literacy and numeracy: scores at least 50% in both an English literacy and a numeracy test

Table 6 compares the results for Enugu's teachers in CS1 and CS2. (The fifth criterion is not available here as teacher tests were not conducted as part of CS1.) Use of teaching aids, use of praise during classes and assignment of tasks have each improved significantly. Overall in Enugu, the proportion of teachers meeting the (CS1) competence standard increased from just over half to

three-quarters, which represents a significant improvement. We also calculate a continuous 'competence score', based on the number of criteria met by each teacher. A teacher who meets all of the three or four criteria would score 100%, while a teacher who meets none of them would score 0%. The competence score is also significantly higher in CS2 than in CS1.

Table 6. Enugu: Teacher competence in CS1 and CS2

	CS1	CS2	
(1) Knowledge of English/maths curriculum	56.4	45.1	
(2) Use of 1+ teaching aid	84.3	99.9	+
(3) Praise more than reprimand	63.3	86.8	+
(4) Assigns 2+ individual/group tasks	43.9	74.9	+
Competence score (CS1 version)	63.6	76.7	+
Teacher competence standard (CS1)	51.1	75.9	+

Note. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

Focusing on the findings in CS2, there is evidence of teachers performing better in ESSPIN schools than in non-ESSPIN schools (Table 7). We distinguish three groups of teachers: (1) those who are in schools that received no ESSPIN intervention; (2) those who are in schools that received ESSPIN intervention but who did not individually receive ESSPIN teacher training; and (3) those who are in ESSPIN schools and individually received ESSPIN teacher training. Teachers in ESSPIN schools are significantly more likely than those in non-ESSPIN schools to use praise more than reprimand, and 100% of teachers who individually received ESSPIN training met this criterion. Teachers who received ESSPIN training also did better in literacy and numeracy tests, with 89% passing compared with 73% in non-ESSPIN schools. ESSPIN-trained teachers were significantly more likely to meet the CS2 competence standard than teachers in non-ESSPIN schools, at 77% and 55% meeting the standard respectively. More teachers in ESSPIN schools who did not receive individual training met the CS1 competence standard than in non-ESSPIN schools, suggesting some spillover effect from the teachers who did receive training and were encouraged to share their training with other staff.

Table 7. Enugu: Teacher competence in CS2, by intervention group

	(1) Non-ESSPIN	(2) ESSPIN school		(3) ESSPIN trained	
Knowledge of English/maths curriculum	44.5	49.6		55.8	
Use of 1+ teaching aid	99.9	100		100	
Use of 1+ teaching aid excluding read/write/copy from blackboard	90.2	93		92.3	
Praise more than reprimand	85.7	97.2	+	100	+
Assigns 2+ individual/group task	74.5	84		73.2	
Literacy score (%)	59.9	65.4		66.6	+
Numeracy score (%)	70.1	74.4		73.5	
Passes literacy and numeracy test	73.2	78.5		88.9	+
Competence score (CS1 version)	76.2	82.9		82.5	
Teacher competence standard (CS1)	74.8	89.2	+	86.3	
Competence score (CS2 version)	72.9	78.3		78.5	
Teacher competence standard (CS2)	55.3	67.2		76.7	+

Note: The CS2 version of the competence score adds the teacher's performance in the literacy and numeracy tests to the number of other criteria met by the teacher. For example, a teacher who met all four original criteria and also scored 100% in the literacy and numeracy tests would receive a competency score of 100%.+ indicates a significant difference from the results in non-ESSPIN schools (p < .05).

Did teachers benefitting from ESSPIN interventions improve faster than those who did not between 2012 and 2014? The comparison of means (Table 8) shows that all three categories of teachers improved between CS1 and CS2. However, the magnitude of improvement suggests that teachers who are not in ESSPIN schools in fact improved their competency scores faster than those who were individually trained by ESSPIN. An alternative method of analysing difference in differences, using regression (see Annex D), finds similar results.

Table 8. Enugu: Teacher competence difference in differences (comparison of means)

Teacher competence scores (CS1 version)	(1) Non-ESSPIN	(2) ESSPIN school	(3) ESSPIN trained
CS1	61.3	77.7	82.4
CS2	76.2	82.9	82.5
Difference	14.9	5.1	0.1*

Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

Overall in Enugu the findings suggest that teachers generally became more competent between 2012 and 2014, with improvements in three out of four criteria and the overall competence scores. Generally speaking, teachers who have received training through ESSPIN were more likely to meet the competence standard in 2014 than those without training, as would be expected. We find that all teachers improved between 2012 and 2014, but improvements in competency between 2012 and 2014 were faster for teachers who did not receive ESSPIN training than for those who did. This may reflect that teachers in non-ESSPIN schools had lower competence scores in 2012 and so had much more room for improvement. Teachers in the ESSPIN schools were already quite competent, and raising performance at that level may be more difficult.

3.1.2   Findings from the teacher content knowledge tests

The teacher tests included items pitched at primary school grades 1 through to 5 and focusing on different areas: foundational skills for teaching literacy; writing; reading; grammar; number concepts; calculation; and other numeracy skills. In Enugu, teachers were stronger on reading and grammar than they were in foundational literacy and writing (Figure 1). In mathematics, they were stronger in number concepts than calculation and other numeracy items. As would be expected, teachers' ability to answer the questions falls as the grade level of the questions increases (Figure 2). On the whole the mathematics items were easier for teachers in Enugu than the English items.

Figure 1. Enugu: Teacher test scores across domains of learning
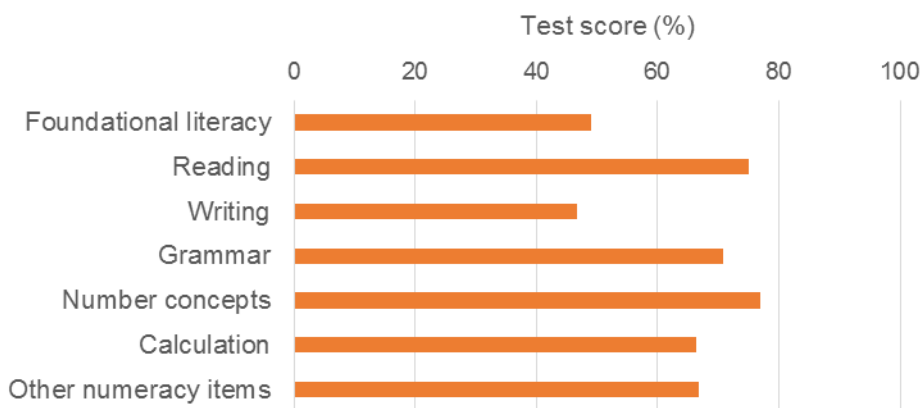
Figure 2. Enugu: Teacher test scores by grade
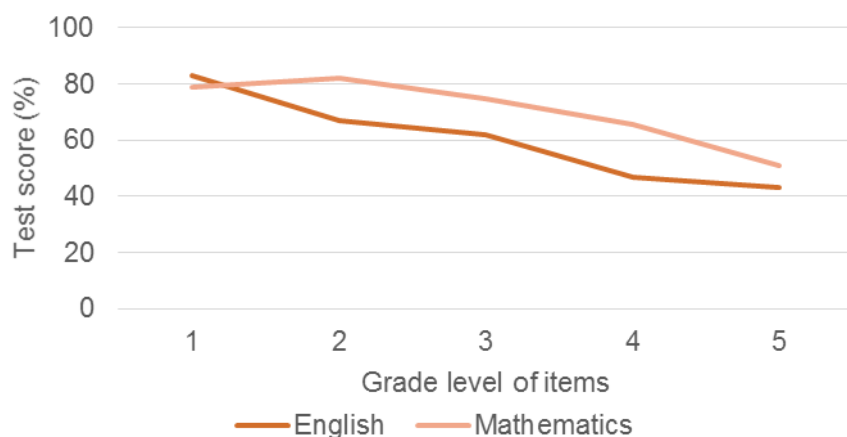
3.2   Head teacher effectiveness

The ESSPIN logframe defines head teacher effectiveness in terms of seven criteria (Box 5). These reflect both activities by the head teacher and behaviour across the teachers and pupils, such as agreement on what time the school opens (criterion 4), presence in class at the beginning of the school day (criterion 5), and appropriate break and lesson durations (criteria 6 and 7).

Box 5. Logframe standard for head teacher effectiveness

A head teacher must ensure that five out of seven of the following criteria are met in order to meet the head teacher effectiveness standard:

1) Have carried out two or more lesson observations in the past two weeks

2) Have held four or more professional development meetings since the start of the 2011/12 or 2013/14 school year (NB: survey took place more than nine months into the school year)

3) School has a teacher attendance book and head teacher recalls at least two actions taken to promote teacher attendance

4) Clear school opening time: more than 50% of pupils sampled agree on the school opening time and more than 50% of teachers sampled agree on the school opening time

5) More than 50% of classes are in their classroom with their teacher within 30 minutes of school opening time

6) Length of morning break is 15 minutes or less

7) More than 50% of lessons observed finished within 5 minutes of a standard 35-minute lesson duration (i.e. between 30 and 40 minutes long)

Overall in Enugu the proportion of head teachers who met the effectiveness standard increased from 10% to 19% between CS1 and CS2 (although this change is not significant) (Table 9). More head teachers were carrying out lesson observations and holding professional development meetings in 2014 than in 2012, but fewer could demonstrate that they had taken action to promote teacher attendance. The proportion of schools meeting the other criteria appeared to decline, but this change is not significant.

