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ESSPIN Composite Survey 3

Enugu State Report

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September 2016

Acknowledgements

Ifeatu Nnodu and Shefali Rai managed the Composite Survey 3 (CS3) project. Femi Adegoke of Oxford Policy Management (OPM) Abuja directed the survey team in Abuja. Ekundayo Arogundade and Kelechi Udoh, and their team of state coordinators and monitoring officers, managed the fieldwork. Babatunde Akano and Joshua Moriyonu led data management. Caine Rolleston provided helpful comments on an earlier draft of this report. David Megill provided sampling support and survey weights. Reg Allen analysed learner assessments, teacher assessments, and the teacher motivation survey. Rachita Daga and Sourovi De contributed analysis of School-Based Management Committee (SBMC) and inclusion indicators.

From the Education Sector Support Programme in Nigeria (ESSPIN), we acknowledge the contribution of Ron Tuck, who first devised the concept of the Composite Survey; and we also acknowledge the various leadership roles undertaken in relation to Composite Survey 1 (CS1) and Composite Survey 2 (CS2) by Stuart Cameron, Kayode Sanni, John Kay, Lilian Breakell, Simon Thomson, Fatima Aboki, Sandra Graham and Jake Ross. For CS3, Abimbola Osuntusa, Fatima Aboki, Helen Pinnock, Kayode Sanni, Laura McInerney, Manjola Kola, Sandra Graham, Simon Thomson, Jake Ross, Simeon Ogbonna and Kingsley Ogbonna provided valuable information and support, including comments on an earlier draft of this report. Allan Findlay and Agbenu Onazi provided information on enrolment and school numbers from the Annual School Censuses.

The Composite Surveys would not have been conducted without UK aid funding provided by the UK Department for International Development (DFID), in relation to which we acknowledge the guidance and support of Barbara Payne, Emily Oldmeadow and Esohe Eigbike.

We are very grateful to the School Support Officers (SSOs), Social Mobilisation Officers (SMOs), and other local government and state staff who acted as data collectors for the Composite Survey. We are also very grateful to the state government officials who shared information on the context in which ESSPIN has been implemented. Finally, we are extremely grateful to all of the head teachers, teachers and students who kindly took the time to participate in this survey.

This survey is being carried out by Oxford Policy Management (OPM) for the Education Sector Support Programme in Nigeria (ESSPIN), which is funded by the UK Department for International Development and managed by a consortium led by Cambridge Education. The survey technical lead is Stuart Cameron. The project manager is Shefali Rai. For further information please contact shefali.raio@opml.co.uk.

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Executive summary

The Education Sector Support Programme in Nigeria (ESSPIN) (2008–17) seeks to improve learning outcomes for children of basic education age in six Nigerian states – Enugu, Jigawa, Kaduna, Kano, Kwara and Lagos. The aims of the ESSPIN Composite Surveys are to assess the effects of ESSPIN’s integrated School Improvement Programme (SIP), and to report on the quality of education in the six ESSPIN-supported states. ESSPIN is funded by the UK Department for International Development (DFID) and managed by a consortium led by Cambridge Education. The Composite Survey has been carried out for ESSPIN by Oxford Policy Management (OPM).

This report presents findings for Enugu State from the first, second and third rounds of the ESSPIN Composite Survey (CS1, CS2 and CS3). These took place in 2012, 2014 and 2016, respectively. The survey covered a wide range of indicators at the teacher, head teacher, School-Based Management Committee (SBMC) and pupil levels. The aim is to understand how schools in ESSPIN states are changing over time and whether schools which receive ESSPIN interventions are working better than those which do not. The main findings are as follows:

Head teacher effectiveness has improved significantly across time in Enugu. In 2016 over half of all head teachers qualified as effective. However, head teachers from schools that received a greater degree of ESSPIN intervention are not significantly more effective than head teachers from schools that received a lesser degree of ESSPIN intervention.

School development planning also became significantly more effective, with 31% of all schools reaching the standard in 2016. Schools that have received a greater degree of ESSPIN intervention are not more likely to reach the standard than schools that have received a lesser degree of intervention.

Trends in **inclusiveness** – measured by aspects such as whether the head teacher has taken action on learners’ attendance, and whether teachers engage boys and girls equally – depend on the exact measure used. More schools in Enugu now meet the overall inclusiveness standard than in 2012, but a more nuanced continuous measure of how close they are to meeting it has declined. Schools that have received a greater degree of ESSPIN intervention are not more likely to meet the overall standard than those that have received a lesser degree.

SBMCs in Enugu are more functional than they were in 2012 or 2014, and they have become more inclusive of women and children. The SBMCs in schools which have received more than one year of ESSPIN intervention are found to function much better than those in schools which have only received a small degree of ESSPIN intervention.

Teachers in Enugu have become more competent since 2012, with almost 76% (or 51% depending on the measure) reaching the competence standard. However, teachers’ test scores in English and mathematics have not improved since 2014. Teachers trained through ESSPIN are found to be more motivated than non-ESSPIN trained teachers but they are not significantly more competent and do not have higher test scores.

40% of all schools in Enugu reached the **school quality** standard, a composite measure based on head teacher effectiveness, school development planning, SBMC functionality, and teacher competence. This translates into 36,000 more pupils going to quality standard schools in 2016 than in 2012.¹ Schools with more years of ESSPIN intervention have higher school quality scores. However, looking at the change over time we find that schools with more years of ESSPIN intervention already had higher quality scores at baseline. The difference in quality between

¹ Calculations based on data from the annual school census (ASC).

schools with more ESSPIN intervention and schools with less ESSPIN intervention has decreased between 2012 and 2016.

Children's **learning outcomes** in Enugu have improved significantly since 2012, except for Grade 2 numeracy. Children from schools that received two or three years of ESSPIN intervention had higher test scores (except for Grade 2 numeracy), compared with children from schools that received only one year of intervention. However, after controlling for pre-existing differences between the schools from different intervention groups, we find that the ESSPIN intervention only had a statistically significant and positive effect on Grade 4 literacy results.

Table 1, Table 2 and Table 3 below summarise the key findings.

Table 1: Enugu: Change over time – Key indicators in 2012, 2014, 2016

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change 2012–16	Change 2014–16
Effective head teacher (%)	9.7	15.8	52.3	+42.6*	+36.5*
School development planning (%)	10.7	25.9	30.7	+20.0*	+4.7
Inclusive (%)	10.2	29.8	48.1	+37.9*	+18.2*
Functioning SBMC (%)	8.7	27.2	56.1	+47.4*	+28.9*
Competent teachers (%)	63.6	63.8	76.9	+13.3*	+13.1*
Competent teachers (new measure, %)		31.5	52.1	n/a	+20.6*
Good quality school (%)	7.1	14.2	39.5	+32.4*	+25.3*
Good quality school (new measure, %)		10	19.4	n/a	+9.3*
Grade 2 literacy score	543.1	572.0	580.1	+37.0*	+8.1
Grade 4 literacy score	525.9	544.0	561.5	+35.6*	+17.4*
Grade 2 numeracy score	539.8	548.1	542.6	+2.8	-5.5
Grade 4 numeracy score	493.2	521.1	526.8	+33.6*	+5.7

Note. * indicates statistical significance ($p < .05$)

Table 2: Enugu: Key indicators in 2016, by years of ESSPIN intervention

	Min (one year)	Med (two to three years)	Estimated effect of one year of full intervention
Effective head teacher (%)	50.8	55.2	6.4
School development planning (%)	30.3	31.3	-1.0
Inclusive (%)	48.4	47.5	-0.1
Good quality school (%)	33.8	51.2	14.7*
Good quality school (new measure, %)	11.7	35.4	13.6*
Grade 2 literacy score	568.5	603.2	27.4*
Grade 4 literacy score	552.7	577.3	17.9*
Grade 2 numeracy score	544.1	539.8	-2.9
Grade 4 numeracy score	516.6	545.5	19.9*

Note. * indicates statistical significance ($p < .05$)

Table 3: Enugu: Teacher competence, non-ESSPIN-trained versus ESSPIN-trained

	Non-ESSPIN trained	ESSPIN-trained	Difference
Competent teachers (%)	75.2	81.6	+6.4
Competent teachers (new measure, %)	54.3	49.9	-4.4
Teachers' English scale	548	525	-22.7*
Teachers' mathematics scale	539	504	-35.0*

Note. * indicates statistical significance ($p < .05$)

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List of abbreviations

ACLED	Armed Conflict Location & Event Data Project
CAPI	Computer-assisted personal interviewing
CBOs	Community-based organisations
CS1	Composite Survey 1
CS2	Composite Survey 2
CS3	Composite Survey 3
ESSPIN	Education Sector Support Programme in Nigeria
IRT	Item response theory
LGA	Local Government Area
LGEA	Local Government Education Authority
NGN	Nigerian Naira
OPM	Oxford Policy Management
PTR	Pupil-Teacher Ratio
SBMC	School-Based Management Committee
SDP	School Development Plan
SIP	School Improvement Programme
SSO	School Support Officer
SSIT	State School Improvement Team
SUBEB	State Universal Basic Education Board

1 Introduction

ESSPIN (2008–17) seeks to improve learning outcomes for children of basic education age in six Nigerian states – Enugu, Jigawa, Kaduna, Kano, Kwara, and Lagos. The ESSPIN Composite Surveys seek to assess the effects of ESSPIN’s integrated SIP, and to report on the quality of education in the six ESSPIN-supported states. ESSPIN is funded by the DFID and managed by a consortium led by Cambridge Education. The Composite Survey has been carried out for ESSPIN by OPM.

The first two rounds of the Composite Survey were carried out in 2012 and 2014. The surveys address five output indicators: teacher competence, head teacher effectiveness, school development planning, SBMC functionality and inclusive practices in schools. They also address one outcome indicator, school quality, and one impact indicator, pupil learning achievement. The third round of the Composite Survey (CS3) collects comparable data on these indicators in order to provide information on the extent to which key school-level indicators in the six states have improved during the course of the programme.

This report focuses on the Composite Surveys findings in Enugu State. It presents the key findings from CS3, compares these to the findings of the previous rounds of the survey, and draws out the implications of these findings for ESSPIN’s contribution to school-level outputs and outcomes in the state.

1.1 ESSPIN’s SIP

ESSPIN aims to bring about better learning outcomes for children of basic education school age in six states, with a range of activities at the state, national, local and school levels. It has four output streams that focus on:

- strengthening federal government systems;
- increasing the capability of state and local governments as regards the governance and management of schools;
- strengthening the capability of primary schools to provide improved learning outcomes; and
- improving inclusion policies and practices in basic education (ESSPIN, 2013b).

Under the third of these outputs, 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 (Sanni, 2015). The SIP 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 help maintain and continue improving quality gains. At the same time, many of the same schools have been receiving interventions under the fourth output stream, facilitating community involvement and inclusion through SBMCs.

1.2 ESSPIN in Enugu State

ESSPIN has been working in Enugu since 2010, and has delivered its SIP to both government and mission schools since 2011. This is in contrast to the other five ESSPIN states, in which the programme has been working since 2008. Since 2011, the intervention has been gradually rolled out in Enugu, such that by the time of the 2016 CS3, 100% of public primary schools had benefited from the full package of Output Stream 3 (Output 3) interventions for at least one year (Table 4).

Table 4: Proportion of schools receiving full package of ESSPIN Output Stream 3 interventions and Output Stream 4 interventions

%	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Full package Output Stream 3, including leadership training	0	0	8	8	25	99	99
Any Output Stream 3 intervention	0	0	8	8	33	99	99
Full package Output Stream 4	0	0	0	0	0	33	0

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 are some missing data in the school census

ESSPIN's support to schools in Enugu has encompassed all three elements of the SIP – support to teachers, head teachers and school improvement planning. Teachers have received training on basic teaching skills, the use of classroom organisation, teaching aids and praise. Head teachers received training on academic leadership, school planning, the management of teachers and working with the community. This has been reinforced through regular monitoring and support visits by School Support Officers (SSOs). The 2011/12 cohort of ESSPIN schools received one school grant at an average of Nigerian Naira (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 School Development Plan (SDP) based on a school self-evaluation. It is also important to note that the state government provided a one-year school grant to all schools, but this is only NGN 25,000 per school; this is considered inadequate for implementing the SDP.

The roll-out of Output Stream 3 in Enugu has taken place in several stages. The pilot schools to be included in the programme in 2011/12 were selected based on total coverage of public schools in one LGA. Therefore, all 91 public schools in Udi LGA were part of the pilot, in addition to 30 mission schools that participated in the challenge fund. In total there were 121 pilot schools. In 2013/14 and 2014/15 the programme was rolled out to two additional groups of schools (307 and 820 schools, respectively). Thus, by 2015/16 the ESSPIN Output Stream 3 intervention was implemented in a total of 1,229 public schools in Enugu. Annex B describes in detail the number of schools in each phase and the level of intervention received each year.

In the process of scaling up, there have been some changes to ESSPIN's model for delivering school support. During the pilot phase of ESSPIN (2011/12 and 2012/13), State School Improvement Teams (SSITs) trained directly by ESSPIN staff were responsible for supporting and training head teachers and teachers directly. As the programme expanded, SSOs – a second, larger group of employees working at the Local Government Educational Authority (LGEA) level – were trained by the SSITs and ESSPIN. Responsibility for working directly with head teachers and teachers has been shifted progressively towards the SSOs, who are on average less qualified and have received less intensive training than the SSITs. In addition, SSITs in Enugu came on board in different batches: the initial 12 in 2011, 12 more in 2013, and another 13 in 2015. This means that even among SSITs the quantity and quality of training differed, with the first batch receiving the most training directly from ESSPIN.

Following the scale up of the programme to all schools in 2014/15, we can expect the ESSPIN effect to start having an impact on average school quality, teacher competence and learning outcomes in Enugu as a whole. However, it is to be noted that the last year of Output Stream 3

ESSPIN intervention in 2015/16 is considered to be too recent for the stream to have begun to influence school-level outcomes.

In addition to the SIP activities under Output Stream 3, schools in Enugu have received support under ESSPIN's Output Stream 4: improving inclusion policies and practices in basic education. ESSPIN has trained civil society members and government officers from the department of Social Mobilisation, Social Mobilisation Officers (SMOs), to enable them to train and mentor SBMCs. SBMC members, in turn, have been trained on the roles and responsibilities of SBMCs, school planning and management, communication and leadership, change and relationships management, the participation of women and children in school improvement and education decision-making, resource mobilisation and financial processes, and child protection and participation. This has been complemented by follow-up mentoring visits by SMOs.

The Output Stream 4 intervention (Annex C) began in Enugu in 2011/2012. However, to date there has only been one year in which some schools received the full package of Output Stream 4 intervention. The Output Stream 4 intervention has therefore not yet been scaled up in Enugu, with the majority of schools (820) having received only one day of SBMC training by 2016. Table 4 shows what proportion of schools in Enugu received Output Stream 3 and Output Stream 4 intervention in any given year.