ESSPIN staff note that there has been a high turnover of head teachers in Enugu in 2012/13 and 2013/14, with many retiring and a shortage of teachers as a result. This may mean the population of head teachers in CS2 was quite different to in CS1.

Table 9. Enugu: Head teacher effectiveness in CS1 and CS2

	CS1	CS2	
(1) Lesson observations	11.6	33.7	+
(2) Professional development meetings	5.7	45.1	+
(3) Action on teacher attendance	97.9	83.7	-
(4) Clear opening time	63.3	61.1	
(5) In class on time	92.2	86.2	
(6) Appropriate morning break	11.2	2.8	
(7) Appropriate lesson length	25.9	19.6	
Number of criteria fulfilled (/7)	3.1	3.2	
Effective head teacher (5/7 criteria met)	9.7	19.3	

Note. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; $p < .05$)

Focusing on the CS2 data, head teachers who are expected to have improved due to leadership training from ESSPIN are more effective than those who have not (Table 10), with 42% meeting the effectiveness criteria as opposed to 17% in non-ESSPIN schools. Although the differences in head teachers meeting each individual criterion were not significant, the average number of criteria met was significantly higher for the trained head teachers at four out of seven as opposed to 3.2 out of seven.

Table 10. Enugu: Head teacher effectiveness in CS2, by intervention group

	(i) Non-ESSPIN	(ii) ESSPIN	
(1) Lesson observations	32.1	51.6	
(2) Professional development meetings	43.8	59.9	
(3) Action on teacher attendance	83.4	86.8	
(4) Clear opening time	60.9	64	
(5) In class on time	85.6	92.7	
(6) Appropriate morning break	3	0	
(7) Appropriate lesson length	18.4	32.7	
Number of criteria fulfilled (/7)	3.2	4	+
Effective head teacher (5/7 criteria met) (%)	17.3	41.7	+

Note. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).

As in the previous section on teacher competence, we also examine change over time in head teacher effectiveness to see whether head teachers in schools that received more ESSPIN intervention between 2012 and 2014 improved faster than comparators. The results suggest there was no significant difference between the improvement of head teachers in schools benefiting from ESSPIN and schools which did not expect an improvement, when comparing the change in average criteria met (Table 11). We also adjusted this for the year that the head teacher was appointed to his or her current school and found similar results. Annex D shows that similar results are also found using a regression method of analysis.

Table 11. Enugu: Head teacher effectiveness difference in differences (comparison of means)

Number of criteria met (out of 7)	(i) Non-ESSPIN	(ii) ESSPIN
CS1	3	4.2
CS2	3.2	4
Difference	0.1	-0.2

Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

In summary, the evidence suggests that overall head teacher effectiveness has improved in Enugu, but not significantly. However, head teachers are significantly more effective in ESSPIN schools than in non-ESSPIN ones. There was no significant difference in the pace of improvement of ESSPIN and non-ESSPIN schools.

3.3   School development planning

The definition of effective school development planning depends on five criteria (Box 6). Overall, around a quarter of schools in Enugu reach this standard, and this is an improvement from 11% in 2012 (Table 12). The proportion of schools meeting each criterion increased between CS1 and CS2, and for four of the five criteria the change was significant. In particular, the number of schools with evidence of school evaluation, a SDP and activities to strengthen teaching and learning each increased from around one in 10 to one in two, suggesting effective interventions on school planning in Enugu.

Box 6. Logframe standard for effective school development planning

The school must meet criterion 1 and criterion 2 listed below and at least two out of three of the remaining criteria in order to meet the effective school development planning standard:

1) Written evidence of school self-evaluation process for current school year

2) SDP for current school year available

3) SDP contains three or more activities which aim to strengthen teaching and learning

4) Physical evidence of four or more activities from SDP having been carried out

5) Cashbook is up to date (balanced in the last 60 days)

Table 12. Enugu: SDP effectiveness in CS1 and CS2

	CS1	CS2	
(1) Written evidence of school self-evaluation process	12.3	57.3	+
(2) SDP available	12.5	55.4	+
(3) SDP contains 3+ activities to strengthen teaching and learning	10.3	48.1	+
(4) Evidence that 4+ activities from SDP carried out	7.2	8.4	
(5) Cashbook up to date	11	23.9	+
Number of SDP criteria fulfilled (/5)	0.5	1.9	+
School meets effective school development planning standard (4/5 criteria met) (%)	10.7	25.9	+

Note. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

In 2014, for two of the five criteria, and for the overall number of criteria met, ESSPIN schools are doing significantly better than non-ESSPIN schools at school development planning (Table 13). Enugu's ESSPIN schools are slightly more likely to have met the overall SDP effectiveness criteria than those where we did not expect an improvement, but it is not a significant difference.

Table 13. Enugu: SDP effectiveness in CS2, by intervention group

	(i) Non-ESSPIN	(ii) ESSPIN	
(1) Written evidence of school self-evaluation process	55	82.5	+
(2) SDP available	53.2	79.6	+
(3) SDP contains 3+ activities to strengthen teaching & learning	46.4	67.1	
(4) Evidence that 4+ activities from SDP carried out	8.5	7.1	
(5) Cashbook up to date	23.3	30.3	
Number of SDP criteria fulfilled (/5)	1.9	2.7	+
School meets effective school development planning standard (%)	25.5	30.1	

+ indicates a significant difference from the results in non-ESSPIN schools (p < .05).

We assess whether ESSPIN schools improved faster than non-ESSPIN schools in terms of school development planning using a comparison of the mean number of criteria met (Table 14). The results show a significant difference in the level of improvement between ESSPIN and non-ESSPIN schools—with non-ESSPIN schools improving but ESSPIN schools actually worsening. This result is confirmed when using a regression analysis, shown in Annex D.

Table 14. Enugu: SDP effectiveness difference in differences (comparison of means)

Number criteria met (out of 5)	(i) Non-ESSPIN	(ii) ESSPIN
CS1	0.2	4.2
CS2	1.9	2.7
Difference	1.7	-1.5*

Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

In summary, school development planning has improved substantially in Enugu between 2012 and 2014. Much of that improvement comes from a rapid increase in the SDP effectiveness of schools where no improvement was expected. These schools started at a lower base and have managed to narrow the gap in the two-year period. The ESSPIN schools remain slightly more effective at school development planning than non-ESSPIN schools in 2014.

3.4   School inclusiveness: meeting the needs of all pupils

The school inclusiveness standard depends on meeting three out of four criteria (Box 7), and schools are defined as partially meeting the standard if two criteria are met. In Enugu there was a large and statistically significant improvement in the proportion of schools meeting the inclusiveness standard between 2012 and 2014, increasing from around 10% to around 33% (Table 15). Of the individual criteria, there was a significant improvement in the number of schools planning two or more activities to improve access for disadvantaged children. We calculate an overall inclusiveness score: a continuous indicator based on the number of actions to improve pupil attendance, number of SDP activities to improve access, proportion of teachers using different assessment methods, and teacher spatial and gender inclusiveness. This score has increased only marginally, although more schools have crossed the inclusiveness standard threshold.

Box 7. Standard for school inclusiveness (meeting needs of all pupils)

The school must meet at least three of the four criteria listed below in order to meet the school inclusiveness standard. The standard is partially met if two criteria are met.

1) Head teacher states three or more actions that he/she has taken to improve pupil attendance

2) SDP contains two or more activities that aim to improve access

3) More than 50% of teachers observed provided evidence of using two or more assessment methods (marked class test, marked pupil workbook, or graded examination paper)

4) More than 50% of teachers observed met the spatial inclusion criterion (defined as engaging with at least one pupil from four different areas of the classroom during a lesson) and more than 50% of teachers observed met the gender-inclusion criterion (defined as engaging with boys and girls proportionally to their presence in the classroom within a 10% margin. For example, if the class contains 50% girls then teachers who engage with girls between 60% and 40% of total engagements will meet the criterion).

Table 15. Enugu: School inclusiveness in CS1 and CS2

	CS1	CS2	
(1) 3+ actions to improve attendance	49.5	50.6	
(2) 2+ activities in SDP to improve access for disadvantaged children	5.4	20.2	+
(3) >50% of teachers use 2+ assessment methods	88.3	87.3	
(4) >50% of teachers spatially inclusive and >50% are gender-inclusive	18.9	35.2	
Number of inclusiveness criteria fulfilled (/4)	1.6	1.9	
Inclusiveness score	75.6	76.5	
School partially met inclusiveness standard (2-4 criteria out of 4)	59.2	64.7	
School fully met inclusiveness standard (3-4 criteria out of 4)	10.2	33.1	+

Note. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

Focusing on CS2 schools, more schools where we would expect to see an improvement due to ESSPIN met the school inclusiveness standard (46%) compared with non-ESSPIN schools (32%), and the difference was significant for schools partially meeting the standard. All the sub-criteria were higher for ESSPIN schools than non-ESSPIN schools, and significantly so in terms of teachers using more assessment methods and being more spatially and gender-inclusive of pupils in the classroom.