1.3 Contextual factors and their implications for the SIP in Enugu

This section describes some of the key aspects of the backdrop against which ESSPIN's implementation in Enugu has taken place over the last couple of years. This is helpful in terms of interpreting the changes in school-level outputs and outcomes between CS1, CS2 and CS3. Changes over time in outputs and outcomes could have resulted from ESSPIN support, but equally they could also have been driven by other changes in the state over that period. This section considers the main developments in Enugu that may have positively or adversely affected school-level outcomes in the state, or that may have interfered with SIP implementation.

One of the concerns over the last two years in Enugu relates to staffing and recruitment of teachers. Stakeholders stated that teacher recruitment has not taken place in Enugu State for the past few years. Even after educational supervisors, head teachers and class teachers retire, there has been no subsequent recruitment. Due to this, some stakeholders are worried that there is increased pressure on existing school resources. As a new policy, the Governor has asked teachers and other staff (who are also SSOs and SMOs under the SIP) to return to their schools. There are concerns that this may have adversely affected the implementation of SIP in the state, as the programme is now facing a shortage of support staff, who are crucial for the monitoring of project activities and visiting schools. Another concern is that many teachers who replaced those head teachers who had retired turned out to have little or no skills to support the class teachers through effective professional development meetings and lesson observations.

Secondly, the sharp drop in oil prices and the consequent economic downturn had fiscal repercussions for almost all Nigerian states, including Enugu. Funding from federal allocations have decreased in the last two years, which could be the reason for why some SIP activities were not carried out. For example, the time spent on the literacy and numeracy training of teachers had to be cut down to one day per term due to funding constraints. This could have negative consequences for teachers' content knowledge, and subsequently for the learning outcomes of their pupils.

Looking at data from the Annual School Census it becomes clear that enrolment in public primary schools in Enugu has decreased in recent years. Between 2009/10 and 2014/15 (the most recent

year for which Annual School Census data are available), total enrolment decreased by 25.4% (Table 5). This decrease in enrolment is accompanied by a slight increase in the number of schools in Enugu. Between 2009 and 2015 35 new primary schools were established in Enugu. Despite the stakeholders’ concerns mentioned above, data show that in the same period pupil-teacher ratios (PTRs) in Enugu also decreased. (Annex A).

Table 5: Number of schools and enrolment in the 2009, 2013 and 2014 school censuses

	Enrolment	Number of schools	Enrolment change (%)
2009/10	237,548	1,188	
2013/14	187,495	1,222	-21.0
2014/15	177,185	1,223	-5.5
Overall			-25.4

Note: Enrolment is for Primary Grades 1–6.

Note: 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.

Source: Annual School Censuses.

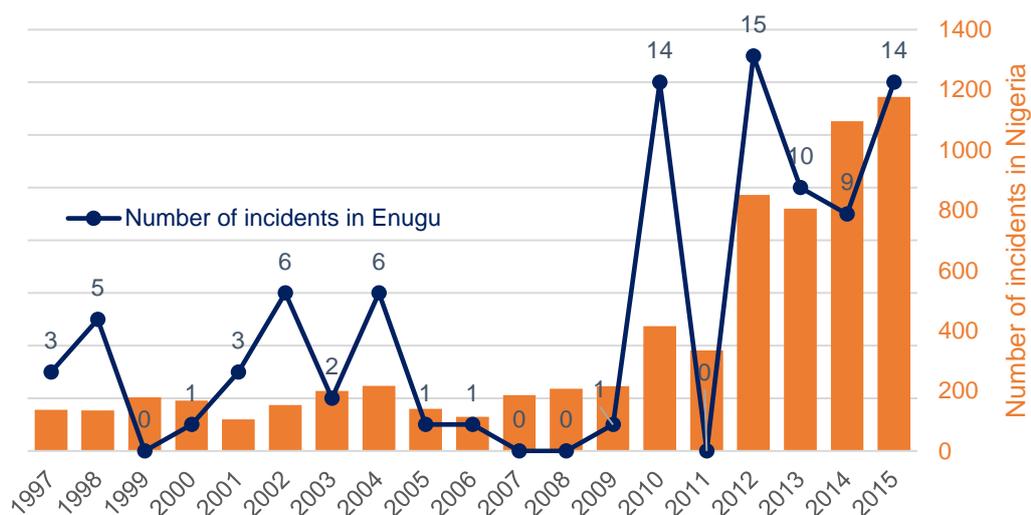
Insecurity in Enugu is a concern, although it is not nearly as severe as in some of the northern states. Across Nigeria the number of recorded incidents of political violence and conflict has increased eightfold since 1997, including increases at a smaller rate in Enugu (

Figure 1). Most notably, in May 2016, in a border town in Enugu State, Nimbo, seven villages were invaded by 500 Fulani herdsmen. It is reported that this was not an isolated incident and that incidents of similar nature have occurred in Enugu in recent years.

The Nimbo herdsmen saga caused some schools within and around the communities to close down. School monitoring and mentoring visits came to a halt almost across the whole state because of the fear of attacks in other communities. Training was also stopped. The Nimbo case affected the school system across Enugu and still remains a threat to the SIP in most parts of the state.

While it is important to note this incident, it does not affect the way our results should be interpreted as it occurred too recently to have had an effect. The number of conflict events and fatalities during our period of study remained fairly small in Enugu (Table 6). In 2015, there were 14 incidents, with 15 fatalities across the state.

Figure 1: Incidents of political violence in Nigeria and Enugu



Source: Armed Conflict Location & Event Data Project (ACLED), Version 6 (1997–2015). Note: all events from ACLED are included except for those categorised as protests which did not involve a fatality.

Table 6: Enugu: Political violence: Incidents and fatalities, 2010–2015

Variable	2010	2011	2012	2013	2014	2015
Events	14	0	15	10	9	14
Fatalities	2	0	11	11	8	15

These contextual factors should be kept in mind in the interpretation of the results presented in this report.

2 Methodology and analysis

2.1 Evaluation strategy

2.1.1 ESSPIN intervention groups

It was originally intended for ESSPIN 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 2013/14 group, and finally a 2014/15 group), based on the government's capacity and willingness.

For the purposes of assessing ESSPIN's impact, we have grouped schools in Enugu according to the number of years of the 'full package' of Output Stream 3 support they have received (see Annex B for full details).² Schools that have received one year of intervention fall into the 'minimum' category. Schools that have received two to three years of ESSPIN support fall into the 'medium' category and schools with four to five years of support are in the 'maximum' category. This way of categorising schools is necessary because there is no longer a group of control schools that have not received any support from ESSPIN. Therefore, the analysis will not compare 'ESSPIN schools' to 'non-ESSPIN schools', as it did in regard to CS2, but rather it will compare schools with different degrees of exposure to the ESSPIN interventions. When counting the years of intervention, we disregarded the current intervention year (2015/16) as, at the time of the field work, we do not expect the effects of the intervention in that year to have materialised.

Table 7 in the following subsection shows the number of schools in each of these categories. Around 67% of all primary schools in Enugu received only one year of full ESSPIN Output Stream 3 intervention by the time of CS3, and therefore are part of the 'minimum' intervention group. They were added to the programme in 2014/15, the third phase of the roll-out in Enugu. The remaining 33% of primary schools are part of the 'medium' intervention group. Most of these received two years of the full Output Stream 3 intervention package, except for the 91 pilot schools, which had received three years. Since the roll-out in Enugu started relatively late, there are no schools that received four or more years of intervention, and therefore there is no 'maximum' intervention group in this state.

While it makes sense to compare the outcomes of schools with different levels of exposure to the intervention, two points must be kept in mind when interpreting the results. (i) There are spill-over effects between schools, which means that staff or SBMCs in minimum or medium intervention group schools might have already been exposed to ESSPIN ideas through informal communication or deliberately by LGEA personnel. (ii) Sometimes there are quite extensive changes in school personnel within the state. This means that just because a school has been exposed to the ESSPIN intervention in the past, this does not necessarily mean that its current teachers and head teachers have, and vice versa.

For certain indicators we alter the classification scheme slightly according to the purpose of our analysis. For example, when examining teacher competence within the CS3 survey we consider two different groups: teachers who are in schools that have received ESSPIN intervention but who

² A companion report, 'Composite Survey 3: Gender and Inclusion Report' (De and Cameron, 2016), 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.

have not themselves been trained by ESSPIN³; and teachers who have been trained by ESSPIN. When examining SBMC functionality and inclusive practices of SBMCs, we classify schools according to the amount of Output Stream 4 intervention received. Schools are classified as 'no intervention' (less than five days of Output Stream 4 intervention received), 'post-CS1' (started receiving intervention after to CS1), and pre-CS1 (started receiving intervention prior to CS1). This means that the pre-CS1 schools have received the most Output Stream 4 intervention.

When we are looking at one point in time (cross-sectional analysis), the schools that have received more years of ESSPIN activities are expected to perform better. When we are looking at change over time, the schools that received more years of ESSPIN activities are expected to have improved faster because of ESSPIN.

2.1.2 Types of analysis

The purpose of CS3 is both to provide insights into the changes over time in Enugu, and to evaluate whether the ESSPIN model is having an effect in the specific schools in which 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 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 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 two main types of analysis:

1. Change over time between CS1 and CS3 and between CS2 and CS3, for Enugu as a whole. The recent expansion of ESSPIN interventions means that the programme now has direct links with the majority of schools in Enugu. By 2015 all schools have had at least one year of ESSPIN intervention, although a large proportion of schools received the full package of ESSPIN activities for only one year in 2014/15. Therefore we would expect that schools in CS3 have higher output, outcome and impact measures than schools in CS1 and CS2. However, any differences between indicator performance in CS1, CS2 and CS3 will be difficult to attribute to the ESSPIN intervention, since there are other reasons why schools may be improving (or deteriorating) over time.

We use statistical significance tests (t-tests) to give an indication of whether a difference in results over time is significant (i.e. unlikely to have arisen by chance). This should not be taken as constituting rigorous hypothesis testing (given the large number of indicators tested) but it does provide 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 Enugu.

2. Differences between the different levels of intervention categories (minimum, medium and maximum) within the CS3 results. We hypothesise that schools that have received more years of full ESSPIN intervention have higher output, outcome and impact measures than schools which have received fewer years of intervention.

³ Three to six selected teachers within each school attended workshops delivered by SSOs. In some states the same group of teachers continued to receive training year after year, while in other cases attempts were made to spread the training to teachers who had not yet received any. However, teachers in ESSPIN schools are also expected to receive more support through other channels, and particularly through professional development meetings organised by the head teacher (RTI International, 2014; and personal communications from ESSPIN). We distinguish the teachers who received direct training ('ESSPIN trained') from those who were not themselves directly trained, but who are in ESSPIN schools and so are expected to have received support from their head teachers and colleagues ('Not ESSPIN trained').

To test this, we use a binary measure for ESSPIN intervention and calculate the estimated effect of having received one additional year of intervention using a simple regression model. This approach allows us to come one step closer to estimating the effect of ESSPIN intervention. However, this will not be a conclusive indicator of ESSPIN's effect because there are also differences in school and pupil background characteristics within Enugu. Controlling for this fully is a more difficult statistical exercise, so we will only attempt this for our impact measure, pupil learning outcomes.

For an outcome indicator (overall school quality), and for impact indicators (children's results in literacy and numeracy tests) we conduct additional analysis in order to understand what basis there might be for making causal attribution of ESSPIN impact. This analysis is described in Sections 5 and 6.2.

2.2 Sampling, coverage and weights

During CS1, 70 schools were sampled in Enugu: 35 schools that had received ESSPIN support and 35 schools that had not. For CS2 and CS3, the sample was increased to 105 in order to increase the effective sample size and to provide greater accuracy in the analysis of CS results (Megill, 2014). While the 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 pilot and the 2012/13 roll-out of SIP.⁴ The number of schools sampled in each of the categories (as defined in Section 2.1, so taking account of the full period of intervention) is shown in Table 7.

Table 7: Sample in CS3 and population of schools, by intervention group

Category for sampling purposes	Years of full intervention	CS1 sample	CS2 sample	CS3 sample	Population (no. of schools)
Minimum	1	35	35	35	820
Medium	2–3	35	70	70	409
Total		70	105	105	1,229

In each of the sampled 105 schools in Enugu the head teacher and the SBMC chairperson or deputy were interviewed. As in CS2, we also intended to sample six teachers per school, or all of the eligible teachers in schools with fewer than six teachers. The sample coverage among head teachers, SBMC chairs and teachers for interviews is 100% (Table 8). The coverage of teachers is 98% for lesson observations and 97% for the literacy and numeracy tests.

Within the classes taught by the sampled teachers, eight pupils from P2 and P4 each were randomly sampled, four for the literacy test and four for the numeracy test. The sample coverage across all pupils is around 97.5%, which is only slightly short of the targeted sample size. Again, the deficit in sample coverage is mainly explained by the fact that some schools had fewer than eight pupils in P2 or P4.

⁴ In Enugu, mission schools are funded by the state.

Table 8: Enugu: Survey instruments, respondents, sample size and coverage in CS3

	Respondents	Targeted sample size	Number of respondents covered	Sample coverage (% of targeted sample size)
Number of schools	-	105	105	100%
Head teacher interview	Head teachers	105	105	100%
SBMC interview	SBMC chair person	105	105	100%
Teacher interview	Sampled teachers	548	547	99.8%
Teacher literacy test	Sampled teachers	548	532	97%
Teacher numeracy test	Sampled teachers	548	533	97%
Lesson observations	Sampled teachers	548	537	98%
P2 literacy	Sampled P2 pupils	420	391	93%
P2 numeracy	Sampled P2 pupils	420	377	90%
P4 literacy	Sampled P4 pupils	420	397	95%
P4 numeracy	Sampled P4 pupils	420	391	93%

Source: CS3 Fieldwork Completion Report

Note. The 'targeted sample size' for teachers represents six teachers per school, or the number of eligible teachers in schools where this is less than six.

Comparing the number of schools sampled to the population size, it becomes clear that simple averages of the results from the Composite Survey data would not be representative of what is happening across the state (as Table 8 above shows). 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, CS2 and CS3 schools, teachers and pupils.

2.3 Fieldwork and instruments

Fieldwork for CS3 in Enugu was conducted using computer-assisted personal interviewing (CAPI) between April and June 2016. We made a number of changes to instruments to take on board some additional concerns and to make use of innovations introduced in other recent Nigerian school surveys (described in detail in the CS3 Overall Technical Report). At the same time, we retained the questionnaire items required for comparability with previous rounds of the Composite Survey.

Data were collected on teacher competence, head teacher effectiveness, school development planning, inclusive practices in schools, SBMC functionality, teacher competence, teacher subject knowledge and learning outcomes of children in Grades 2 and 4 in English and mathematics. The following activities were carried out as part of the data collection:

- structured interviews with head teachers, SBMC chairpersons and teachers;
- teacher tests in English literacy and numeracy;
- lesson observations; and
- literacy and numeracy tests for pupils in Primary Grades 2 and 4.

The instruments were pre-tested over two days in Abuja during April 2016. State coordinators and monitoring officers collected the data using CAPI, after they had been trained on the instruments. Minor revisions were made to the instruments in consultation with state coordinators.

As in CS2, pupil assessments in CS3 were administered using CAPI. Children were given a printed pupil book to read and write in. The interviewers made use of a tablet computer, which prompted them on the questions the children were to be asked orally, gave instructions on the administration of the different test items, including timing, and allowed them to input whether each part of each question was answered correctly or incorrectly (or not attempted at all) by the pupil. A number of changes were made to the CAPI systems and manuals for the administration of the pupil tests, to make them easier to train on and administer. This included a clear manual, with consistent instructions across questions of a particular type, automated timers for timed questions, and translations into Hausa, Igbo and Yoruba of text that did not need to be read in English.

3 School management and head teachers

ESSPIN's interventions include leadership training for head teachers on managing the school and its teachers, planning for the school's development, advocating for more resources, and ensuring that the school is inclusive. ESSPIN also supports the development of SBMCs. This includes training and mentoring on how SBMCs can encourage the participation of women and children. This chapter examines how well schools in Enugu are doing on each of these fronts.

ESSPIN's logframe identifies and defines a number of indicators related to school management, inclusiveness and SBMCs. The logframe groups these indicators into a set of 'standards' or composite indicators. These are as follows:

- **Head teacher effectiveness:** A head teacher is deemed to be effective if they engage in a set of practices including observing teachers' lessons, holding professional development meetings with teachers, monitoring teacher attendance, keeping records, and ensuring that the school adheres to a regular schedule.
- **School development planning:** As part of the SIP, schools are encouraged to carry out a self-review process involving the head teacher, teachers, SBMCs, parents and other community members. The aim of this process is to identify the school's strengths and weaknesses, and then list the steps that need to be taken to improve it in an SDP. The SDP can also be used to request resources from local government or the community. The associated logframe standard assesses whether a self-evaluation has been carried out, whether the school has an SDP, and whether it has implemented the activities in its SDP.
- **School inclusiveness:** This refers to the extent to which the school makes an effort to include all learners, regardless of gender or socio-economic background. Inclusiveness is assessed on the basis of the steps listed in the SDP and actions taken to boost access, as well as the extent to which teachers encourage the participation of all children in the classroom.
- **SBMCs' functionality and performance:** The associated standards assess the extent to which SBMCs are functioning and active, and the degree to which they ensure that women and children are actively participating in their activities.

The rest of this section describes each of these standards and then presents associated findings from the Composite Surveys.

3.1 Head teacher effectiveness

Box 1: Head teacher effectiveness: Key findings

- In 2016, 52% of all head teachers in Enugu met the effectiveness standard.
- This is a large and statistically significant increase from 2012 and 2014.
- There seems to be no statistically significant difference in head teachers' effectiveness between schools that have received only one year of intervention and schools that have received two or more years.

Head teacher effectiveness is based on seven criteria set out in the ESSPIN logframe (

Box 2: Logframe criteria 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) carried out two or more lesson observations in the past two weeks;
- 2) held four or more professional development meetings since the start of the 2014/15 or 2015/16 school year (NB: the survey took place more than nine months into the school year);
- 3) school has a teacher attendance book and the 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 35 minutes or less; and
- 7) more than 50% of lessons observed finished within five minutes of a standard 35-minute lesson duration (i.e. the lesson was between 30 and 40 minutes long).

). These include actions taken by the head teacher, as well as behaviour by teachers and pupils. Head teachers must meet five of the seven criteria in order to be classified as effective.

Box 2: Logframe criteria 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:

- 8) carried out two or more lesson observations in the past two weeks;
- 9) held four or more professional development meetings since the start of the 2014/15 or 2015/16 school year (NB: the survey took place more than nine months into the school year);
- 10) school has a teacher attendance book and the head teacher recalls at least two actions taken to promote teacher attendance;
- 11) 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;
- 12) more than 50% of classes are in their classroom with their teacher within 30 minutes of school opening time;
- 13) length of morning break is 35 minutes or less; and
- 14) more than 50% of lessons observed finished within five minutes of a standard 35-minute lesson duration (i.e. the lesson was between 30 and 40 minutes long).

The share of head teachers that are deemed to be effective increased sharply in Enugu, from 16% in 2014 to 52% in 2016. Head teachers' performance improved on most of the criteria listed above. In particular, very large increases were recorded in the share of head teachers carrying out lesson observations, those holding professional development meetings, and those ensuring that the length of the morning break was 35 minutes or less.

On the other hand, fewer head teachers could demonstrate that they had taken action to promote teacher attendance. This raises a number of questions for ESSPIN. In particular, it is worth exploring why head teachers have become less likely to take action on teacher attendance. One possibility is that they have limited efficacy to influence teacher attendance (partly because they lack the authority to take disciplinary action against teachers).

Furthermore, in 2016 only around 22% of schools conformed to a 35-minute lesson length in 2016 (measured as a lesson length of between 30 and 40 minutes). This is slightly less than in 2012. A length of 35 minutes was formerly considered the standard lesson length across the six states. However, schools have been encouraged to adopt 60-minute lessons, in line with ESSPIN lesson plans, which are intended to be taught over one hour. Longer lessons should therefore arguably be discounted as an indicator of school quality, as they may reflect a shift towards one-hour lessons in literacy and numeracy. We have therefore calculated a new indicator, defined as the proportion of schools in which at least half of the observed lessons are at least 30 minutes in length. On this indicator, there is a dramatic increase in the proportion of schools satisfying this condition, from 26% in 2014 to 72% in 2016, suggesting that lessons in fact are becoming longer.

When interpreting the results it must also be kept in mind that 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. According to one ESSPIN staff member, the mass retirement of head teachers coincided with the roll-out of the programme across most of Enugu. This meant that new head teachers (who had not previously received any initiation or training) were starting their posts at the same time as receiving the newly scaled-up training under ESSPIN. Therefore, they might have been much more prepared and pro-active in applying the content of the training.

Table 9: Enugu: Head teacher effectiveness in CS1, CS2 and CS3

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
(1) Lesson observations (%)	11.6	33.7	70.9	+59.2*	+37.1*
– No. lesson observations in past two weeks	1.2	1.6	3	+1.8*	+1.4*
(2) Professional development meetings (%)	5.7	45.1	70.2	+64.5*	+25.1*
– No. professional development meetings last term	0.5	2.2	2	+1.5*	-0.2
(3) Action on teacher attendance (%)	97.9	83.7	75.6	-22.3*	-8.1
(4) Clear opening time (%)	63.3	28.4	38.8	-24.6	+10.4
– Learners who agree on opening time (%)		51.5	51.2	n/a	-0.3
– Teachers who agree on opening time (%)		68.9	85.4	n/a	+16.5*
(5) In class on time (%)	92.2	86.2	94.0	+1.8	+7.9
(6) Appropriate morning break (%)	11.2	2.8	78.9	+67.6*	+76.1*
(7) Appropriate lesson length (%)	25.9	19.6	21.2	-4.7	+1.5
– Lesson not too short (%)	-	25.7	72.0	n/a	+46.3*
Number of criteria fulfilled (/7)	3.1	2.9	4.5	+1.3*	+1.6*
Effective head teacher (5/7 criteria met) (%)	9.7	15.8	52.3	+42.6*	+36.5*
* indicates change over time is statistically significant ($p < .05$)					

Looking only at CS3 findings, results indicate that schools that had received more years of ESSPIN's 'full package' of Output Stream 3 support performed better across most head teacher effectiveness criteria (Table 10), yet none of these differences were statistically significant. For instance, while 86.8% of head teachers from the medium intervention group (two to three years of ESSPIN SIP) had taken action on teacher attendance, only 70% from the minimum intervention group (one to two years of ESSPIN SIP) did.

The proportion of head teachers who met the head teacher effectiveness standard among the medium intervention group was higher, at 55.2%, as compared to 50.8% for the minimum intervention group. That said, the estimated effect of one year of full intervention is not statistically significant.

Table 10: Enugu: Head teacher effectiveness in CS3, by intervention group

Intervention group	Min.	Med.	Estimated effect of one year of full intervention by 2016
(1) Lesson observations (%)	72.1	68.4	-0.9
No. lesson observations in past two weeks	3.1	2.9	0.0
(2) Professional development meetings (%)	71.6	67.5	-2.9
No. professional development meetings last term	2	2	0.0
(3) Action on teacher attendance (%)	70	86.8	12.5
School has a teacher attendance book (%)	100	100	n/a
(4) Clear opening time (%)	34.8	46.6	7.8
Learners who agree on opening time (%)	51.5	50.7	0.2
Teachers who agree on opening time (%)	85.2	85.8	0.6
(5) In class on time in morning (%)	92.9	96.4	0.0
Classes where learners present on time (%)	97.6	98.7	1.0
Classes where teachers present on time (%)	89.8	86.6	-3.9
(6) Appropriate morning break (%)	79.3	78.1	2.5
(7) Appropriate lesson length (%)	22.2	19	-0.6
– Lesson not too short (%)	75.9	64.3	-6.8
Number of criteria fulfilled (/7)	4.4	4.6	0.1
Effective head teacher (5/7 criteria met) (%)	50.8	55.2	6.4
Additional indicators			
In class on time after break (%)	96.8	97.5	-1.1
Classes where learners present on time (%)	98.1	98	-0.3
Classes where teachers present on time (%)	90.5	92.3	-0.8
Teacher absenteeism (%)	14.9	14.3	-1.2
* indicates estimated effect of one year of full intervention is statistically significant ($p < .05$)			

3.2 School development planning

Box 3: School development planning: Key findings

- Enugu primary schools have become significantly better at school development planning since 2012.
- In 2016, 31% of all schools met ESSPIN's standard for effective school development planning.
- Schools that have received a greater degree of ESSPIN intervention were not more effective at school development planning than schools that have received a lesser degree of intervention.

ESSPIN's leadership training encourages and supports head teachers to review how the school is doing each year and to put together a plan for the development of the school, which can be used to advocate for more resources from local government or from the community. Ideally, the plan will

not just include infrastructure improvement (e.g. a school fence, a toilet block), but also activities relating directly to strengthening teaching and learning, and activities to improve access, particularly for children from disadvantaged backgrounds. Head teachers are also trained on using a cashbook to record the school's expenditures and income.

The effectiveness of school development planning is assessed with respect to five criteria set out by the ESSPIN logframe (Box 4).

Box 4. Logframe criteria for the effectiveness of 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; and
- 5) cashbook is up-to-date (balanced in the last 60 days).

In 2016, 31% of all schools met the standard for effective school development planning (Table 11). This is a large, statistically significant increase from 2012 and a small, but not statistically significant increase from 2014.

Almost all indicators measuring school development planning in Enugu schools have shown improvement between 2012 and 2014, and to a lesser extent between 2014 and 2016. Most notably, the proportion of schools which had an SDP available increased from nearly 13% in 2012 to over 82% in 2016.

Furthermore, since ESSPIN was rolled out to all primary schools in Enugu in 2014, the proportion of schools that had a cashbook available rose from 50% to 93%, and the proportion of schools that updated this cashbook regularly rose from 24% to 41%.

Table 11: Enugu: SDP effectiveness in CS1, CS2 and CS3

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
(1) Written evidence of school self-evaluation process (%)	12.3	57.3	85.2	+72.9*	+28.0*
(2) SDP available (%)	12.5	55.4	82.4	+70.0*	+27.1*
(3) SDP contains three or more activities to strengthen teaching and learning (%)	10.3	48.1	47.4	+37.1*	-0.7
No. activities in SDP to strengthen teaching and learning	0.4	2.1	2.8	+2.5*	+0.7
(4) Evidence that four or more activities stated in SDP carried out (%)	7.2	8.4	21.6	+14.4*	+13.2
No. activities in SDP carried out	0.4	1	2.2	+1.8*	+1.2*
(5) Cashbook up-to-date (%)	11	23.9	41.1	+30.1*	+17.2*
School has a cashbook (%)	12.2	49.1	93.2	+81.1*	+44.1*
Number of SDP criteria fulfilled (/5)	0.5	1.9	2.8	+2.3*	+0.8*
School meets effective school development planning standard (%)	10.7	25.9	30.7	+20.0*	+4.7
* indicates change over time is statistically significant ($p < .05$)					

Within CS3, we find that there are no statistically significant differences between the minimum and the medium intervention group. This indicates that there is not enough evidence to suggest that more years of ESSPIN intervention have made a positive contribution to SDP effectiveness in Enugu. However, it also must be noted that in order to have an effective SDP, schools must have funds available to them. If there is no money, in the form of school grants, there is no motivation to plan and no money to execute a plan, even if one is developed. This suggests that SDP effectiveness does not only depend on ESSPIN intervention and its training.

Table 12: Enugu: SDP effectiveness in CS3, by intervention group

Intervention group	Min.	Med.	Estimated effect of one year of full intervention by 2016
(1) Written evidence of school self-evaluation process (%)	86.7	82.1	-0.8
(2) SDP available (%)	81.9	83.6	3.8
(3) SDP contains three or more activities to strengthen teaching and learning (%)	51.3	39.5	-7.4
No. activities in SDP to strengthen teaching and learning	3	2.5	-0.4
(4) Evidence that four or more activities stated in SDP carried out (%)	19.3	26.1	1.6
No. activities in SDP carried out	2.1	2.3	0.1
(5) Cashbook up-to-date (%)	38.9	45.6	3.7
School has a cashbook (%)	91.4	97	7.0
Number of SDP criteria fulfilled (/5)	2.8	2.8	0.0
School meets effective school development planning standard (%)	30.3	31.3	-1.0
* indicates estimated effect of one year of full intervention is statistically significant ($p < .05$)			

3.3 School inclusiveness

Box 5. School inclusiveness: Key findings

- Enugu schools have become more inclusive of learners from disadvantaged backgrounds since 2012.
- In 2016, 48% of all schools met the full inclusiveness standard, while 80% of all schools were at least partially inclusive.
- Schools that have received more than one year of ESSPIN intervention in Enugu are not more inclusive than those that have only received one year.

The criteria on school inclusiveness measure the extent to which the school makes efforts to include all learners, including those from disadvantaged backgrounds. The overall standard for school inclusiveness in ESSPIN depends on four criteria (

Box 6: Standard for school inclusiveness

).

In order to meet the school inclusiveness standard, schools must fulfil three out of four criteria. A school that fulfils two out of the four criteria is classified as partially inclusive. Further detail on these is provided in the companion Gender and Inclusion Report.

Box 6: Standard for school inclusiveness

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) the SDP contains two or more activities which 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); and
- 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 in 60% to 40% of the total number of engagements meet the criterion).