Table 16. Enugu: School Inclusiveness in CS2, by intervention group

	(i) Non-ESSPIN	(ii) ESSPIN	
Inclusiveness criteria			
(1) 3+ actions to improve attendance	49.1	66.7	
(2) 2+ activities in SDP to improve access for disadvantaged children	19.2	30.9	
(3) >50% of teachers use 2+ assessment methods	86.4	97.4	+
(4) >50% of teachers spatially inclusive and >50% are gender-inclusive	33.2	56.5	+
Overall inclusiveness standard			
Number of inclusiveness criteria fulfilled (/4)	1.9	2.5	+
Inclusiveness score	76.2	79.6	
School partially met inclusiveness standard (2-4 criteria out of 4)	62.2	92.5	+
School fully met inclusiveness standard (3-4 criteria out of 4)	31.9	46.1	
Detailed			
Number of actions to improve attendance	2.9	3.3	
Number of activities on access for disadvantaged children	0.7	1.1	
Average number of assessment methods used	2.3	2.3	
Average number of zones participating in lessons	4.5	5.1	+
Average gender equity score (0=completely unequal, 100=perfectly equal)	86.3	88.5	

Notes: + indicates a significant difference from the results in non-ESSPIN schools (p < .05). The gender equity score for a teacher is $100 - 100 \times abs(\frac{g}{g+b} - \frac{G}{G+B})$ where *g* is the number of girls who participate, *b* is the number of boys who participate, *G* is the number of girls present in the class, and *B* is the number of boys present in the class. It is expressed as a percentage score. For a lesson where the proportion of girls and boys participating is exactly equal to the proportion

of girls and boys sitting in the lesson, the gender equity score will be 100; for a lesson where no boys participate or no girls participate, the score will be zero.

Using a difference in difference analysis of schools in Enugu depending on the level of ESSPIN intervention, the comparison of means suggests that all schools improved their inclusiveness, and ESSPIN schools did not improve significantly faster than other schools during 2012 to 2014 (Table 17). The regression method also did not find any significant effect of receiving more intervention on school inclusiveness over time, as is shown in Annex D.

Table 17. Enugu: School inclusiveness difference in differences (comparison of means)

Inclusiveness score	(i) Non-ESSPIN	(ii) ESSPIN
CS1	75.4	77.4
CS2	76.2	79.6
Difference	0.9	2.1

Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

3.5 SBMC functionality and inclusiveness

ESSPIN conducted qualitative research into SBMCs and community engagement in education in five ESSPIN states in 2009 (ESSPIN, 2009) (Jigawa, Kaduna, Kano, Kwara and Lagos were included). This research suggested that SBMCs were not functioning well—there was a lack of clarity and understanding over the SBMC's role and responsibilities; they lacked the financial resources to support schools in the ways that LGEAs often expected them to; community members were sometimes excluded by local elites; and there was little participation by women and children despite guidelines requiring it.

In this context, SBMCs were starting from a low base and with substantial socio-cultural barriers to be overcome to reach functionality and inclusive participation. ESSPIN has aimed to improve community involvement in schools through functioning SBMCs and increased women's and children's participation, with a number of interventions under its output stream 4 (see Annex C).

At the time of the CS1 survey, out of the sample of schools in Enugu only 57% of schools had SBMCs (40 out of 70 schools; Table 18). By CS2 this had increased to 90% of the schools sampled, showing an improvement in the establishment of SBMCs. This does not mean that all the SBMCs are functional or inclusive, however, and they may not have received ESSPIN output stream 4 support. Enugu in particular did not conduct women's and children's participation training in any schools until 2013/14, so we cannot expect high performance in these indicators in CS1 or any substantial impact by the time of CS2. The following sections use criteria and standards defined by the ESSPIN logframe to examine SBMC functionality and the extent to which SBMCs are inclusive of women and children.

Table 18. Enugu: Sample size of schools with SBMCs

	CS1	CS2
Schools sampled in Enugu	70	105
Schools with SBMCs sampled in Enugu	40	95

3.5.1 SBMC functionality

There are nine criteria used to assess SBMC functionality, of which five must be fulfilled to meet the logframe standard (Box 8). In Enugu there was a significant improvement in the state average

across six of the nine criteria between 2012 and 2014, which contributed to an increase in the total proportion of schools meeting the SBMC functionality criteria from 9% to 23% (Table 19). The average number of criteria met increased from 0.9 in 2012 to 3.4 in 2014, and there were notable increases in SBMCs holding two or more meetings, conducting awareness-raising activities, networking with other community organisations, and contribution of resources to the school from the SBMC. Most of the criteria for SBMC functionality rely on the ability to provide written or photographic evidence, or at least oral recollection, of a specific event. Consequently, the criteria may reflect the quality of record keeping of the SBMC more than the particular aspects of functionality they aim to measure. It may therefore be that Enugu's SBMCs are more functional than is recorded in the data.

Two additional criteria related to the inclusiveness of SBMCs (not included in the CS1 report) are also examined in this section: whether the SBMC did anything to support commonly excluded groups and whether it raised issues about children's exclusion from school with the community, LGEA or state government. Both of these indicators improved in Enugu between CS1 and CS2, and significantly so in terms of SBMCs raising issues of inclusion.

Box 8. Logframe standard for SBMC functionality

The school must meet at least five of the nine criteria listed below in order to meet the SBMC functionality standard for the current school year:[3]

1) Two or more SBMC meetings have taken place since the start of the current school year (written evidence)

2) SBMC conducted awareness-raising activities (written or oral evidence)

3) SBMC took steps to address exclusion (written or oral evidence)

4) SBMC networked with community-based organisations (CBOs), traditional or religious institutions, or other SBMCs (written or physical evidence)

5) SBMC interacted with LGEAs on education service delivery issues (written or physical evidence)

6) SBMC women's committee exists (written or physical evidence)

7) SBMC children's committee exists (written or physical evidence)

8) SBMC contributed resources for the school (written or physical evidence)

9) SBMC chair visited the school at least three times since the start of the current school year (written evidence)

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[3] A slightly different standard with 10 criteria was used in CS1. The new standard with nine criteria was applied to both the CS1 and CS2 data.

Table 19. Enugu: SBMC functionality in CS1 and CS2

	CS1	CS2	
(1) 2+ meetings this school year	16	54.7	+
(2) Conducted awareness raising	9	51.8	+
(3) Addressed exclusion	9.7	15.2	
(4) Networked with CBOs/institutions/other SBMCs	7.2	50.7	+
(5) Interacted with LGEA	4.4	21	+
(6) Has women's committee	9.1	13.6	
(7) Has children's committee	8.4	23.6	+
(8) Contributed resources for school	12.5	48.4	+
(9) Chair visited school 3+ times	8	4.1	
Schools meeting functioning SBMC standard	8.7	22.8	+
Number of SBMC functionality criteria met (/9)	0.9	3.4	+
Additional criteria			
Action for commonly excluded groups	7.9	10.6	
Raised issue of children's exclusion	1.2	18.3	+

Note. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

Looking at the difference between ESSPIN and non-ESSPIN schools, in 2014 Enugu's ESSPIN schools performed more effectively in all of the SBMC functionality criteria, and seven out of nine of them significantly so. Notably, the proportion of schools meeting the overall standard was far higher in ESSPIN schools—at 71%—compared with non-ESSPIN schools, which was only 18%. Schools with ESSPIN interventions also had better results than the control schools in the SBMC inclusiveness criteria.

Table 20. Enugu: SBMC functionality in CS2, by intervention group

	(i) Non-ESSPIN	(ii) ESSPIN	
(1) 2+ meetings this school year	53.3	68.9	
(2) Conducted awareness raising	48.8	83.5	+
(3) Addressed exclusion	13	37.7	+
(4) Networked with CBOs/institutions/other SBMCs	48.8	69.8	
(5) Interacted with LGEA	18.5	46.9	+
(6) Has women's committee	9.1	60.4	+
(7) Has children's committee	19.1	71.1	+
(8) Contributed resources for school	45.5	78.9	+
(9) Chair visited school 3+ times	0.7	38.6	+
Standard G: functioning SBMC	18.1	71.4	+
Number of SBMC functionality criteria met (/9)	3.2	5.6	+
Additional criteria			
Action for commonly excluded groups	8.8	25.7	
Raised issue of children's exclusion	16	37.7	+

Note. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).

While it is clear that the overall level of SBMC functionality improved, and ESSPIN schools have greater functionality, we are interested to know whether SBMCs that received more ESSPIN support improved faster than other schools. The comparison of means (Table 21) finds that all schools saw an improvement between CS1 and CS2, and non-ESSPIN schools actually improved faster than those which received SBMC training. The schools not expected to improve started from a much lower base, typically meeting none of the nine criteria in CS1. This gave them space to improve rapidly to meet 3.2 out of nine on average. It may have been more difficult for ESSPIN schools to improve from their starting point of 5.3 out of nine, so they improved less rapidly than the non-ESSPIN schools. The regression method is shown in Annex D and reinforces these findings.

Table 21. Enugu: SBMC functionality difference in differences (comparison of means)

Number criteria met (out of nine)	(i) Non-ESSPIN	(ii) ESSPIN
CS1	0.4	5.3
CS2	3.2	5.6
Difference	2.7	0.3*

Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

3.5.2   Women's inclusiveness

The 2009 study of SBMCs found that community members were excluded from the process by local elites, and as such SBMCs were little known about and lacked a link to the community. In addition, the requirement (as stated in the guidelines) for participation by women and students was often ignored where this was felt inappropriate in local culture.

In this section and the following section, we examine the extent to which SBMCs were inclusive of women's and children's concerns in 2012 and 2014. We measure SBMC women's inclusiveness using four criteria (Box 7). The support to improve participation of women and children, which included establishing sub-committees, was rolled out after initial SBMC training and mentoring. In Enugu this was not until 2013/14, and only in a subset of schools (see Annex C), so we cannot expect to see much impact on women and children's participation at the time of the CS2.

In Enugu there was no significant change found between CS1 and CS2 in each of the individual criteria or the overall standard. There was a significant improvement in the average number of criteria met by schools across Enugu, which increased from 0.4 to 1.4 out of four (Table 22).