Over the last four years Enugu primary schools have improved in terms of school inclusiveness (Table 13). In 2016, 80% of all schools partially met the standard and 48% of all schools fully met the standard in Enugu. These were statistically significant increases, both between 2012 and 2016 and between 2014 and 2016.

While all indicators were higher in 2016 than in 2012 and 2014, only the proportion of schools that had included two or more activities on access in their SDP saw a statistically significant increase.

An alternative measure of inclusiveness confirms an improvement in school inclusiveness between 2012 and 2016. However, the vast majority of the increase in the score happened since 2014. The weighted inclusiveness score is a percentage score based on the number of actions taken to improve attendance, the number of activities in the SDP on access, the average number of assessment methods used, the average number of zones participating in each lesson observed (observers imagined the classroom as being divided into six zones), and a measure of the extent to which girls and boys participated equally in the class.

Table 13: Enugu: School inclusiveness in CS 1, CS2 and CS3

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
(1) Three or more actions on learner attendance (%)	49.5	44.6	56.4	+6.9	+11.7
Number of actions on learner attendance	2.6	2.5	2.8	+0.2	+0.3
(2) Two or more activities in SDP on access (%)	5.4	20.2	58.4	+53.0*	+38.3*
Number of activities on access	0.2	0.8	2.2	+2.0*	+1.4*
(3) >50% of teachers use two or more assessment methods (%)	88.3	87.3	95.9	+7.6	+8.6
(4) >50% of teachers spatially inclusive and	18.9	35.2	38.4	+19.5*	+3.2

>50% are gender inclusive (%)					
Number of inclusiveness criteria fulfilled (out of four)	1.6	1.9	2.5	+0.9*	+0.6*
Weighted sum inclusiveness score	56.3	58.3	49.8	-6.5*	-8.4*
School fully met standard (three out of four criteria) (%)	10.2	29.8	48.1	+37.9*	+18.2*
School partially met standard (two out of four criteria) (%)	59.2	61.9	80.4	+21.1*	+18.5*
* indicates change over time is statistically significant (p < .05)					

There are no statistically significant differences between minimum and medium intervention group schools in terms of school inclusiveness (Table 14). This suggests that there is not enough evidence to conclude that an extra year of intervention is associated with an increase in school inclusiveness in Enugu.

Table 14: Enugu: School inclusiveness in CS3, by intervention group

Intervention group	Min.	Med.	Estimated effect of one year of full intervention by 2016
(1) Three or more actions on learner attendance (%)	53.2	62.6	4.1
– Number of actions on learner attendance	2.8	2.8	0.0
(2) Two or more activities in SDP on access (%)	62.8	49.7	-5.3
– Number of activities on access	2.4	1.7	-0.3
(3) >50% of teachers use two or more assessment methods (%)	93.8	100	0.0
(4) >50% of teachers spatially inclusive and >50% are gender inclusive (%)	39.5	36.2	-3.0
Number of inclusiveness criteria fulfilled (/4)	2.5	2.5	0.0
Weighted sum inclusiveness score	50.1	49.4	0.3
School fully met standard (three out of four criteria) (%)	48.4	47.5	-0.1
School partially met standard (two out of four criteria) (%)	77	87.2	9.9
Additional indicators			
Enrolment increased since last year (%)	52.8	26	-19.1*
Change in enrolment since last year	0.2	0	-0.2
* indicates estimated effect of one year of full intervention is statistically significant (p < .05)			

3.4 SBMCs

Box 7: SBMCs: Key findings

- The share of SBMCs deemed functional increased from 8% in 2012 to 56% in 2016.
- ESSPIN Output Stream 4 intervention is associated with slightly better functioning SBMCs, although the difference between the different intervention groups does not reach the level of being statistically significant.

ESSPIN conducted qualitative research into SBMCs and community engagement in education in five ESSPIN states in 2009 (ESSPIN 2009). This research suggested that SBMCs were not functioning well: there was a lack of clarity and understanding in regard to the SBMCs' 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 their inclusion.

In this context, SBMCs were starting from a low base and with substantial sociocultural barriers to be overcome to achieve 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).

According to the data, all schools in the Enugu sample have had SBMCs since 2016 (see Table 15). This is a large increase since 2012, when only around 25% of all schools had an SBMC. However, this does not mean that all the SBMCs are functional or inclusive.

To be counted as functioning well, SBMCs are expected to meet regularly, and to work with the community, community-based organisations (CBOs), and traditional or religious institutions, to raise awareness about the school and its needs, raise resources, and address exclusion. They are expected to have a women's committee and a children's committee, to keep financial records, and the chairperson is expected to visit the school regularly. There are nine criteria in the standard for SBMC functionality (

Box 8: Logframe criteria for SBMC functionality

). In most cases, these require evidence to be presented, rather than just accepting the word of the respondent (usually the SBMC chairperson). Thus, they reflect the ability of the SBMC to keep good records of their activities, as well as reflecting the activities themselves. In addition to these criteria, we present statistics on a number of other measures from the composite survey SBMC interview (Table 15 and Table 16).

Box 8: Logframe criteria 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:⁵

- 1) two or more SBMC meetings have taken place since the start of the current school year (written evidence);
- 2) SBMC has conducted awareness-raising activities (written or oral evidence);
- 3) SBMC has taken steps to address exclusion (written or oral evidence);
- 4) SBMC has networked with CBOs, traditional or religious institutions, or other SBMCs (written or physical evidence);
- 5) SBMC has interacted with local government education authorities on education service delivery issues (written or physical evidence);
- 6) an SBMC women's committee exists (written or physical evidence);
- 7) an SBMC children's committee exists (written or physical evidence);
- 8) SBMC has contributed resources for the school (written or physical evidence); and
- 9) SBMC chair has visited the school at least three times since the start of the current school year (written evidence).

By 2016, there have been statistically significant and sometimes large improvements across all but one of the SBMC indicators (Table 15). 56% of all schools had functional SBMCs in 2016, while in 2012 only 9% and in 2014 only 27% of all Enugu schools had a functional SBMC. These changes are statistically significant.

Compared to 2012 and 2014, a larger proportion of Enugu schools had SBMCs that held more than two meetings per school year, conducted awareness training, addressed inclusion, networked with CBOs, and with other institutions and other SBMCs, interacted with the LGEA, had women's and children's committees, and contributed resources to the school. Across most indicators these average increases were continuous. This is very interesting, especially given that in Enugu prior to the 2015/16 school year 67% of all schools had never received any Output Stream 4 intervention at all. For CS3 we only take into account the period before 2015/16, as we do not think that interventions during that year could have led to changes in outcomes by the time CS3 was conducted. Although pilot schools did receive SBMC training from 2011 onwards, and the second phase schools did so since 2013, even these schools only received one year of the full Output Stream 4 intervention package in 2014/15. This might suggest that the Output Stream 4 intervention can be very effective, in terms of SBMC functionality, even if it is not delivered in the form of the full package of trainings and visits every year. These findings may also be driven by spill-over effects to schools that did not receive any Output Stream 4 intervention. Schools in adjoining communities seem to have borrowed ideas from communities that did receive ESSPIN's Output Stream 4 intervention.

Additional indicators for which data were collected further confirm improvements in SBMC functionality. For example, in 2016 45% of all SBMCs had a cashbook available, compared to only 13% in 2012, and the percentage of SBMCs that mobilised non-cash resources for their schools increased from 4% in 2012 to almost 60% in 2016. This shows increased organisational capacity and community involvement in education. Regarding some key indicators of SBMC actions to make the school inclusive – whether the SBMC took action for commonly excluded groups, and whether it raised issues of children's exclusion – there have been some improvements compared to 2012. However, compared to 2014 there was a non-significant decline in the proportion of

⁵ 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.

SBMCs that raised issues of children's exclusion. Box 9 explains the indicators used to measure inclusion and exclusion.

Table 15: Enugu: SBMC functionality in CS1, CS2 and CS3

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
(1) Two or more meetings this school year (%)	16	54.7	58.6	+42.5*	+3.9
(2) Conducted awareness-raising (%)	9	51.8	69.5	+60.5*	+17.7*
(3) Addressed exclusion (%)	9.7	34.2	60	+50.3*	+25.9*
(4) Networked with CBOs/institutions/other SBMCs (%)	7.2	50.7	78.2	+71.0*	+27.5*
(5) Interacted with LGEA (%)	4.4	21	46.5	+42.1*	+25.5*
(6) Has women's committee (%)	9.1	13.6	35.1	+26.0*	+21.5*
(7) Has children's committee (%)	8.4	23.6	39.8	+31.4*	+16.2*
(8) Contributed resources for school (%)	12.5	48.4	62	+49.6*	+13.6
(9) Chair visited school three or more times (%)	8	4.1	5.9	-2.1	+1.8
Number of SBMC functionality criteria met (out of nine)	0.9	3.7	4.4	+3.5*	+0.8*
School meeting functioning SBMC standard (five out of nine criteria met) (%)	8.7	27.2	56.1	+47.4*	+28.9*
Additional indicators: inclusion and drop-out					
(A1) Action for commonly excluded groups (%)	7.9	10.6	12.3	+4.4	+1.7
(A2) Raised issue of children's exclusion (%)	1.2	18.3	9	+7.8*	-9.3
(A3) Raised cash to support vulnerable children (%)			12.7	n/a	n/a
(A4) Monitored drop-out or non-attendance (%)			65.9	n/a	n/a
(A5) Communicated with school or community about drop out (%)			98.1	n/a	n/a
(A6) No. actions taken to address non-attendance			1.6	n/a	n/a
Additional indicators: organising and mobilising resources					
(A7) School has an SBMC (%)	24.9	84.2	100	+75.1*	+15.8*
(A8) Cashbook available (%)	12.7	41.4	44.5	+31.8*	+3.0
(A9) Requested support from LGEA or SUBEB (%)			53.4	n/a	n/a
(A10) Raised cash to support school improvement (%)	7.2	25.6	13.1	+5.9	-12.5

(A11) Mobilised non-cash resources (%)	3.9	38.6	59.4	+55.6*	+20.8*
(A12) Involved in making SDP (%)		36.8	55.5	n/a	+18.6*

* indicates change over time is statistically significant ($p < .05$)

Box 9: Asking SBMCs about inclusion and exclusion

A number of different criteria aim to measure the SBMC's inclusiveness and the actions it has taken on excluded children. These were based on the following questions addressed to the SBMC chairperson. As elsewhere, questions were asked in local language, with instructions to use a language that the respondent could understand, but not to provide additional explanation or prompts.

Criterion	Question asked (with data collector instructions in blue)	Criterion met if...
(2) Conducted awareness-raising	Did the SBMC do anything to raise awareness about the value of education for all boys and girls in the community in the current school year?	Respondent answers yes and can present oral or written evidence
(3) Addressed exclusion	Did the SBMC do anything to address issues which prevent children from attending school or which cause drop-out in the current school year?	Respondent answers yes and can present oral or written evidence
(A1) Took action for commonly excluded groups	Did the SBMC do anything to support commonly excluded groups in the current school year ? You can explain that commonly excluded groups could be orphans, nomadic children, girls, children with disability, ethnic or religious minorities, etc.	Respondent answers yes and can present oral or written evidence
(A2) Raised issues of children's exclusion	Did the SBMC raise issues of children's exclusion from school in the community, with the LGEA, or with the state government, in the current school year ?	Respondent answers yes and can present oral or written evidence
(A3) Raised cash to support vulnerable children	Did the SBMC mobilise any cash to support vulnerable children in the current school year?	Respondent answers yes (no evidence required)
(A4) Monitored drop-out or non-attendance (A5) Communicated with school or community about drop out	What actions were taken to address issues which prevent children from attending school or which cause drop-out in the current school year ? <i>Do not prompt. This is a multiple response question – SELECT ALL THAT APPLY</i> <ul style="list-style-type: none"> Monitoring drop-out Monitoring non-attendance 	Respondent answers yes to a previous question (asking whether any action was taken to address these issues) and then provides this information in the follow-up question on what type of action and how many actions were taken. No specific evidence is required

(A6) Number of actions taken to address non-attendance	<ul style="list-style-type: none"> • Communicating with school about drop-out • Communicating with community about drop-out • Other (specify) • Don't know / refused 	
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ESSPIN Output Stream 4 intervention is associated with slightly better functioning SBMCs in Enugu (Table 16). Looking at the overall functionality standard, there is a difference in the proportion of schools that meet the standard: 66% of schools in the post-CS1 intervention group meet the standard and 87% of the pre-CS1 intervention group, compared to only 50% of schools that have received less than five days of intervention so far ('no intervention'). We estimate that a year of full Output Stream 4 intervention is associated with an increase in the proportion of schools that have functional SBMCs of 9 percentage points, although this change is not statistically significant.

On the individual criteria, results are in the expected direction for six out of nine, but are not always statistically significant. SBMCs in schools with a greater degree of ESSPIN intervention are significantly more likely to have women's and children's committees, and to hold two or more meetings per year.

Table 16: Enugu: SBMC functionality in CS3, by intervention group

Intervention group	No intervention	Post-CS1	Pre-CS1	Estimated effect of one year of full intervention by 2016
(1) Two or more meetings this school year (%)	48	77	91.2	14.3*
(2) Conducted awareness-raising (%)	65.1	75.6	89.1	5.8
(3) Addressed exclusion (%)	63.1	74.8	48.8	-3.1
(4) Networked with CBOs/institutions/other SBMCs (%)	71.6	89.4	100	11.7
(5) Interacted with LGEA (%)	45.7	43.9	65.1	1.2
(6) Has women's committee (%)	24.2	55.6	62.4	12.1*
(7) Has children's committee (%)	33.4	47.9	73.3	8.6*
(8) Contributed resources for school (%)	64.2	51.1	84.6	-1.0
(9) Chair visited school three or more times (%)	7.6	2.3	2.8	-3.0
Number of SBMC functionality criteria met (out of nine)	4.1	6.4	4.7	0.4
School meeting functioning SBMC standard (five out of nine criteria met) (%)	49.6	87.3	65.5	9.0
Additional indicators: inclusion and drop out				

(A1) Took action for commonly excluded groups (%)	12.3	8.7	26.5	0.7
(A2) Raised issues of children's exclusion (%)	8.3	6.6	26	1.6
(A3) Raised cash to support vulnerable children (%)	12.8	12.8	11.3	0.1
(A4) Monitored drop-out or non-attendance (%)	68.8	57.7	70.4	-2.9
(A5) Communicated with school or community about drop out (%)	97.5	99	100	0.7
(A6) No. actions taken to address non-attendance	1.5	1.7	1.9	0.1
Additional indicators: organising and mobilising resources				
(A7) School has an SBMC (%)	100	100	100	n/a
(A8) Cashbook available (%)	45.9	35.9	64.5	-0.8
(A9) Requested support from LGEA or SUBEB (%)	44.8	70.7	69.9	9.8*
(A10) Raised cash to support school improvement (%)	13.1	10.2	24.7	0.6
(A11) Mobilised non-cash resources (%)	64.2	41.4	84.6	-3.7
(A12) Involved in making SDP (%)	50.7	61.9	78.5	6.6
* indicates estimated effect of one year of full intervention is statistically significant (p < .05)				

3.4.1 How inclusive are SBMCs of women and children?

Box 10: SBMCs' women and children inclusiveness: Key findings

- SBMCs have, on average, become less inclusive of women and children since 2012. In 2016, 32% of all SBMCs were inclusive of women, compared to 38% in 2012, and 15% were inclusive of children, compared to 25% in 2012.
- Schools that have benefited from a greater degree of ESSPIN Output Stream 4 intervention are on average more inclusive of women and children than those that have benefited from a lesser degree.

As noted above, SBMCs are expected to have women's and children's committees. We also record a number of other measures of the extent to which SBMCs are inclusive of women's and children's concerns. In each case, there are four criteria, and an overall standard (

Box 11: Logframe standard for SBMCs' inclusiveness of women and children

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Box 11: Logframe standard for SBMCs' inclusiveness of women and children

The school must meet at least three of the four criteria listed below in order to meet the SBMC **women's** inclusiveness standard:

- 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 a female member of the SBMC);
- 3) at least one issue raised by a female member at an SBMC meeting led to action (written, physical or oral evidence from a female member of the SBMC); and
- 4) at least one SBMC women's committee meeting took place.⁶

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

- 1) at least one child attended two or more SBMC meetings (written evidence);
- 2) a 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); and
- 4) at least one SBMC children's committee meeting took place and the committee has a trained facilitator.⁷

Overall, SBMCs were not significantly more inclusive of women in 2016 than they were in 2012 or 2014 (Table 17). While there were no statistically significant changes in the proportion of SBMCs that reached the women's inclusiveness standard, almost all indicators changed in the right direction between 2012 and 2016 (the exception being that the women's committee met). The largest improvements were made in regard to the proportion of SBMCs where an issue raised by a female member led to action.

The trends in terms of children's inclusiveness in Enugu's SBMCs are similar. There is no statistically significant increase in the proportion of SBMCs which met the children's inclusiveness standard, even though the number of criteria met increased slightly between 2012 and 2016, from 0.3 to 1.1.

⁶ This criterion has been slightly altered since CS1, where it also required the women's committee to have a female leader.

⁷ 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 17: Enugu: SBMC inclusiveness of women and children in CS1, CS2 and CS3

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
Participation of women in SBMCs					
(1) At least one woman attended two or more meetings (%)	39.9	41	41.7	+1.8	+0.7
(2) Female member raised an issue (%)	50	46.4	54.9	+4.9	+8.5
(3) Issue raised by female member led to action (%)	28.5	28	54	+25.4*	+26.0*
(4) Women's committee met (%)	35.6	20.3	20.4	-15.2	+0.1
Number of criteria met (out of four)	0.4	1.4	1.6	+1.2*	+0.2
Meets women's inclusiveness standard (three out of four criteria met) (%)	37.6	20.7	31.8	-5.8	+11.1
Participation of children in SBMCs					
(1) At least one child attended two or more meetings (%)	33.3	23.7	39.7	+6.4	+16.0
(2) Child raised an issue (%)	30.2	36	20.8	-9.5	-15.2
(3) Issue raised by child led to action (%)	29.3	20	36.1	+6.8	+16.1*
(4) Children's committee met and has a trained facilitator (%)	15.1	19.1	17.3	+2.2	-1.8
Number of criteria met (out of four)	0.3	1	1.1	+0.8*	+0.1
Meets children's inclusiveness standard (three out of four criteria met) (%)	25.3	20.7	15.1	-10.1	-5.6
* indicates change over time is statistically significant ($p < .05$)					

There is evidence that a greater degree of Output Stream 4 intervention is beneficial to SBMC women's inclusiveness (Table 18). 42% of all schools that received Output Stream 4 intervention after CS1 and 78% of schools that received Output Stream 4 intervention before CS1 met the SBMCs women's inclusiveness standard. However, only 23% of schools that received no intervention had SBMCs that were deemed to be inclusive of women.

For SBMCs' inclusiveness of children we do not find any evidence that a greater degree of Output Stream 4 intervention leads to more schools achieving that standard or performing better across the individual indicators. There is no statistically significant effect for children's inclusiveness of an extra year of Output Stream 4 intervention.

Table 18: Enugu: SBMC inclusiveness of women and children in CS3, by intervention group

Intervention group	No intervention	Post-CS1	Pre-CS1	Estimated effect of one year of full intervention by 2016
Participation of women in SBMCs				
(1) At least one woman attended two or more meetings (%)	28.6	66.8	72.9	14.7*
(2) Female member raised an issue (%)	51.5	55.4	80.6	5.2
(3) Issue raised by female member led to action (%)	53.9	49	75.2	1.5
(4) Women's committee met (%)	12.4	32.6	51.8	8.5*
Number of criteria met (out of four)	1.3	2	2.8	0.4*
Meets women's inclusiveness standard (three out of four criteria met) (%)	23.3	41.8	78.4	10.5*
Participation of children in SBMCs				
(1) At least one child attended two or more meetings (%)	35.1	40.8	81.6	6.8
(2) Child raised an issue (%)	18.3	20.3	46.4	4.2
(3) Issue raised by child led to action (%)	39.8	26.8	36.3	-4.5
(4) Children's committee met and has a trained facilitator (%)	14.8	16.1	46.8	4.2
Number of criteria met (/4)	1	1	2	0.1
Meets children's inclusiveness standard (three out of four criteria met) (%)	13.7	13.5	36.3	2.6
* indicates estimated effect of one year of full intervention is statistically significant ($p < .05$)				

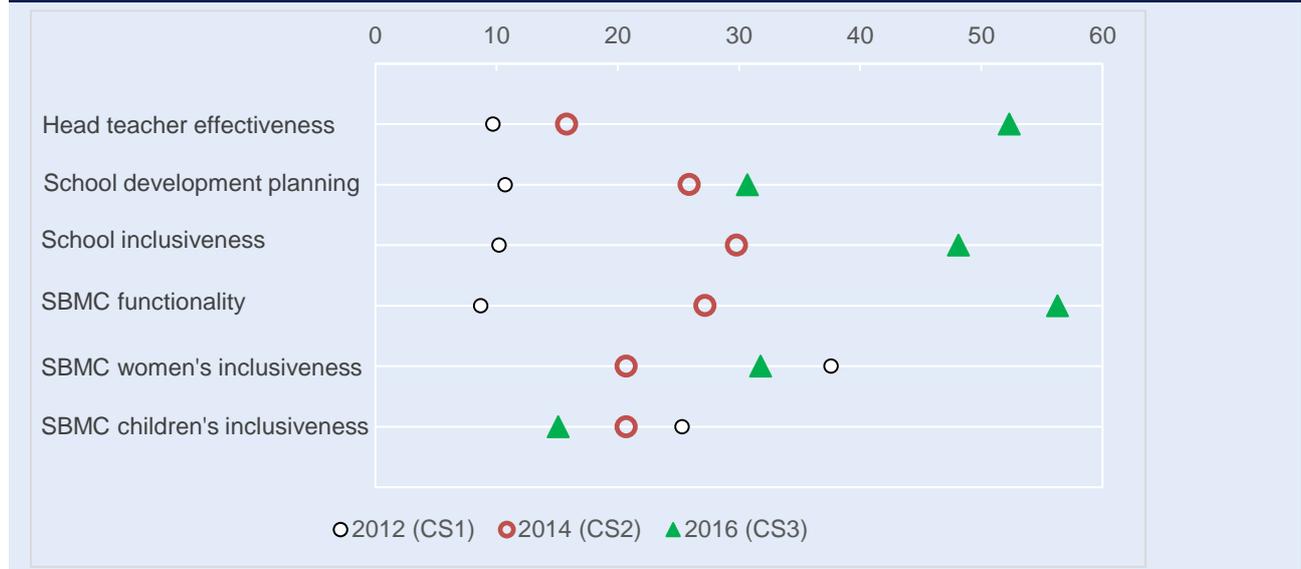
3.5 Summary and conclusion

Enugu rolled out the ESSPIN intervention to all primary schools in the state relatively late, compared to other states. The first year that any school received an intervention under Output Stream 3 was in 2011/12, which means that by the time of the first Composite Survey, none of the Enugu schools could have materialised any effects from ESSPIN intervention. In the following years the scale-up was only gradual, so that 2014/15 was the first year that all schools in Enugu had received at least one year of intervention. Given that in 2012 schools were only just starting to benefit from the Output Stream 3 ESSPIN intervention, we would expect vast improvements in school management and head teacher performance between 2012 and 2016.

Box 12 shows the average progress in the different standards of school management and head teacher effectiveness in Enugu primary schools between 2012 and 2016. We would expect the proportion of schools that achieved the standards to be the lowest in 2012 and the highest in 2016, as schools benefitted from additional years of the intervention. The farther to the right a point on the graph, the better the average performance of schools in that category.

Indeed, the proportion of schools meeting each of the respective standards was higher in 2016 than in 2012 across all categories, except in regard to SBMC inclusiveness of women and children. The increases were statistically significant in all categories that saw improvements. The proportion of schools that had SBMCs that were inclusive of women and children was lower in 2016 than in 2012, although these are not statistically significant changes. There is some clear room for improvement in this area in Enugu, especially given that by 2016 around two-thirds of all schools had never received any women’s and children’s participation training under Output Stream 4, and only around 7% of schools had received the training for more than one year (see Annex C).

Box 12: Enugu: Change in school management and head teacher standards over time
 Comparing CS1 (2012), CS2 (2014) and CS3 (2016)

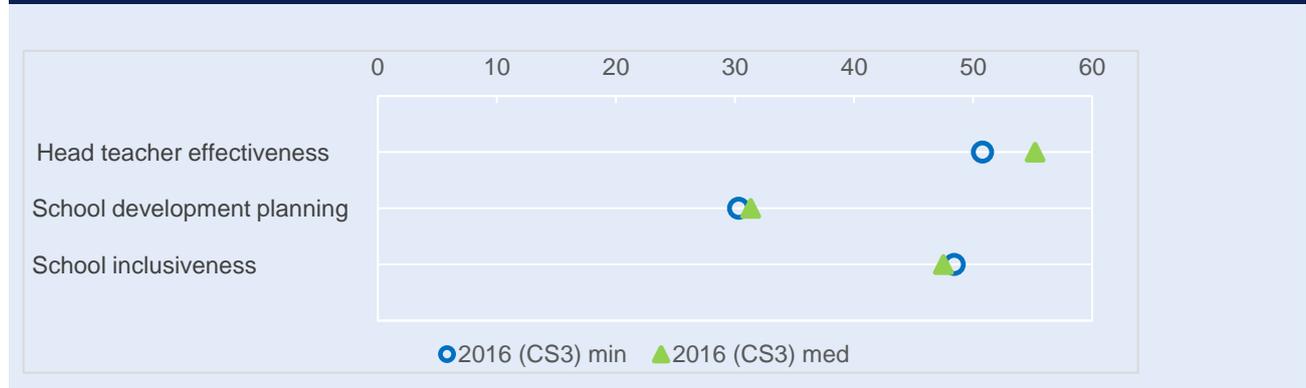


Comparing results from different intervention groups in 2016, we find that there are no statistically significant differences between schools that had received one year of Output Stream 3 intervention versus schools that had received two to three years of Output Stream 3 intervention in terms of head teacher effectiveness and school management (

Box 13: Enugu: Difference in school management and head teacher standards by ESSPIN intervention**Comparing minimum and medium Output Stream 3 intervention schools in 2016**

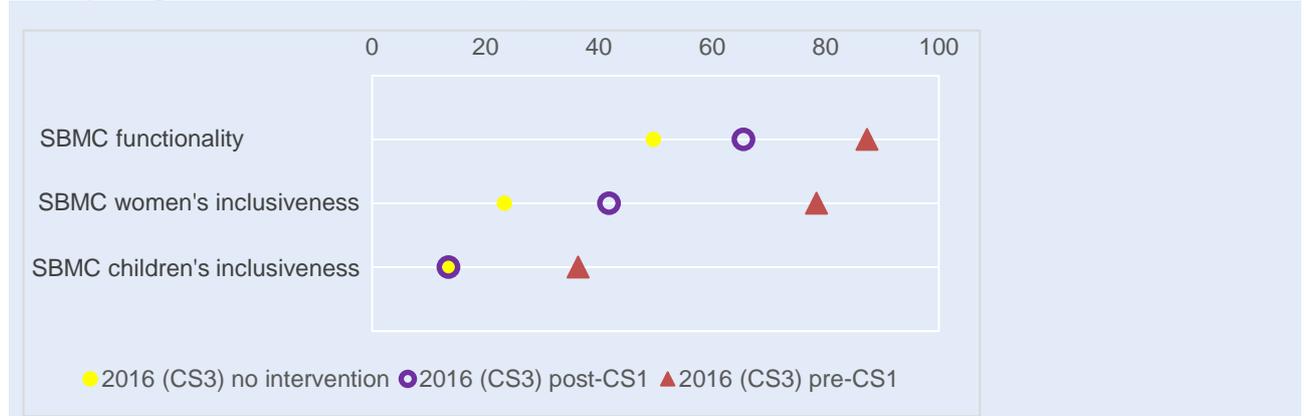
). Although across some categories the proportion of schools that met the respective standard was slightly higher among the medium intervention group, these differences were not statistically significant. These findings may suggest that schools new to the intervention appear to catch up quickly to schools that have been exposed to it for more years. The reason behind this might partly lie in the fact that staff in schools are not static. A school might not have had the same head teacher for the whole period of the intervention, so even if a school has received the intervention for three years that does not mean that the current head teachers has. There might also be some spill-over effects since staff are quite commonly moved between schools.

Box 13: Enugu: Difference in school management and head teacher standards by ESSPIN intervention
 Comparing minimum and medium Output Stream 3 intervention schools in 2016



On the other hand, we did find that by 2016 a greater degree of Output Stream 4 intervention is associated with a significantly larger proportion of schools that meet the SBMC women’s inclusiveness standard (). The proportion of schools whose SBMCs met the functionality and children’s inclusiveness standard in 2016 is also slightly higher among the schools that received more Output Stream 4 intervention, but this difference is not statistically significant. These results support the above claim that schools in Enugu could benefit from more years of women and children participation training under Output Stream 4.

Box 14: Enugu: Difference in SBMC standards by ESSPIN intervention
 Comparing minimum and medium Output Stream 4 intervention schools in 2016



4 Teachers

ESSPIN's interventions include teacher training on teaching skills, including the use of teaching aids, participation and praise, and techniques for classroom organisation. The training also includes basic literacy and numeracy training. This chapter examines the changes in teacher competence over time and across different intervention groups. In this chapter, we first look at how teacher competence has changed by reference to the teacher competence logframe indicator that combines the various aspects on which teachers receive training. We then take a more in-depth look at teachers' performance on the literacy and numeracy content knowledge tests.