Box 9. Logframe standard for SBMC women's inclusiveness

The school must meet at least three of the four criteria listed below in order to meet the SBMC women's inclusiveness standard for the last school year:
1)   At least one woman attended two or more SBMC meetings (written evidence)
2)   Female member of SBMC raised at least one issue at SBMC meetings (written evidence or oral evidence from female member of SBMC)
3)   At least one issue raised by a female member at an SBMC meeting led to action (written, physical or oral evidence from female member of SBMC)
4)   At least one SBMC women's committee meeting took place[4]

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[4] This criterion has been slightly altered since CS1, where it also required the women's committee to have a female leader.

Table 22. Enugu: SBMC's women's inclusiveness in CS1 and CS2

	CS1	CS2	
(1) At least one woman attended 2+ meetings (%)	39.9	41	
(2) Female member raised an issue (%)	50	46.4	
(3) Issue raised by female member led to action (%)	28.5	28	
(4) Women's committee met (%)	35.6	20.3	
Number of criteria met	0.4	1.4	+
Meets standard (3/4 criteria)	37.6	20.7	

Note: Schools that did not have SBMCs at all in CS1 are excluded from the analysis. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

Women's inclusiveness was found to be higher in ESSPIN schools for all the criteria in CS2, and with significant differences in the number of schools where female members of the SBMC raised issues and the women's committees met (Table 23). Looking at the overall standard, 43% of ESSPIN schools in Enugu met the standard compared with 18.5% of non-ESSPIN schools.

Table 23. Enugu: SBMC women's inclusiveness in CS2, by intervention group

	(i) Non-ESSPIN	(ii) ESSPIN	
(1) At least one woman attended 2+ meetings (%)	40.7	44	
(2) Female member raised an issue (%)	43.7	69.6	+
(3) Issue raised by female member led to action (%)	27.3	34	
(4) Women's committee met (%)	14.4	76.7	+
Number of criteria met	1.3	2.3	+
Meets standard (3/4 criteria)	18.5	43.3	+

Note. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).

ESSPIN schools are much more inclusive of women than non-ESSPIN schools. However, difference in differences analysis in fact suggests that non-ESSPIN schools were catching up with ESSPIN schools between 2012 and 2014; the increase in women's inclusiveness was faster in non-ESSPIN schools than in the ESSPIN schools between 2012 and 2014 (Table 24).

Table 24. Enugu: SBMC women's inclusiveness difference in differences (comparison of means)

Number criteria met (out of 4)	(i) Non-ESSPIN	(ii) ESSPIN
CS1	0.1	2.6
CS2	1.3	2.3
Difference	1.1	-0.2*

Note: Schools that did not have SBMCs at all in CS1 are excluded from the analysis. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

3.5.3   Children's inclusiveness

Earlier qualitative research (ESSPIN, 2009) found that many SBMCs did not allow the participation of children and that, where they had student members, they were not always able to be invited or may not have been comfortable voicing opinions in meetings. In this section, we examine whether SBMCs have improved in the extent to which they are inclusive of children, in accordance with guidelines for how they are supposed to operate. There are four criteria within the standard on

SBMC children's inclusiveness. As mentioned above, the intervention support for children's participation was only rolled out to a selection of schools in 2013/14, so we cannot expect a large impact on the indicators in 2014.

As with women's inclusiveness, there was a significant increase between CS1 and CS2 in the average number of criteria met, increasing from 0.3 in 2012 to one out of four in 2014. The individual indicators and the logframe standard saw no significant change.

Box 10. Logframe standard for SBMC children's inclusiveness

The school must meet at least three of the four criteria listed below in order to meet the SBMC's children's inclusiveness standard for the current school year:

1)   At least one child attended two or more SBMC meetings (written evidence)

2)   Child member of SBMC raised at least one issue at SBMC meetings (written evidence or oral evidence from child member of SBMC)

3)   At least one issue raised by a child member at an SBMC meeting led to action (written, physical or oral evidence from child member of SBMC)

4)   At least one SBMC children's committee meeting took place and the committee has a trained facilitator[5]

Table 25. Enugu: SBMC children's inclusiveness in CS1 and CS2

	CS1	CS2	
(1) Child attended 2+ meetings (%)	33.3	23.7	
(2) Child raised an issue (%)	30.2	36	
(3) Issue raised by child led to action (%)	29.3	20	
(4) Children's committee met and it has a trained facilitator (%)	15.1	19.1	
Number of criteria met	0.3	1	+
Meets standard (3/4 criteria) (%)	25.3	20.7	

Note: Schools that did not have SBMCs at all in CS1 are excluded from the analysis. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

Looking at children's inclusiveness in CS2, there are positive differences between ESSPIN and non-ESSPIN schools in all the indicators (Table 26), significantly so in terms of children raising an issue in the SBMC and the children's committee meeting (again the same as the women's inclusiveness indicators). Overall, 41% of ESSPIN schools met the standard for SBMC children's inclusiveness, compared with 18% of non-ESSPIN schools, although this was not found to be a significant difference. However, there is no evidence to suggest that ESSPIN schools in Enugu improved faster in terms of SBMC children's inclusiveness between 2012 and 2014, and in fact may have improved more slowly than other schools (Note. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).
Table 27).

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[5] In CS1 this criterion required written evidence in the form of minutes of at least one children's committee meeting held in the past school year. This requirement was dropped for CS2 as it was considered unlikely that children's committees would keep good minutes, and that failure to keep minutes does not mean the committee is not functioning.

Table 26. Enugu: SBMC children's inclusiveness in CS2, between intervention groups

	(i) Non-ESSPIN	(ii) ESSPIN	
(1) Child attended 2+ meetings (%)	22	38.1	
(2) Child raised an issue (%)	33.3	58.4	+
(3) Issue raised by child led to action (%)	18.8	31.2	
(4) Children's committee met and it has a trained facilitator (%)	15.5	49.7	+
Number of criteria met	0.9	1.8	+
Meets standard (3/4 criteria) (%)	18.4	40.6	

Note. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).

Table 27. Enugu: Difference in differences in SBMC children's inclusiveness (comparison of means)

Number of criteria fulfilled (out of 4)	(i) Non-ESSPIN	(ii) ESSPIN
CS1	0.2	1.5
CS2	0.9	1.8
Difference	0.8	0.2

Note: Schools that did not have SBMCs at all in CS1 are excluded from the analysis. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

Overall, Enugu's schools appear to be improving in terms of SBMC functionality and inclusiveness indicators overall, and we can see that ESSPIN schools have higher performance than other schools. That said, the evidence suggests that if anything the non-ESSPIN schools improved at a pace that ESSPIN schools could not match over the intervention period, narrowing the gap between ESSPIN and non-ESSPIN schools.

3.6   School quality

Overall school quality is measured as a combination of the standards on teacher competence, head teacher effectiveness, school development planning, and SBMC functionality. A quality school is defined as one that meets the teacher competence standard and at least two of the other standards (Box 11). Comparison of school quality between CS1 and CS2 suggests that the proportion of Enugu's schools meeting the overall school quality standard (three out of four of the sub-criteria) has more than doubled, rising from 7% to 18% (Table 28). We also use a 'quality score' indicator, which is an average of the continuous indicators developed in the previous sections for teacher competence, head teacher effectiveness, school development planning, and SBMC functionality. There was a significant increase in this quality score from 31% in CS1 to 53% in CS2.

Box 11. Logframe standard for school quality

The school must meet at least three of the four output standards listed below in order to meet the school quality outcome standard, with teacher competence having to be one of those three:

1) Teacher competence standard (more than 50% of sampled teachers are competent)

2) Head teacher effectiveness standard

3) School development planning effectiveness standard

4) SBMC functionality standard

As the teacher competence standard has changed between CS1 and CS2 (with teachers now required to score a minimum of 50% in both English and mathematics tests to pass the competence standards) we report both 'CS1' and stricter 'CS2' versions of the overall quality standard.

Table 28. Enugu: School quality in CS1 and CS2

	CS1	CS2	
Meets three or four standards (CS1 version)	7.1	17.7	+
Quality score (CS1 version)	31.1	53.2	+

Note. + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

Within CS2, around a third of schools where improvement would be expected due to ESSPIN interventions meet the overall school quality standard, and this is more than double that for non-ESSPIN schools (Table 29). The difference is significant when using the new stricter definition of teacher competence. Using our continuous indicator of school quality, scores are significantly higher in ESSPIN than non-ESSPIN schools at around 65% as opposed to 51%.

Table 29. Enugu: School quality in CS2, by intervention group

	(i) Non-ESSPIN	(ii) ESSPIN	
Meets three or four standards (CS1 version)	16.2	35.3	
Meets three or four standards (CS2 version)	13.9	35.3	+
Quality score (CS1 version)	51.9	64.6	+
Quality score (CS2 version)	51	66.4	+

Note: The CS2 version of the quality score and school quality standard reflect the 'strict' version of the teacher competence standard, where teachers are required to pass literacy and numeracy tests as well as fulfilling other criteria. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).

The difference in differences analysis finds that ESSPIN schools actually improved significantly more slowly than schools where no improvement is expected, and may even have worsened (Table 30). Non-ESSPIN schools have improved rapidly during 2012 to 2014, while ESSPIN schools appear to have slipped back somewhat. This narrowing of the gap between ESSPIN and control schools can be seen clearly in Figure 3. Analysis using a regression method finds similar results (Annex D).