4.1 Teacher competence

Box 15: Teacher competence: Key findings

- Teachers in Enugu have become more competent over the last four years and have improved their teaching methods. 77% (or 52% depending on the measure used) were deemed to be competent teachers in 2016.
- Teachers that were trained by ESSPIN performed better in the use of teaching aids and praising students instead of reprimanding pupils. However, overall they are not significantly more competent than teachers that were not trained by ESSPIN.
- It is important to note that teachers did not perform as well as expected on the subject tests. The proportion that passed the English and mathematics test has decreased since 2014, and a significantly lower proportion of ESSPIN trained teachers passed the test compared to non-ESSPIN trained teachers.

Teacher competence is based on four criteria set out by the ESSPIN logframe. **Error! Reference source not found.**) Teachers who teach English and mathematics meet the competence standard if they fulfil three of the four criteria. Teachers who teach subjects other than English and mathematics are exempted from criteria 1 and therefore meet the competence standard if they fulfil two out of the three remaining criteria.

Box 16: Criteria 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 mathematics. Teachers of other subjects must meet two out of three criteria (excluding 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 reprimands during lesson observation; and
- 4) in terms of class organisation: assigning individual or group tasks at least twice during lesson observation (or for two contiguous five-minute blocks).

For CS2 and CS3, stricter criteria for teacher competence were introduced. These modified (2) to exclude reading from or writing on, or having pupils copy from, the blackboard as a use of a teaching aid. A fifth criterion was added:

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

In 2016, 78% of all teachers in Enugu met the competence standard (Table 19). This is a statistically significant increase from 2012 and 2014.

There were significant and sometimes very large improvements across all indicators that measured teaching skills. The only exception is the percentage of teachers that passed the English and mathematics content knowledge tests, where the results show a decrease.

This explains why the percentage of teachers that met the stricter competence score is lower. Nevertheless, the share of teachers meeting this strict version of the standard improved significantly, from 32% in 2014 to 52% in 2016.

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 original teacher competence score as well as the stricter version have shown consistent and substantial improvement between 2012 and 2016.

Table 19: Enugu: Teacher competence in CS1, CS2 and CS3

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
(1) Knowledge of Eng/Maths curriculum (%)	56.4	44.5	66.7	+10.3*	+22.2*
(2) Use of one or more teaching aid (%)	84.3	98.9	99.8	+15.5*	+0.9
(2a) Use of one or more teaching aid, excl. blackboard (%)		67.7	91.0	n/a	+23.3*
(3) Praise more than reprimand (%)	63.3	87.2	95.2	+31.9*	+8.0*
(4) Assigns two or more ind./group tasks (%)	43.9	24.1	46.5	+2.4	+22.2*
(5) Passes English and mathematics test (%)		71.5	65.5	n/a	-5.4
Teacher competence score (% of criteria fulfilled)	51.1	52.1	78.3	+27.2*	+26.2*
Teacher competence standard fulfilled (three out of four criteria met) (%)	63.6	63.8	76.9	+13.3*	+13.1*
Teacher competence score (% of criteria fulfilled; strict version)		58.2	72.1	n/a	+14.0*
Teacher competence standard fulfilled (strict version: four out of five criteria met) (%)		31.5	52.1	n/a	+20.6*
* indicates change over time is statistically significant ($p < .05$)					

Next, we examined how Enugu teachers who reported having received ESSPIN training performed in 2016, compared to those that did not report having received ESSPIN training in 2016 (Table 20).

ESSPIN-trained teachers performed better than non-ESSPIN trained teachers across most of the indicators of teacher competence, although these differences were not statistically significant. There is also some evidence that ESSPIN-trained teachers are more likely to achieve the original teacher competence standard, but again this finding does not reach the level of being statistically

significant. However, a significantly lower proportion of trained teachers was found to pass the English and mathematics test, a result which also resulted in a lower proportion achieving the stricter competence standard. The difference in the proportions that achieved the stricter competence standard is also not statistically significant.

Table 20: Enugu: Teacher competence in CS3, ESSPIN trained versus non-ESSPIN trained

	Non-ESSPIN trained	ESSPIN trained	Difference in means
(1) Knowledge of Eng/maths curriculum (%)	66.0	67.5	+1.5
(2) Use of one or more teaching aid (%)	100	99.8	-0.2
(2a) Use of one or more teaching aid, excl. blackboard (%)	89.4	92.7	+3.3
(3) Praise more than reprimand (%)	94.9	95.5	+0.6
(4) Assigns two or more ind./group tasks (%)	41.7	51.4	+9.7
(5) Passes English and mathematics test (%)	72.1	59.3	-12.8*
Teacher competence score (% of criteria fulfilled)	75.5	78.4	+2.9
Teacher competence standard fulfilled (three out of four criteria met) (%)	75.2	81.6	+6.4
Teacher competence score (% of criteria fulfilled; strict version)	71.2	73.1	+1.9
Teacher competence standard fulfilled (strict version: four out of five criteria met) (%)	54.3	49.9	-4.4

* indicates estimated effect of one year of full intervention is statistically significant ($p < .05$)

4.2 Findings from teacher content knowledge tests

The findings above suggest that results from teachers' content knowledge tests in Enugu did not change significantly between 2014 and 2016, and that teachers trained by ESSPIN did not perform significantly better than those that had not been trained by ESSPIN. Percentage scores in the teacher content knowledge tests provide a rough indication of teachers' test performance, but analysis using item response theory (IRT) provides more reliable learning scales that can also be interpreted more readily in terms of learning benchmarks (see Allen, 2016a). The teachers' results can be divided into four performance bands in literacy and five performance bands in numeracy. Review of the items that teachers in each band can mostly answer correctly then provides descriptors for each band (Table 21). For example, a teacher in Band 2 for literacy is one who shows knowledge of some basic phonics, can write a simple sentence, and perform basic comprehension of a passage, as well as being able to satisfy the easier items – testing limited comprehension of simple passages, basic nouns and verbs – associated with a teacher in Band 1. The teacher in Band 2 cannot typically correctly answer the harder items associated with Bands 3 or 4, such as identifying simple antonyms.

Table 21: Band descriptors based on IRT analysis

Band	Literacy	Numeracy
5		Understands conversion of fractions to decimals, and place values in decimals
4	Creates several sentences, shows knowledge of phonics, punctuation, formal letter layout, suffixes and alphabetical order	Understands ideas of area, nets, pictograms and rounding
3	Past/present of verbs, completes a sentence, extracts basic information from a passage, identifies simple antonyms, forms plurals	Understands basic sets, use of the number line to represent sums, conversion of units of time and mass, can complete word problems involving division
2	Shows knowledge of some basic phonics, writes a simple sentence, basic comprehension of a passage	Simple division, word problems involving addition, signs for arithmetic operations, integer comparisons and integer place values
1	Limited comprehension of simple passages, basic nouns and verbs	Simple addition with carrying over, simple subtraction, identifying a fraction, counting, simple regular shapes

Within the literacy and numeracy tests, items can be grouped according to specific sub-domains of learning: reading, writing and grammar within literacy, and number concepts and calculation within numeracy.

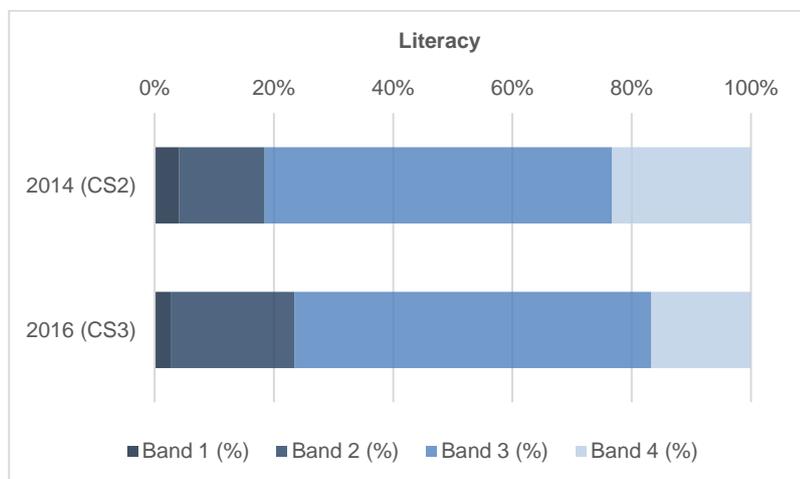
In Enugu, overall teacher test scores in English and mathematics did not change significantly. However, both were slightly lower in 2016 than in 2014, and there were significant decreases in some of the sub-scores, such as reading and grammar (

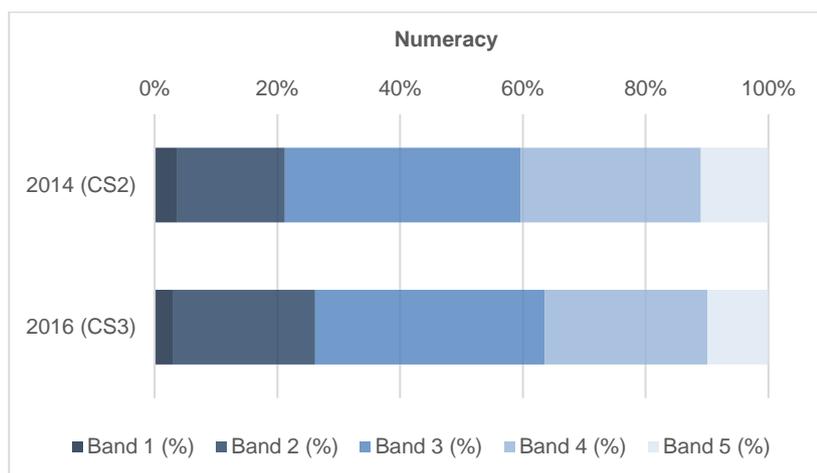
Table 22). As a result, the proportion of teachers in the lower middle band increased (Figure 2). Although there were similar declines in the mathematics test scores, these were not statistically significant. There were only slight declines of teachers in the upper performance bands in mathematics between 2014 and 2016 (Figure 2).

Table 22: Enugu: Teachers' test scores (IRT analysis) in 2014 and 2016

	2014 (CS2)	2016 (CS3)	Change: 2014 vs. 16
English IRT scale score (mean 500, s.d. 100)	534	522	-11.7
English Band 1 (%)	4	3	-1.4
English Band 2 (%)	14	21	+6.4*
English Band 3 (%)	58	60	+1.6
English Band 4 (%)	23	17	-6.6
Reading (English sub-scale, mean 500, s.d. 100)	535	522	-13.9*
Writing (English sub-scale, mean 500, s.d. 100)	555	539	-16.0
Grammar (maths sub-scale, mean 500, s.d. 100)	561	544	-16.3*
Mathematics IRT scale score (mean 500, s.d. 100)	534	522	-11.7
Mathematics Band 1 (%)	4	3	-0.8
Mathematics Band 2 (%)	17	23	+5.7
Mathematics Band 3 (%)	38	37	-1.0
Mathematics Band 4 (%)	29	26	-2.9
Mathematics Band 5 (%)	11	10	-1.0
Number concepts (maths sub-scale, mean 500, s.d. 100)	536	526	-10.1
Calculation (maths sub-scale, mean 500, s.d. 100)	527	513	-13.6

Figure 2: Enugu: Proportion of teachers in each English and mathematics performance band, by year



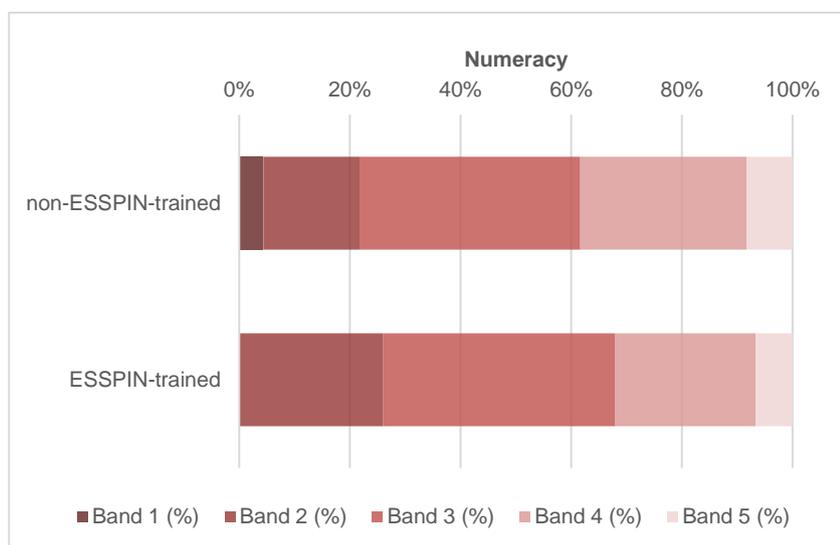
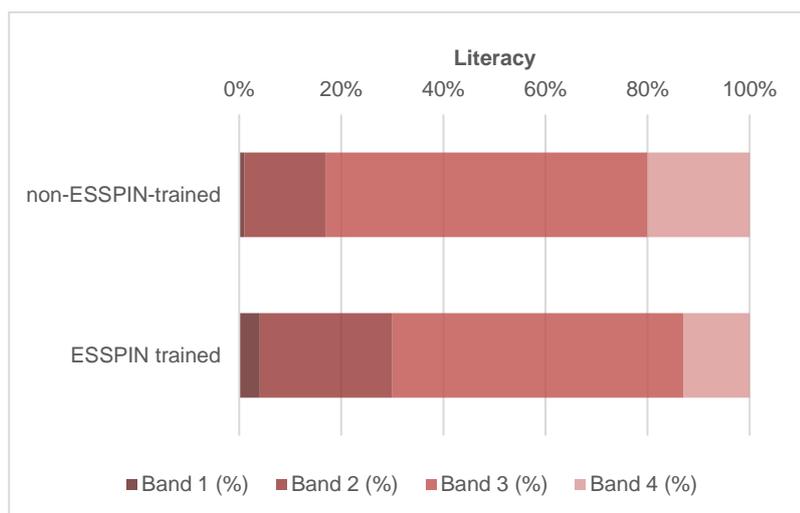


In 2016 ESSPIN trained teachers performed significantly worse than teachers who were not trained by ESSPIN across all test scores. In line with this, a larger proportion of ESSPIN-trained teachers is found in the lower performing bands compared with the teachers not trained by ESSPIN (Figure 3). There are several potential explanations for these findings. It is possible that the training was too short to actually make a difference, as teachers only got one day of training per term per subject. Trainings could also have been too focused on pedagogy, instead of on content knowledge. Finally, it is also possible that the proportion of teachers from mission schools in the sample of non-ESSPIN trained teachers could be driving the results.