Table 30. Enugu: School quality difference in differences (comparison of means)

School quality score	(i) Non-ESSPIN	(ii) ESSPIN
CS1	28.3	71.1
CS2	51.9	64.6

Difference	23.7	-6.5*

Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

Figure 3. Enugu: School quality in 2012 and 2014, in control and ESSPIN schools
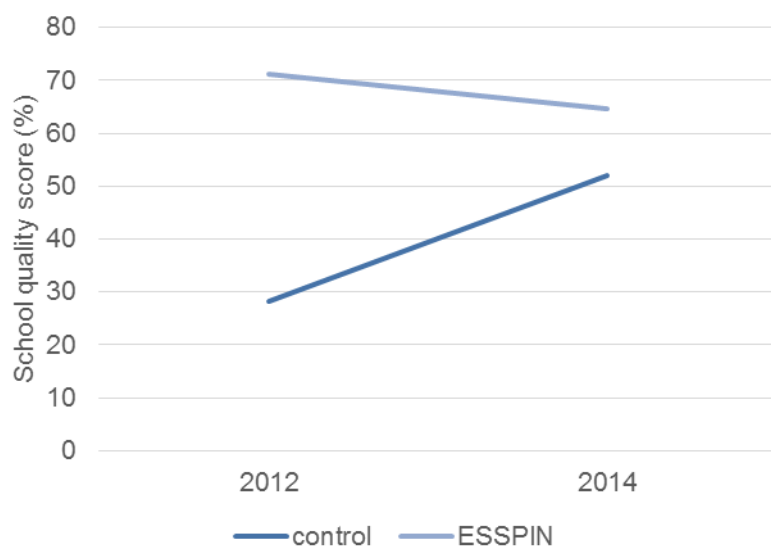
3.7 Pupil learning achievement in English literacy and numeracy

The learning achievement indicators are included as indicators of the impact of the ESSPIN programme. Pupils were tested in grades 2 and 4, in literacy and numeracy. This section begins by following the same analysis conducted for other indicators: looking at the change in the state average between CS1 and CS2, the difference between ESSPIN and non-ESSPIN schools in 2014, and the change in results between 2012 and 2014 for pupils in schools expected to improve in this time compared with those not expected to improve. It then moves on to a more detailed look at the breakdown of pupil results. Here we look at how pupil scores were distributed in the 2014 tests, split between ESSPIN and non-ESSPIN schools. We also look at the average test scores on sub-scales of the tests, such as grasp of number concepts or addition and subtraction, and how these vary over time for the state average and for pupils from different types of schools.

3.7.1 Main analysis

Average test results for Enugu have improved between CS1 and CS2. The test scores for literacy in both grade 2 and grade 4 increased significantly, from 51% to 62% and 47% to 59% respectively (

Table 31). Grade 4 numeracy scores also increased significantly and reach just below 50% on average. Numeracy in grade 2 did not significantly improve but is one of the highest test scores at 61% on average.

As well as changes in average test scores,

Table 31 shows the proportion of schools that met ESSPIN's logframe indicator. This is a relatively narrow indicator based on whether each child correctly answered a subset of questions in each test or not (see Cameron, 2015, Annex A.1). The trend is overall similar to that for average test scores, except for grade 4 literacy, where the change over time is negative and non-significant.

Table 31. Enugu: Test scores and proportion of children reaching logframe indicator in CS1 and CS2

	Test	CS1	CS2	
Test score (%)	L2	51	61.9	+
	L4	46.7	58.6	+
	N2	59.9	61	
	N4	40.1	47.4	+
Logframe indicator (%)	L2	5.5	13	+
	L4	9.1	8.2	
	N2	13.6	14.6	
	N4	2	3.6	

Note: L2 = grade 2 literacy; L4 = grade 4 literacy; N2 = grade 2 numeracy; N4 = grade 4 numeracy + = significant improvement between 2012 and 2014; - = significant worsening between 2012 and 2014 (using a t-test; p < .05)

Focusing on the CS2 data, pupils in ESSPIN schools had higher test scores than in other schools (a category that includes schools that received ESSPIN only recently or not at all) (Table 32). The difference was statistically significant in all assessments except grade 2 numeracy. The most striking difference was in grade 2 literacy, where pupils in ESSPIN schools scored 80% on average but those in non-ESSPIN schools scored 60%. The higher test scores of pupils in schools which received some ESSPIN support, compared with those which had no support, can be seen clearly in Note. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).

Figure 4. The proportion of pupils achieving ESSPIN logframe indicators in each test remained low, with the exception of grade 2 literacy, which saw 44% of ESSPIN schools' pupils meet the indicator against only 10% of pupils in other schools.

Table 32. Enugu: Test scores and proportion of children reaching logframe indicator in CS2, by intervention group

	Test	(i) Non-ESSPIN	(ii) ESSPIN	
Test score (%)	L2	60.2	80	+
	L4	57.7	68.7	+
	N2	60.7	64	
	N4	46.9	52.4	+
Logframe indicator (%)	L2	10.1	44.2	+
	L4	7.8	12.2	
	N2	14.1	20.1	
	N4	3.6	4.4	

Note. + indicates a significant difference from the results in non-ESSPIN schools (p < .05).

Figure 4. Enugu: Test scores by ESSPIN intervention group
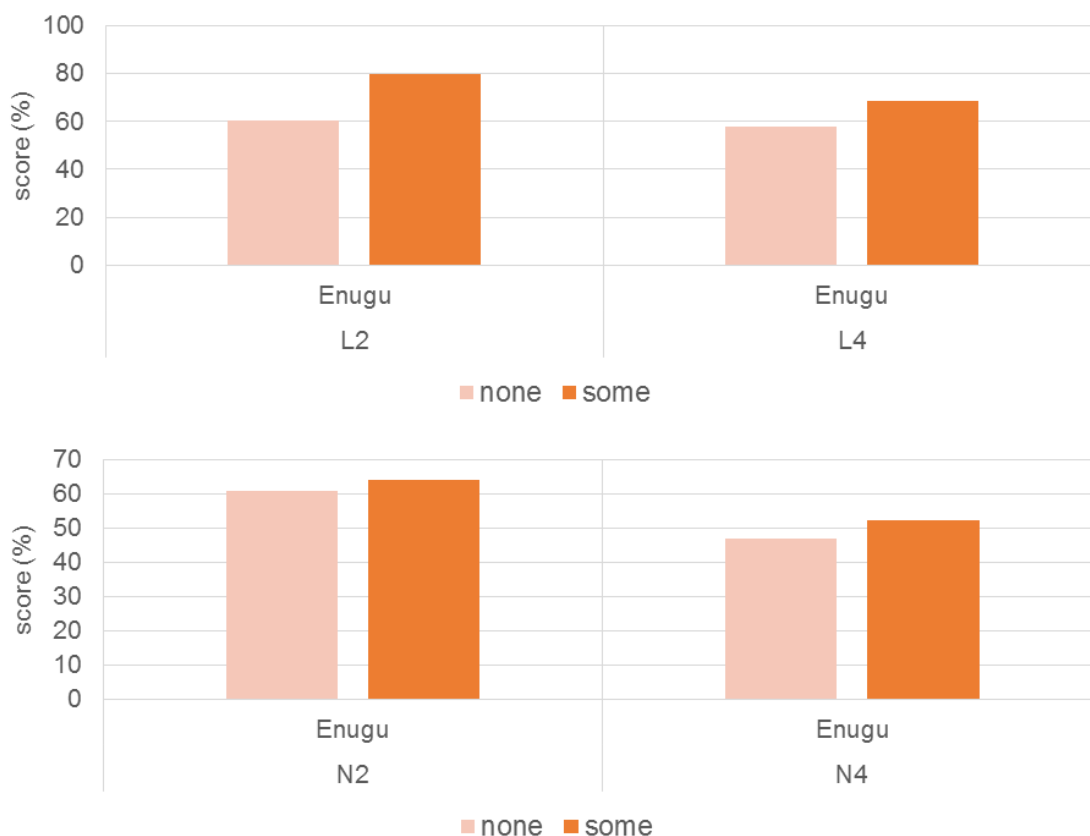
Turning to the   question of whether the ESSPIN activities had an impact on change in pupil test scores between 2012 and 2014, we find that generally pupils in ESSPIN schools did not improve as much as pupils in non-ESSPIN schools. The comparison of means method (Table 33) finds no significant difference between the change in test scores in ESSPIN and non-ESSPIN schools, except that in grade 4 literacy non-ESSPIN schools' results improved significantly faster. This narrowing of the gap between ESSPIN and non-ESSPIN schools can be seen in Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

Figure 5. The regression analysis, shown in Annex D, also finds similar results.

Table 33. Enugu: Pupil test score difference in differences (comparison of means)

Pupil test score		(i) Non-ESSPIN	(ii) ESSPIN
L2	CS1	48.9	69.6
	CS2	60.2	80
	Difference	11.3	10.4
L4	CS1	44.6	67.3
	CS2	57.7	68.7
	Difference	13	1.5*
N2	CS1	59	68.3
	CS2	60.7	64
	Difference	1.7	-4.3
N4	CS1	39.2	50.2
	CS2	46.9	52.4
	Difference	7.7	2.2

Note. * indicates a significant difference in differences compared to the non-ESSPIN schools (p < .05).