Table 23: Enugu: Teachers' test scores (IRT analysis) by ESSPIN training

	Non-ESSPIN trained	ESSPIN-trained	Difference in means
English IRT scale score (mean 500, s.d. 100)	548	525	-22.7*
English Band 1 (%)	1	4	+2.6
English Band 2 (%)	16	26	+9.8*
English Band 3 (%)	63	57	-5.5
English Band 4 (%)	20	13	-6.9*
Reading (English sub-scale, mean 500, s.d. 100)	530	513	-17.1*
Writing (English sub-scale, mean 500, s.d. 100)	548	530	-18.5
Grammar (maths sub-scale, mean 500, s.d. 100)	559	530	-29.5*
Mathematics IRT scale score (mean 500, s.d. 100)	539	504	-35.0*
Mathematics Band 1 (%)	1	5	+4.2
Mathematics Band 2 (%)	20	27	+6.9
Mathematics Band 3 (%)	36	38	+2.0
Mathematics Band 4 (%)	29	24	-4.8
Mathematics Band 5 (%)	14	6	-7.3*
Number concepts (maths sub-scale, mean 500, s.d. 100)	543	509	-33.6*
Calculation (maths sub-scale, mean 500, s.d. 100)	530	497	-33.2*

Figure 3: Enugu: Proportion of teachers in each English and mathematics performance band, ESSPIN-trained versus non-ESSPIN-trained



4.3 Teacher motivation

Teacher motivation has been proposed as an important aspect which may sustain the effects of a training intervention. For example, as teachers acquire new skills through teacher training their motivation may increase as they feel more effective.

For this round of the survey (CS3) we included a measure of teacher motivation and teacher interaction using a scale that had been developed for the Nigerian context, and that was used and tested in two previous school-based surveys. We define teacher motivation as the propensity of teachers to start and maintain behaviours that are directed towards fulfilling their professional goals, and in particular towards achieving better learning outcomes for the school’s learners (Cameron, 2015b). Many existing instruments designed to measure teacher motivation focus exclusively on ‘efficacy’ – the extent to which teachers see themselves as able to influence their pupils’ learning outcomes – which can also be seen as the ‘can do’ aspect of motivation (Bennell and Akyeampong, 2007). We wished to go beyond this to include measures relating more closely to teachers’ willingness to work hard, commitment, effort and enjoyment, which might together be labelled as ‘will do’ aspects of motivation.

The motivation scale we developed was incorporated into the teacher interviews. Teachers were asked to what extent they agreed with (‘strongly disagree’, ‘disagree’, ‘agree’, ‘strongly agree’) a series of statements that measure different aspects of motivation. The scale consists of three sub-scales of teacher motivation (satisfaction, skills and engagement) and one scale of teacher–teacher interaction (collegiality). The three sub-scales of teacher motivation were combined into a composite motivation measure by calculating the mean of the three sub-scales⁸. The teacher motivation scale was also analysed using IRT.

Table 24 describes each of the different sub-scales and provides some examples of the items used to assess these.

Table 24: Teacher motivation and interaction scale and sub-scales

Scale	Description	Example of items
Collegiality	How I see the extent of commitment and collaboration among my colleagues (‘teacher–teacher interaction’)	<ul style="list-style-type: none"> • All of the teachers in my school trust each other • All teachers at this school are highly committed to their job
Satisfaction	The value I place on my role as a teacher (‘interest and enjoyment’)	<ul style="list-style-type: none"> • I always enjoy teaching very much • I like to spend a lot of energy to make my classes interesting
Skills	The perception I have of my competences and skills as a teacher (‘self-efficacy’)	<ul style="list-style-type: none"> • I believe I know how to teach well • I believe I have the skills needed to encourage my learners to always work hard
Engagement	How engaged and committed I feel I am in relation to my work as a teacher (‘pressure/tension’)	<ul style="list-style-type: none"> • It is difficult to manage learners in my classroom • Teaching is very tiring
Composite measure (mean of satisfaction, skills and engagement)		

⁸ The three sub-scales were also combined into a composite measure using partially non-compensatory methods. These produced composite measures which were very highly correlated with the simple mean composite.

Table 25 shows the levels of motivation among teachers, as reported during CS3, comparing those who reported having received ESSPIN training and those that did not report having received ESSPIN training.

In Enugu, the results show that teachers who were trained by ESSPIN are significantly more motivated than teachers who were not trained by ESSPIN: they have higher scores across all sub-scales. The largest difference is in teachers' perceptions of their own skills and competence.

Table 25: Enugu: Teacher motivation and interaction by ESSPIN training

	Non-ESSPIN trained	ESSPIN-trained	Difference in means
Collegiality	501.2	525.8	+24.6
Satisfaction	548.3	562.1	+13.8
Skills	527.1	570.6	+43.5*
Engagement	499.3	514.1	+14.8
Composite motivation measure	523.4	547.5	+24.1*

Note: All scores are normalised to have an average (mean) of 500 and a standard deviation of 100.

4.4 Summary and discussion

Teachers in Enugu have become significantly more competent between 2012 and 2016. They have improved their teaching behaviour across most indicators. Most notably, by 2016 over 90% of all teachers in Enugu used praise over reprimands, and made use of at least one teaching aid, excluding blackboards. In 2016, 77% of all teachers fulfilled the original teacher competence standard and 52% fulfilled the stricter teacher competence standard, which also takes into account their results in the teacher knowledge tests. In summary, a large proportion of teachers in Enugu uses effective teaching methods. However, when taking their scores in English and mathematics tests into account they appear less competent, which might suggest that this is an area that merits further attention. This conclusion may be reinforced by the fact that we did not find any evidence that teachers in Enugu had improved their test scores in English and mathematics over the last two years.

There is some evidence that teachers who were trained by ESSPIN in 2014 used better teaching methods in 2016 than teachers who were not trained by ESSPIN. A larger proportion of ESSPIN-trained teachers use praise over reprimands, and more diverse teaching aids, compared to teachers who were not trained by ESSPIN, although these differences are not statistically significant. Furthermore, ESSPIN-trained teachers appear to be significantly more motivated and have a stronger belief in their teaching skills than teachers that are non-ESSPIN trained.

On the other hand, ESSPIN-trained teachers performed significantly worse on the English and mathematics tests, with a smaller proportion passing those tests compared to the non-ESSPIN-trained teachers. This is another point of evidence which supports the above conclusion that it might be worth putting a greater focus on content training for teachers in Enugu.

5 Trends in school quality

Box 17: School quality: Key findings

- In 2016, almost 40% of all schools in Enugu met the original school quality standard. Around 19% met the stricter school quality standard.
- These are great improvements from the proportion of schools that met the standard in 2012 and 2014.
- A larger proportion of schools that had more than one year of ESSPIN intervention met the standards, compared to schools that had only one year of the intervention. However, the schools with a greater degree of ESSPIN intervention were already stronger at baseline and improved at a slower rate than schools that received a lesser degree of ESSPIN intervention.

For a broader sense of school quality, how it differs between schools with different levels of ESSPIN intervention, and how it has changed over time, it is useful to define an overall measure of school quality. We do this using the standard developed as part of ESSPIN's logframe. This is a combination of the standards discussed above 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 18). 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. A school that meets all of the criteria under all of the standards will get 100%, while a school that meets none of the criteria will get 0%. The original version of these indicators, used in CS1, did not take into account teachers' content knowledge. For CS2 and CS3, however, we also present a 'strict' version of the standard, which takes into account results in the teacher content knowledge tests (see Section 4 above).

Box 18. 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 half the teachers sampled in each school must be competent);
- 2) head teacher effectiveness standard;
- 3) school development planning effectiveness standard; and
- 4) SBMC functionality standard.

The version of this standard used in CS1 did not rely on teacher content knowledge tests. For CS2, we introduce a second, more strict version of the standard, in which teachers must get above 50% in literacy and numeracy tests to be classed as competent (see Section 4.1 and 4.2 above).

We find that 40% of all schools in Enugu met the original standard for school quality in 2016, compared to around 14% in 2014 and 7% in 2012. This is a large and statistically significant improvement and could potentially reflect the roll-out of the ESSPIN SIP to all primary schools in Enugu since 2014. The improvement in overall school quality is furthermore reflected by a large and statistically significant increase in the school quality score, both since 2012 and since 2014. This positive trend is also reflected by an increase in the proportion of schools that met the stricter school quality standard, and by an increase in the stricter quality score.

Table 26: Enugu: School quality in 2012–2016

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
School meets quality standard (%)	7.1	14.2	39.5	+32.4*	+25.3*
Quality score (%)	31.1	49.7	61.2	+30.1*	+11.5*
School meets quality standard (strict version) (%)		10	19.4	n/a	+9.3*
Quality score (strict version) (%)		48.8	60.1	n/a	+11.3*

* indicates change over time is statistically significant ($p < .05$)

With regard to CS3, we find that significantly more schools from the medium intervention group met the quality standard in 2016 than those from the minimum intervention group. The estimated effect of one year of full intervention on the proportion that meet the original school quality standard is 13 percentage points. For the stricter quality standard, the estimated effect is similar, at 11 percentage points. Therefore, we conclude that having had an additional year of the intervention by 2016 could potentially make a statistically significant difference to achieving school quality.

Table 27: Enugu: School quality in 2016 across different intervention groups

Intervention group	Min.	Med.	Estimated effect of one year of full intervention by 2016
School meets quality standard (%)	33.8	51.2	14.7*
Quality score (%)	59.9	63.9	3.7
School meets quality standard (strict version) (%)	11.7	35.4	13.6*
Quality score (strict version) (%)	58.6	63.1	4.1

* indicates estimated effect of a full year of intervention is statistically significant ($p < .05$)

Can the differences in quality between the intervention groups be attributed to the intervention, or are they associated with differences in the schools at baseline? One way of answering this is to compare changes over time between intervention groups. We find that in schools with only one year of intervention the average school quality score increased by over 32 points between 2012 and 2016, whereas in schools with two to three years of intervention the average score decreased by 7 points (

Table 28). It is notable that schools that received more years of ESSPIN intervention had much higher school quality scores in 2012, and so had less scope for improvement, than those that received just one year of intervention. Nevertheless, the findings in the table below, which suggest that more years of ESSPIN support are associated with a worsening of school quality scores, is surprising.

Table 28: Enugu: Difference between intervention groups in change over time (2012–2016)

	Intervention during 2011/12–2014/15		
	One year	Two to three years	Difference
2012 (CS1)	28.3	71.1	42.8
2014 (CS2)	46.5	54.6	8.1
2016 (CS3)	59.9	63.9	4
Difference (2012-2016)	31.6	-7.2	-38.8*

* indicates the difference is statistically significant (p < .05)

6 Learning outcomes

The ultimate aim of ESSPIN is to improve learning outcomes in government schools in the six states. In this chapter, we examine the trends in learning outcomes over time, and differences in learning outcomes between schools that have received a greater or lesser degree of ESSPIN intervention, and we evaluate whether effects on learning achievement can be attributed to ESSPIN.

Box 19: Learning outcomes: Key findings

- Pupil test scores in Enugu increased significantly across all tests, except for Grade 2 numeracy, between 2012 and 2016.
- In 2016 a significantly larger proportion of pupils can be found in the highest performing bands of each test than in 2012.
- Across all tests, except for Grade 2 numeracy, pupils from schools with a greater degree of ESSPIN intervention had higher scores than pupils from schools with a lesser degree of ESSPIN intervention. This was already the case in 2012 and is likely to be due to some pre-existing differences between schools in different intervention groups.
- After controlling for pre-existing difference and school characteristics we find a positive and statistically significant effect of ESSPIN intervention on Grade 4 literacy scores.

6.1 Pupil learning achievements in English literacy and numeracy

Learning outcomes in literacy and numeracy were measured at Grades 2 and 4, and were analysed using IRT (see Allen, 2016b and Allen, 2016c). The analysis for each test produces a scale score, which, by design, has an average (mean) of 500 and a standard deviation of 100. This scale is also divided into bands, indicating the level of proficiency of the learner. For the Composite Surveys, bands have been designed to correspond to the levels of proficiency expected at each grade in the Nigerian curriculum. For example, a learner in Band 2 for literacy is one who is able to demonstrate knowledge and skills in at least some of the tasks that are considered to be within the range of Grade 2 proficiency. Table 29 and Table 30 list some examples of the tasks within each band.

Table 29: Examples of knowledge and skills that learners in each literacy band can demonstrate

Band 4: Grade 4 and above	Read and understand the grammatical structure of a sentence and complete a missing word using 'where', 'which', 'what' and 'who' Follow the conventions of letter-writing to complete a letter template. Complete grammatically accurate sentences, with correct spelling, and a greeting and sign-off Independently read for meaning a short, simple text with a range of sentence structures
Band 3: Grade 3 literacy	Read phonically decodable two-syllable and three-syllable words that include common diagraphs and adjacent consonants Independently plan and write a grammatically correct simple sentence Read a simple sentence for meaning and complete a missing word using correct spelling
Band 2: Grade 2 literacy	Use phonic knowledge to utter initial sounds of familiar animal names Use knowledge of common inflections in spellings, plurals, to write the answer to a question Spell simple high frequency words accurately
Band 1: Emerging literacy	Verbally compose a short grammatically correct sentence in the continuous present tense in response to a question about a picture Listen to a short passage and remember specific details in order to respond verbally to a question

	Clearly shaped and correctly orientated copying of words with an understanding of space and full stops
Band 0: Pre-literacy	Understand and respond verbally with a grammatically correct sentence to a simple question about their age Understand and respond verbally with a grammatically correct sentence to a simple question about their name Use phonic knowledge to utter initial sounds of names of familiar objects and animals

Table 30: Examples of knowledge and skills that learners in each numeracy band can demonstrate

Band 5: Grade 5 and above	Solve a word problem involving differences in time Determine which number rule was used to make one number into another Solve a simple algebra problem
Band 4: Grade 4 numeracy	Being able to gather information by interpreting simple graphs Calculate the area of a rectangle, multiplying a decimal number, to 1 decimal place, by a one-digit number, and record the answer in m ² Choose the most appropriate strategy to subtract a decimal number, to 2 decimal places and a two digit number, involving measure
Band 3: Grade 3 numeracy	Multiply a two-digit number by a one-digit number Use short division; subtract a two-digit number from a two digit number crossing the tens boundary Choose a strategy to add a three-digit number and a two-digit number crossing the tens boundary, involving money
Band 2: Grade 2 numeracy	Use non-standard units of measure to compare the capacity of three containers Subtract a two-digit number from a two-digit number Name common 2D shapes Extend counting past 800 and count in tens
Band 1: Emerging numeracy	Recognise and complete a sequence of three two-digit numbers that are multiples of five Subtract a one-digit number from a two-digit number 1–19 Read analogue clock to the hour
Band 0: Pre-numeracy	Compare the lengths of two straight lines Use non-standard units of measure to compare the capacity of three containers Count to 10

The trend in learning outcomes among students in Enugu primary schools is promising (Table 31). All scores, except for Grade 2 numeracy, have improved significantly since 2012. Grade 2 numeracy scores have remained fairly constant between 2012 and 2016.