Figure 5. Enugu: Pupil test scores in ESSPIN and control schools, in 2012 and 2014
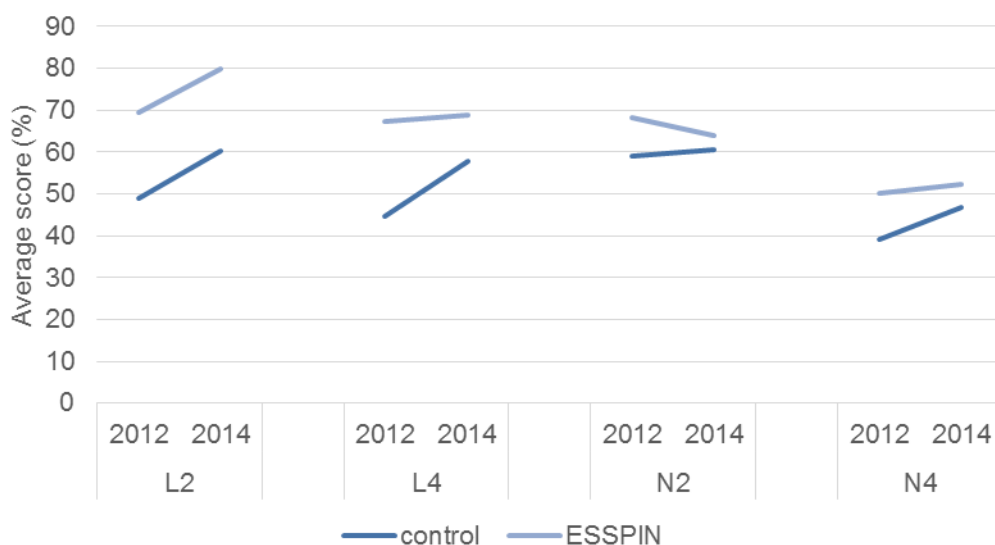
3.7.2 Distribution of test scores and sub-scale scores

In Enugu, in all four tests, a higher proportion of pupils in the schools expected to improve scored the highest results (75–100%) than from schools not expected to improve (Figure 6). This difference is particularly impressive in the literacy tests. Across the tests we find in the lower scores (0–24% and 25–49%) there is a higher proportion of pupils from the schools with no expected improvement than from the schools expecting improvement. Overall, this is the shift we would hope to see from ESSPIN: pupils in the ESSPIN-supported schools score more in the higher ranges.

Figure 6. Enugu: Distribution of pupil test scores
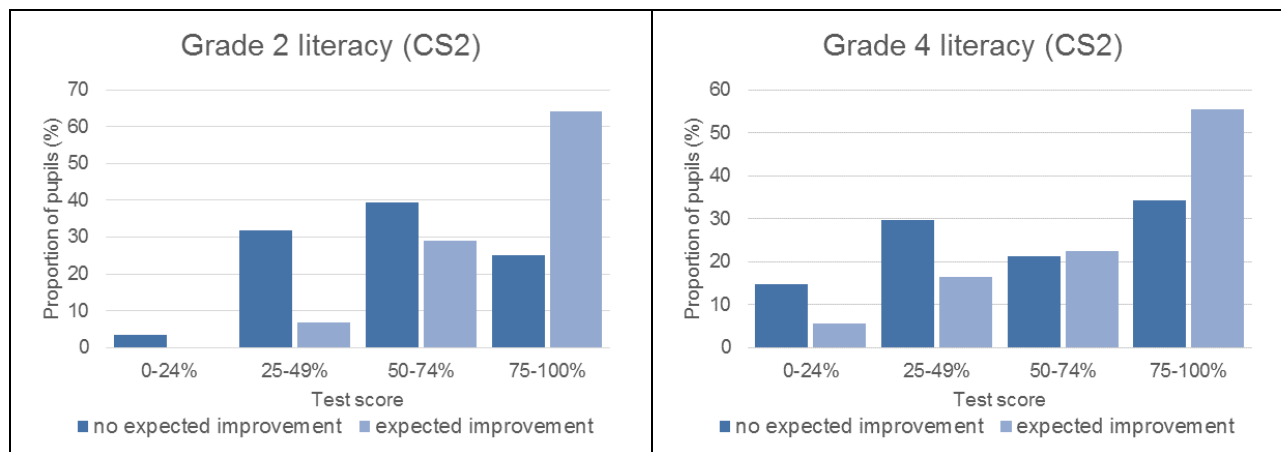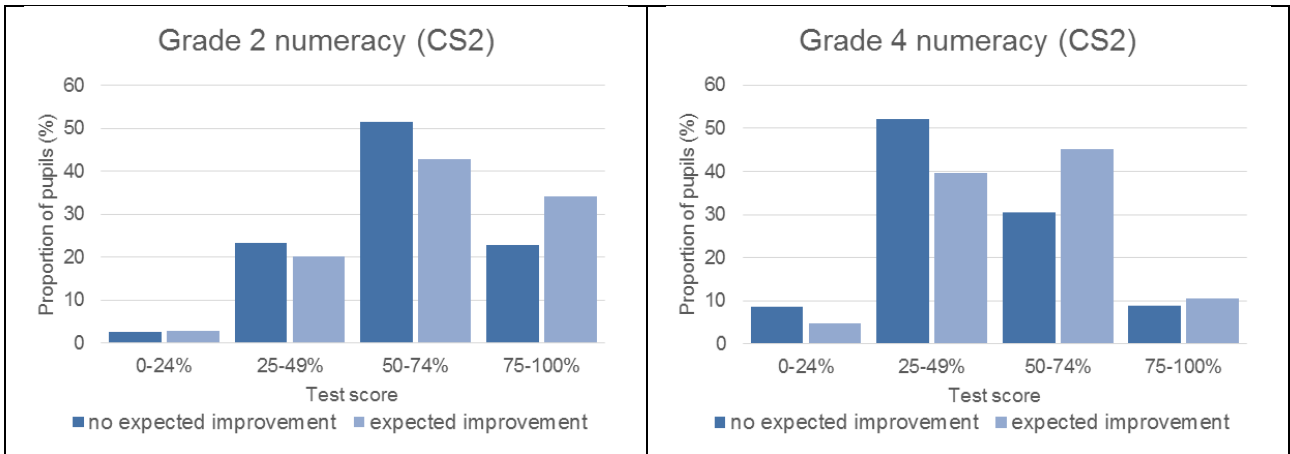
The average pupil test scores in Enugu have increased between CS1 and CS2 in all sub-scale areas of the tests (Figure 7). Some of the largest increases are seen in literacy, particularly reading, and at grade 4 an improvement is seen in pupils answering the grade 1/2 and 3 questions. There was also an improvement in grade 1/2 numeracy questions in grade 4, as well as grade 4 number concepts.

Figure 7. Enugu: Average scores in test sub-scales, CS1 and CS2
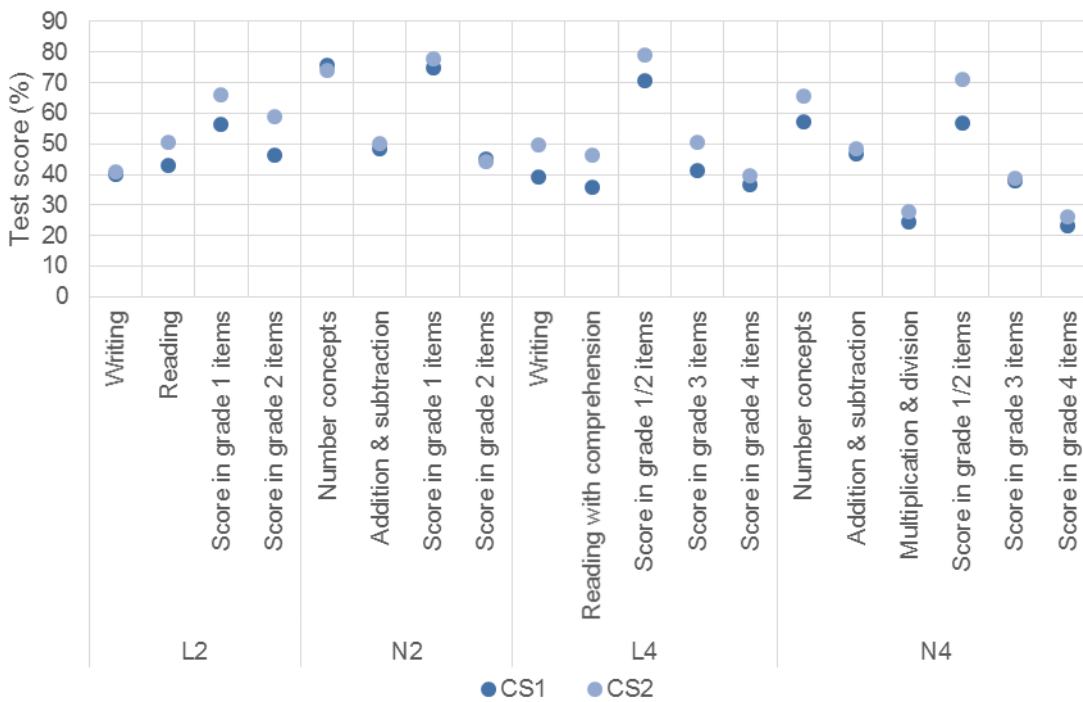
Across all of the sub-scales of the pupil tests, pupils in the ESSPIN schools scored higher on average than pupils in the non-ESSPIN schools (Figure 8). This difference was generally larger in the literacy items, suggesting that ESSPIN schools may be stronger at teaching literacy than non-ESSPIN schools. In numeracy, the results are closer together for the two groups of schools.

Figure 8. Enugu: Average scores in test sub-scales in CS2, ESSPIN and non-ESSPIN
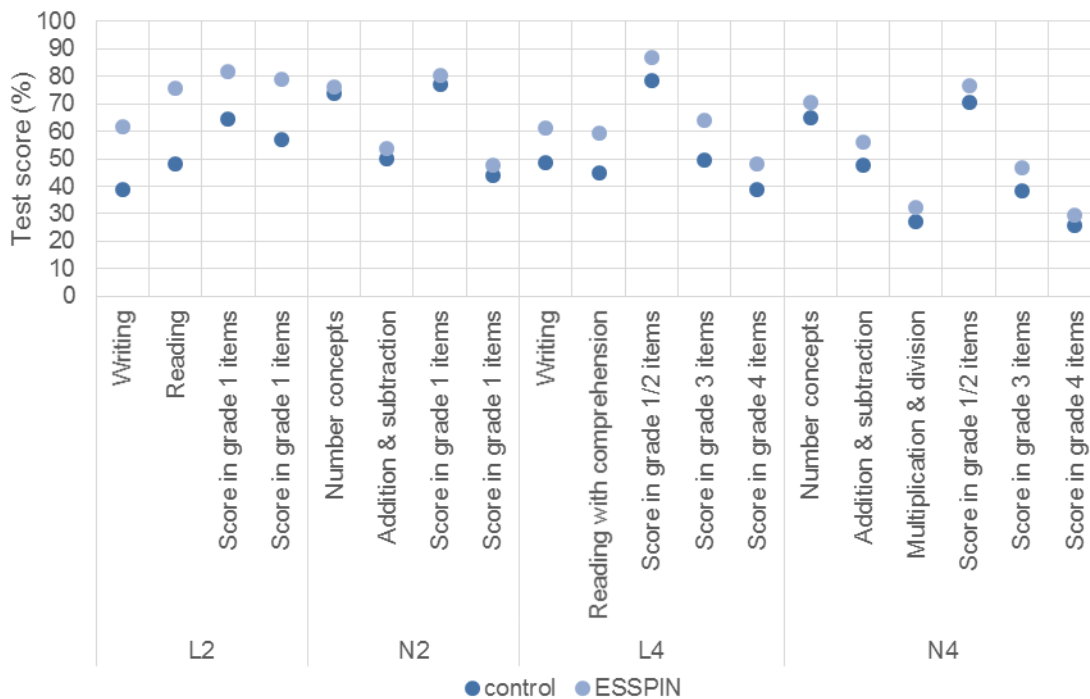
4   Conclusion and implications of survey findings for Enugu's ESSPIN programme

This report has looked at a set of indicators of programme outputs, outcomes and impact, defined under ESSPIN's theory of change. The results across the indicators for Enugu follow a similar pattern:

- Standards have increased in Enugu's schools between 2012 (round 1 of the survey) and 2014 (round 2). Indicators improved significantly for teacher competence, school planning, inclusiveness, SBMC functionality and inclusiveness of women and children, overall school quality, and learning outcomes.

- Schools that have received ESSPIN intervention have more effective head teachers, better teachers, better planning and more functioning and inclusive SBMCs than schools which received no intervention or only received intervention in 2013/14. Children in the intervention schools were also learning more by grades 2 and 4.

- However, it is difficult to argue that this difference is actually due to the ESSPIN school-level intervention. ESSPIN school-level intervention started in 2011/12 in Enugu, with larger numbers of schools joining in 2012/13 and 2013/14. The schools that received this intervention were already better in 2012, and schools that did *not* receive the intervention made greater gains in school quality during 2012 to 2014. Learning outcomes improved at roughly the same pace in ESSPIN and non-ESSPIN schools (except for grade 2 numeracy, which did not change significantly).

Schools and learning outcomes are improving in Enugu, but we are not able to attribute this directly to ESSPIN's interventions at the school level. Instead, broader processes across the state appear to be bringing about improvement. This could include ESSPIN activities at the state level or within LGEAs, other activities by the state government, or social and economic change in the ability and willingness of parents to support their children through school.

Many of our indicators of school quality are either stagnating or are declining slightly in ESSPIN schools. It is possible that some of this change is attributable to measurement error. A different survey training and monitoring process meant that tests were marked more strictly in the second round, and this could have reduced the expected ESSPIN effect. However, as this trend was found in a wide range of indicators, and only in ESSPIN schools, we suspect that measurement error can at best be a partial explanation.

Another possibility is that it is difficult to raise standards further in schools that were already doing relatively well to start with. In struggling schools there may be quick wins that make a measurable rapid improvement possible. Improving higher-performing schools may require more resources to understand what the remaining problems are and address them.

A third possibility is that there are spillover effects. This would mean that schools that do not directly receive ESSPIN interventions somehow benefit from them, for example through the transfer of teachers and head teachers, copying of lesson plans or other learning materials, and the presence of better-trained officers in local and state-level education bodies. However, positive spillover effects are hard to reconcile with a lack of progress (during 2012 to 2014) within the schools that do directly receive ESSPIN interventions.

The first cohort (2011/12) of ESSPIN intervention schools in Enugu were all selected within one LGEA (Udi), from three identified as having low performance indicators based on the annual school

census at the time. (A number of low-fee Mission schools were also included.) Although the census indicated that schools in this LGEA were low-performing—based on criteria such as teacher qualifications, the state of disrepair of classrooms, and pupil–teacher ratios—the survey results suggest that these schools were actually performing better than other schools in 2012. It may be that the interventions were already having an effect in 2011/12, and that this explains the good results in 2012, although it does not explain the lack of further progress since 2012.

Despite the sometimes rapid improvement in the non-ESSPIN schools, in 2014 we found that schools that had benefited from ESSPIN were often significantly higher performing than the control schools. Schools with head teachers who had received leadership training were significantly more likely to cross the threshold for effective head teachers than schools which had not benefited. In school development planning the ESSPIN schools met more of the criteria on average, and ESSPIN schools were more likely to meet the inclusiveness standard. Some of the most notable differences were found in indicators relating to SBMCs. Over 70% of ESSPIN schools had functioning SBMCs according to the criteria, compared with less than 20% of schools that had not received ESSPIN support. Similarly, the ESSPIN schools' SBMCs were more inclusive of women and children. The gap was narrower for the teacher competence indicators, which is a sign that all groups of teachers were high performing and so there was little room for the ESSPIN schools to be ahead.

School quality remained overall higher in ESSPIN schools than other schools in 2014. Nevertheless, it may be worth investigating the lack of improvement in school quality in ESSPIN intervention schools during 2012 to 2014, a period when ESSPIN and its state partner continued to provide direct interventions with training and school visits. Children's test results have continued to improve in these schools (except for grade 2 numeracy), so the lack of change in school quality indicators does not yet appear to be having any negative effect on learning outcomes. But as ESSPIN scales up to reach much larger numbers of students, it will be important to check that the intervention is addressing any barriers to further improvement and having a genuine continued impact on how schools and teachers work. It will also be important to understand what is driving improvements in quality and learning outcomes in non-ESSPIN schools, as there may be lessons for ESSPIN and for other states in Nigeria.

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Annex A   School characteristics

The table below sets out summary statistics for Enugu's schools, split by categories according to the level of output stream 3 intervention (None, Minimum or Medium). The data come from the annual school censuses from 2009/10 and 2013/14.

Enugu's schools by level of ESSPIN intervention	None	Min.	Med. (1) – public	Med. (1) - Mission	
Distance from LGA HQ	12.7	9	13.7	--	
Age of the school in 2014	48.7	53.5	63.4	15.8	+
Urban (%)	12.2	16.7	3.3	72.7	
Nomadic (%)	1.3	1.3	0	0	
Islamic (%)	0	0	0	0	na
Double shift (%)	0.9	0.7	0	0	
Had parent–teacher association in 2009/10 (%)	94.1	93	93.3	--	
Had SBMC in 2009/10 (%)	74.4	77.3	67.1	--	
Pupil–teacher ratio in 2009/10	21	19.5	13.2	--	-
Pupil–teacher ratio in 2013/14	20	19.4	13.1	26.1	-
Change in pupil–teacher ratio (%)	14.1	7.0	13.6	--	
Number of classrooms in 2009/10	5.6	5.8	6.2	6	
Number of teachers in 2009/10	10.5	13	9.9	--	+
Primary enrolment in 2009/10	198.4	228.1	122.6	--	
Change in enrolment 2009/10–2013/14 (%)	6.4	-7.9	0.9	--	
% of teachers with academic diploma / degree	39.9	44.3	53	--	+
% of teachers with PGDE, BEd or Med	20.3	22.9	25.3	--	+
% of teachers with NCE, Grade II or equivalent	78.6	76.3	70.4	--	-
School has a power source (grid/other)	7	9.4	15.7	--	+
% of classrooms with enough seating	19.2	19.9	21.2	--	
% of classrooms with a good blackboard	30.5	32.6	38.8	--	
% of classrooms in good condition/minor repairs	51.5	53.9	51.3	--	
School has at least one toilet (%)	31	36.5	25.8	--	
Number of schools	820	307	91	11	

Source: Annual School Census, 2009/10 and 2013/14. +/- indicates a significant positive/negative coefficient in a linear or logit regression of years of full ESSPIN intervention on the variable of interest.

Annex B   ESSPIN output stream 3 interventions

The table below shows the ESSPIN output stream 3 interventions delivered to date in Enugu State. Each combination of interventions was categorised as None, Minimum, Medium, or Maximum, according to the number of years of continuous intervention and hence expected impact.

	Expected impact	Number of schools	2009/10			2010/11			2011/12			CS1	2012/13			2013/14			CS2
			L	T	SV	L	T	SV	L	T	SV		L	T	SV	L	T	SV	
Enugu	None	820										CS1							CS2
	Minimum	400														6	3	9	
	Medium (1)	121							6	3	9		6	3	9	3		9	
	Medium (2)	151											6	3	9	6	3	9	

L = days of leadership training; T = days of teaching training; SV = school visits

Annex C ESSPIN output stream 4 interventions

The table below shows the days of output stream 4 intervention in Enugu under different headings: SBMC training; women and children participation training; and mentoring visits.

	Level of output stream 3 intervention	2010/11			2011/12				2012/13			2013/14				De facto phase
		S	P	M	S	P	M		S	P	M	S	P	M		
Enugu	None															control
	Minimum											7		4		post-CS1
	Medium								7		4	r	6	4		post-CS1
	Medium				7		4		r		4		6			pre-CS1

Note: S = SBMC training. P = women and children participation training. M = mentoring visits. r = one-day refresher. Mentoring visits were by civil society-government partnership teams, except those marked with an asterisk, which were by SMOs

Annex D Difference in differences analysis using regression

This annex presents the results of regression analysis of difference in differences for the indicators above, to compare change over time between subgroups.

The analysis in Chapter 3 presents the difference in differences of indicator means for sub-categories of groups.

Sometimes we want to use all of the available information and compare schools which have had more or less ESSPIN intervention—a continuous scale—rather than dividing them into some or none. In this case we can use regression analysis, which is a statistical process for estimating relationships among variables. We model the outcome indicator as depending on time (the round of the survey, CS2 versus CS1), the intensity of intervention, and a treatment effect which is the interaction between time and intensity of intervention. The treatment effect tells us if an increase in the level of intervention increased the speed at which the outcome improved. Regression results are reported as a series of 'coefficients'—numbers representing the strength of the relationship with the outcome of interest.

Coefficient	Meaning of coefficient if positive and significant
time (CS2 v. CS1)	The outcome improved over time
Intervention	The higher the level of intervention the more effective (regardless of change over time)
Treatment	The higher the level of intervention, the more or faster the outcome improved over time – this is our key indicator of success

Teacher competence

Here we use regression analysis to examine whether teachers who received more training from ESSPIN improved more, or faster, between 2012 and 2014 (

Table 34). We model the outcome indicator (competence score) as depending upon time (the round of the survey) and the intensity of intervention. Intensity of intervention is measured in terms of the amount of teacher training delivered to the school. We also use an alternative intervention measure that adjusts for the length of time a teacher has been in his or her present school. A teacher who only joined the school in 2012, for example, cannot be expected to have benefited from ESSPIN training delivered in 2010 or 2011, and the intervention variable can be adjusted to reflect this.

The interaction effect between intervention and time, labelled 'treatment', if positive and significant, would provide evidence that schools with more ESSPIN intervention improved more rapidly between 2012 and 2014. Time effects are positive and significant, suggesting that average teacher competence has improved over time. Intervention effects are positive and significant, confirming the finding that teachers who benefit from more ESSPIN intervention appear to be more competent than those receiving less ESSPIN intervention. Treatment effects for school improvement, however, are negative and significant, suggesting that teachers whose schools benefited from more ESSPIN intervention in fact improved less rapidly than those whose schools had less ESSPIN intervention.

Table 34. Enugu: Teacher competence difference in differences (regression)

Regression on competence scores (CS1 version)		Non-adjusted				Adjusted			
Intervention variable		School improvement		Training		School improvement		Training	
Time (CS2 v. CS1)	Coefficient	15.9	*	15.4	*	15.1	*	14.9	*
	SE	3.4		3.5		3.6		3.5	
Intervention	Coefficient	6	*	12.8	*	6.9	*	9	*
	SE	1.3		2.7		1.4		0	
Treatment	Coefficient	-4.4	*	-10.3	*	-4.4	*	-7.3	*
	SE	1.5		3.2		1.8		2.2	
	N	162		162		125		125	

* indicates a significant coefficient ($p < .05$)

Note: adjusted results are adjusted for the length of time a teacher has been in the current school, and therefore whether they would have benefited from the full ESSPIN training package.

Head teacher effectiveness

The regression results suggest there was no significant difference in the change in number of effectiveness criteria met by head teachers in schools benefiting from ESSPIN and schools which did not expect an improvement (Table 35). We also adjusted for the year that the head teacher was appointed to his or her current school and still found no evidence of a difference between the two groups.

Table 35. Enugu: Head teacher effectiveness difference in differences (regression)

Regression on number of criteria met (out of seven)		Intervention variable					
		School improvement		Training		Training (adjusted for start date)	
Time (CS2 v. CS1)	Coefficient	0.15		0.1		0.28	
	SE	0.23		0.25		0.25	
Intervention	Coefficient	0.56	*	0.13	*	0.13	*
	SE	0.16		0.04		0.04	
Treatment	Coefficient	-0.15		-0.07		-0.06	
	SE	0.23		0.05		0.05	
	N	145		144		117	

School development planning

Regression analysis on the number of SDP effectiveness criteria fulfilled finds significant positive time and intervention effects—telling us that all schools improved between 2012 and 2014 and ESSPIN schools were generally better than school development planning (Table 36). The significant negative treatment effect means the level of school development planning improved more slowly in schools with more ESSPIN intervention.

Table 36. Enugu: SDP effectiveness difference in differences (regression)

Regression on SDP effectiveness criteria fulfilled (out of 5)			
Time (CS2 v. CS1)	Coefficient	1.71	*
	SE	0.26	
Intervention	Coefficient	2.01	*
	SE	0.1	
Treatment	Coefficient	-1.61	*
	SE	0.2	
	N	173	

School inclusiveness

A regression on the inclusiveness score has been used for difference in difference analysis of schools in Enugu depending on the level of ESSPIN intervention (Table 37). The results find no significant effects. There is no evidence to support the suggestion that ESSPIN schools improved at a different rate to schools not expected to benefit from the programme.

Table 37. Enugu: School inclusiveness difference in differences (regression)

Regression on inclusiveness score			
Time (CS2 v. CS1)	Coefficient	0.86	
	SE	1.75	
Intervention	Coefficient	1.02	
	SE	0.97	
Treatment	Coefficient	0.64	
	SE	1.34	
	N	159	

SBMC functionality and inclusiveness

A regression to assess the impact of ESSPIN support on the change in SBMC functionality finds that, although all schools saw an improvement between CS1 and CS2, schools where no improvement was expected actually improved faster than those which received more SBMC training (Table 38).

Table 38. Enugu: SBMC functionality difference in differences (regression)

Regression on number of SBMC functionality criteria met			
Time (CS2 v. CS1)	Coefficient	2.72	*
	SE	0.36	
Intervention	Coefficient	2.42	*
	SE	0.23	
Treatment	Coefficient	-1.22	*
	SE	0.33	
	N	158	

The regression on SBMCs' women's inclusiveness also finds that women's inclusiveness improved faster between 2012 and 2014 in schools with less ESSPIN support (Table 39).

Table 39. Enugu: SBMC women's inclusiveness difference in differences (regression)

Regression on number of women's inclusiveness criteria met			
Time (CS2 v. CS1)	Coefficient	1.12	*
	SE	0.24	
Intervention	Coefficient	1.21	*
	SE	0.11	
Treatment	Coefficient	-0.67	*
	SE	0.17	
	N	148	

Note: Schools that did not have SBMCs at all in CS1 are excluded from the analysis.

A regression analysis of difference in differences in SBMC children's inclusiveness finds that all schools improved between 2012 and 2014, according to the positive and significant time coefficient (Table 40). However, the treatment coefficient is not significant, suggesting all SBMCs became similarly more inclusive of children over the period, regardless of ESSPIN support received.

Table 40. Enugu: Difference in differences in SBMC children's inclusiveness (regression)

Regression on number of children's inclusiveness criteria met			
Time (CS2 v. CS1)	Coefficient	0.76	*
	SE	0.2	
Intervention	Coefficient	0.69	*
	SE	0.14	
Treatment	Coefficient	-0.26	
	SE	0.21	
	N	159	

Note: Schools that did not have SBMCs at all in CS1 are excluded from the analysis.

School quality

The regression method for difference in differences in school quality finds that ESSPIN schools tend to have higher quality, as shown by the positive significant intervention coefficient (

Table 41). While the time coefficient tells us that all schools improved between 2012 and 2014, the negative and significant treatment coefficient means that non-ESSPIN schools actually improved more, or more rapidly, than schools with more ESSPIN support. This suggests that the control schools had more catching up to do and so were able to improve at a faster pace.

Table 41. Enugu: School quality difference in differences (regression with continuous intervention variable)

Regression on school quality score			
Time (CS2 v. CS1)	Coefficient	23.66	*
	SE	3.28	
Intervention	Coefficient	21.4	*
	SE	1.61	
Treatment	Coefficient	-15.08	*
	SE	2.5	
	N	123	

Pupil learning

In terms of pupil learning achievement, the regression analysis finds that test scores improved between 2012 and 2014 in all schools, and significantly in all tests except grade 2 numeracy (Table 42). The treatment coefficients are negative but not significant, suggesting some possibility that ESSPIN schools' results improved more slowly than non-ESSPIN schools' pupil test scores.

Table 42. Enugu: Pupil test score difference in differences (regression)

Regression on pupil test score		L2		L4		N2		N4	
Time (CS2 v. CS1)	Coefficient	14.69	*	11.3	*	3.2		7.87	*
	SE	3.05		3.39		2.51		2.18	
Intervention	Coefficient	7.91	*	7.78	*	3.18	*	3.32	*
	SE	1.27		1.61		0.94		0.91	
Treatment	Coefficient	-1.11		-3.24		-2.17		-1.49	
	SE	1.32		1.7		1.13		1.24	
	N	173		174		172		174	