The strong increases in scores in the other three categories resulted in changes in the distribution of students across bands. In 2016 large proportions of students in Enugu primary schools were found to be within the highest performing bands of their category.

Table 31: Enugu: Learning outcomes in 2012–16

	2012 (CS1)	2014 (CS2)	2016 (CS3)	Change: 2012 vs. 2016	Change: 2014 vs. 2016
Grade 2 literacy score	543.1	572	580.1	+37.0*	+8.1
Band 0: Pre-school (%)	18.6	7.6	10.1	-8.5	+2.5
Band 1: Grade 1 (%)	35.1	30.7	25.7	-9.4*	-5.0
Band 2: Grade 2 (%)	46.3	61.7	64.2	+17.9*	+2.5

Grade 4 literacy score	525.9	544	561.5	+35.6*	+17.4*
Band 1: Grade 1 (%)	32.1	27	15.3	-16.8*	-11.7*
Band 2: Grade 2 (%)	29.5	20.2	22.1	-7.3	+2.0
Band 3: Grade 3 (%)	12.5	7.8	6.7	-5.8	-1.1
Band 4: Grade 4 (%)	26	45	55.8	+29.9*	+10.8*
Grade 2 numeracy score	539.8	548.1	542.6	+2.8	-5.5
Band 0: Pre-school (%)	0	0	0.2	+0.1	+0.2
Band 1: Grade 1 (%)	57.1	48.6	54.9	-2.2	+6.3
Band 2: Grade 2 (%)	42.8	51.4	44.9	+2.1	-6.4
Grade 4 numeracy score	493.2	521.1	526.8	+33.6*	+5.7
Band 1: Grade 1 (%)	6.2	2.9	3	-3.2	+0.1
Band 2: Grade 2 (%)	38.7	33.1	27.1	-11.7*	-6.0
Band 3: Grade 3 (%)	34.3	28.9	22.5	-11.8	-6.4
Band 4: Grade 4 (%)	19.1	21	35.9	+16.8*	+14.9*
Band 5: Grade 5 (%)	1.6	14.1	11.5	+9.9*	-2.6

In Enugu, all learning outcomes, except for Grade 2 numeracy, were better for pupils from schools that received two or three years of ESSPIN intervention compared to schools that only received one year of ESSPIN intervention (Table 32).

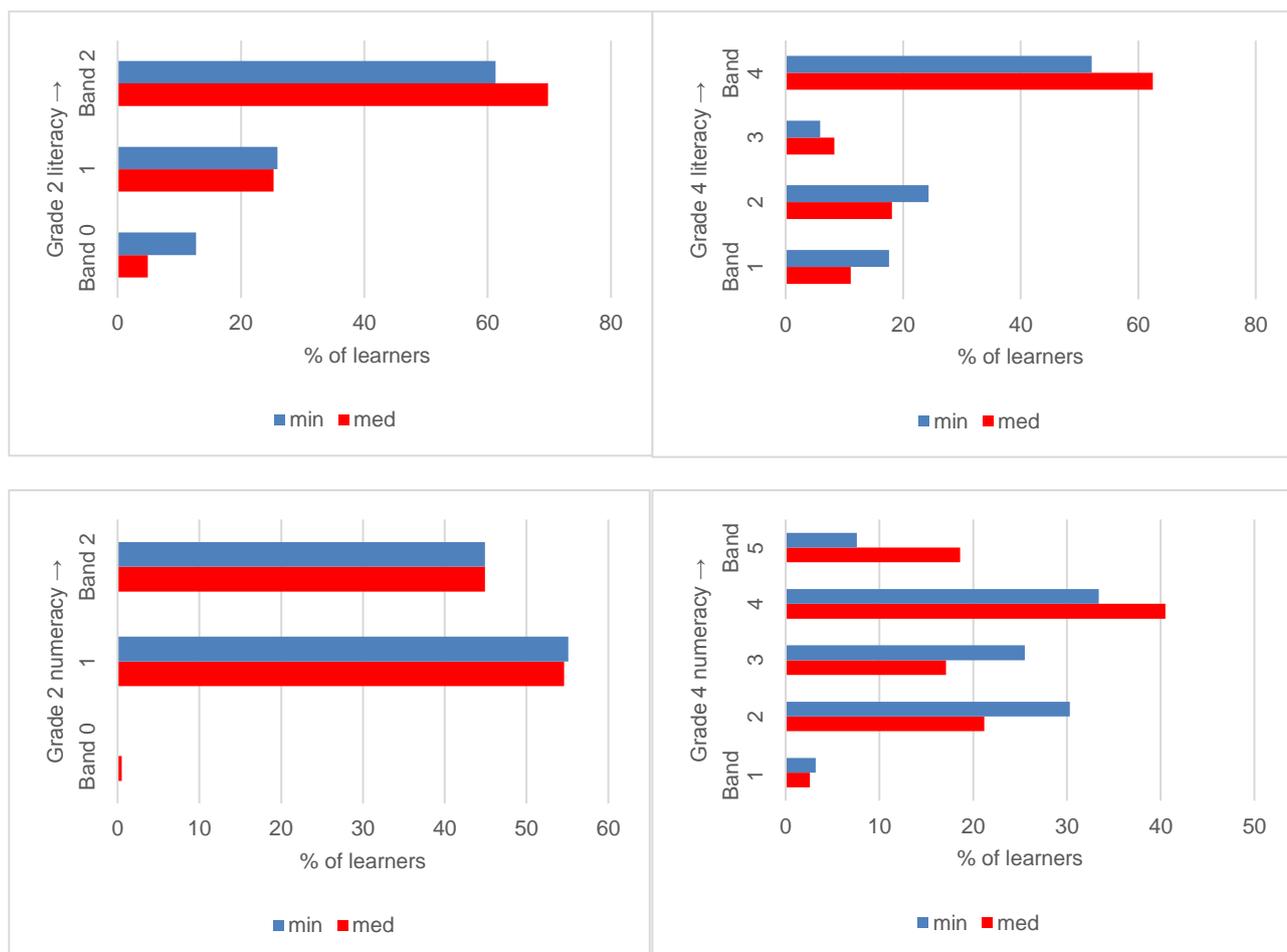
Table 32: Enugu: Learning outcomes by ESSPIN intervention group in 2016

	Min.	Med.	Estimated effect of one year of full intervention
Grade 2 literacy score	568.5	603.2	27.4*
Band 0: Pre-school (%)	12.7	4.9	-8.8
Band 1: Grade 1 (%)	25.9	25.3	-1.4
Band 2: Grade 2 (%)	61.3	69.8	8.0
Grade 4 literacy score	552.7	577.3	17.9*
Band 1: Grade 1 (%)	17.6	11.1	-5.7
Band 2: Grade 2 (%)	24.3	18.1	-4.8
Band 3: Grade 3 (%)	5.9	8.3	1.3
Band 4: Grade 4 (%)	52.1	62.5	8.1
Grade 2 numeracy score	544.1	539.8	-2.9
Band 0: pre-school (%)	0	0.5	0.2
Band 1: Grade 1 (%)	55.1	54.6	-1.1
Band 2: Grade 2 (%)	44.9	44.9	0.8
Grade 4 numeracy score	516.6	545.5	19.9*
Band 1: Grade 1 (%)	3.2	2.6	-0.2
Band 2: Grade 2 (%)	30.3	21.2	-6.8
Band 3: Grade 3 (%)	25.5	17.1	-5.5

Band 4: Grade 4 (%)	33.4	40.5	3.5
Band 5: Grade 5 (%)	7.6	18.6	6.3*

The distribution of test scores by intervention group is shown in Figure 4. Generally, in the lower bands there is a larger proportion of pupils from minimum intervention group schools (blue bar), while in the higher bands we find more pupils from the medium intervention group schools (red bar). This is most pronounced for Grade 4 numeracy, where almost 19% of all pupils from medium intervention group schools are in the highest performing band (Band 5), while only about 8% of all pupils from minimum intervention group schools reach that band.

Figure 4: Enugu: Distribution of test scores by intervention group in 2016



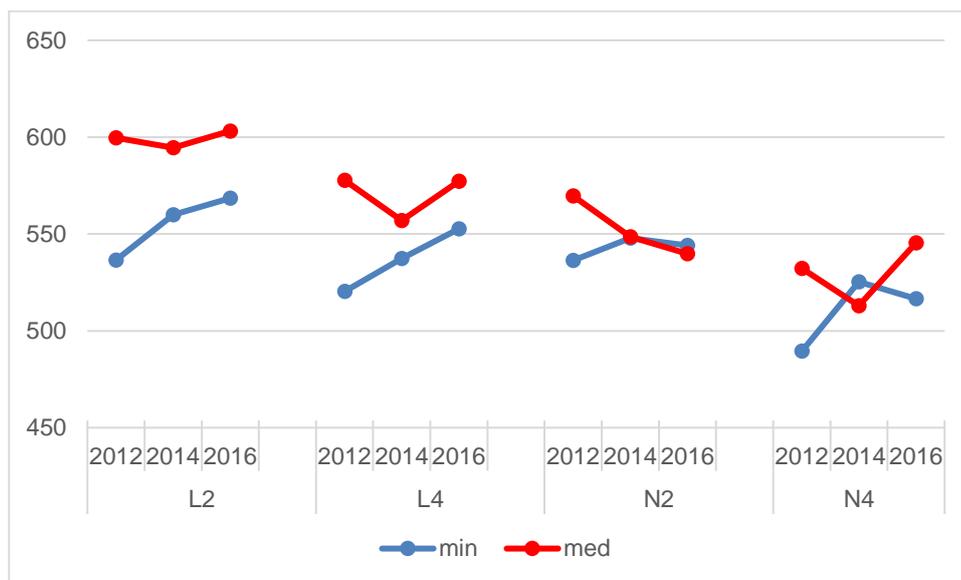
The results above show that in 2016 learners from medium intervention group schools had better test scores than learners from minimum intervention group schools. However, we cannot be sure whether this is because of ESSPIN or because of certain pre-existing differences between the two groups. In a first attempt to answer this question, we look at the change of learning outcomes across time disaggregated by ESSPIN intervention group (Figure 5).

The first point that emerges is that pupils from medium intervention group schools already had better test scores in 2012. Considering that in Enugu the first schools only received ESSPIN Output Stream 3 intervention in 2011/12, this initial difference is unlikely to have been caused by ESSPIN. Instead, it is likely that certain pre-existing differences in the characteristics of the schools are the reason for the higher test scores in the medium intervention group schools. For example, medium intervention group schools are found to have had lower PTRs between 2009 and 2015 and better equipment in terms of seating and blackboards (Annex A).

The second point is that the difference in test scores between pupils from the two intervention groups actually became smaller between 2012 and 2016. Minimum intervention group schools have improved at a faster rate across all four tests. In 2016, for Grade 2 numeracy, pupils from medium intervention group schools even had worse test scores compared to 2012, and compared to pupils from minimum intervention group schools.

These patterns are explored more rigorously in Section 6.2 below, using regression analysis to examine how change over time varies with ESSPIN intervention, and controlling for possible confounding variables such as school characteristics.

Figure 5: Enugu: Learning outcomes by test, year and ESSPIN intervention group



6.2 Controlling for school and pupil characteristics

6.2.1 Differences in background characteristics

Schools from different intervention groups in Enugu have somewhat different background characteristics (see Annex A). Schools from the medium intervention group tend to be older and were more likely to have parent–teacher associations and SBMCs in 2014/15. They also tended to have more teachers and classrooms, and had lower PTRs across all years. Generally, these are factors that are often associated with better learning outcomes. If left uncorrected, this difference between the intervention groups could bias our estimates of ESSPIN intervention upwards. We use a number of statistical methods to control for these differences in the following section. Given that we saw in the previous section that learners from medium intervention group schools already had better learning outcomes in 2012, we also estimate a model which controls for pre-existing differences in test scores by adding test scores in CS1 as a confounding variable.

6.2.2 Are learning outcomes better in schools with a greater degree of intervention in 2016?

We use ordinary least squares regression analysis to estimate the models. Regression analysis estimates the correlation of learning outcomes with ESSPIN intervention, conditional on school characteristics and pre-existing differences in test scores.

The results are shown in Table 33. After controlling for a variety of different school characteristics, we find a statistically significant effect of a greater degree of ESSPIN intervention on learning outcomes for Grade 4 literacy and numeracy in Enugu, but not for Grade 2 literacy and numeracy (Model 2). However, introducing lagged school-level learning outcomes which control for pre-existing differences in test scores per school we find a statistically significant and positive effect of the ESSPIN intervention only on Grade 4 literacy scores (Model 3). Adding school characteristics to this model, the effect remains statistically significant and positive, and increases in magnitude (Model 4).

Table 33: Estimates of the effect of ESSPIN intervention on learning outcomes in 2016

Model	L2		L4		N2		N4	
(1) Simple regression, clustered standard errors, no sample weights	39.34	*	28.07	*	-2.29		24.19	*
(2) Full covariates	13.64		22.06	*	-14.79		18.48	*
(3) Lagged school-level learning outcomes	5.06		3.39	*	-0.87		2.18	
(4) Lagged outcomes and covariates	6.47		5.18	*	-1.4		2.55	

* indicates estimated effect is statistically significant ($p < .05$)

7 Conclusions and implications of the Composite Surveys' findings for ESSPIN in Enugu

This report has found that Enugu State is doing fairly well in terms of meeting ESSPIN's standards for a good school, although there are still some deficits. In 2016, 52% of schools met the standard on head teacher effectiveness; 31% on school development planning; 48% on inclusion; 56% on functional SBMCs; and 35% or 18% on overall school quality (depending on which indicator we use).

There have been significant and sometimes very large improvements over time since 2012 in all of the above output indicators. Furthermore, across most standards, schools that had a greater degree of ESSPIN intervention perform better than those that had a lesser degree, although these differences were not statistically significant. Schools which received a greater degree of Output Stream 4 intervention performed significantly better in terms of SBMC inclusiveness of women. They had slightly higher scores in SBMC functionality and inclusiveness of children but we did not find a significant effect of an extra year of Output Stream 4 intervention. Schools with a greater degree of Output Stream 3 intervention also did significantly better in terms of school quality. However, we found that this group of schools already had higher school quality scores at baseline and that they actually improved at a slower rate than the schools which had a lesser degree of Output 3 intervention.

Teachers' competence also appears to have improved significantly between 2014 and 2016. Teachers improved their behaviour across all indicators, which is a very promising finding. However, teachers performed worse in both the mathematics and English tests in 2016 than they did in 2014. Nevertheless, the majority of teachers in Enugu are still located in the higher or middle performing bands for both tests. The disappointing news is that teachers trained by ESSPIN performed worse on the content knowledge test. A much smaller proportion passed the English and mathematics tests compared to the teachers that were not trained by ESSPIN. On the other hand, we do find that teachers trained by ESSPIN are significantly more motivated than non-ESSPIN trained teachers. Most notably, they are more confident about their teaching skills.

We find that pupils' learning outcomes in Enugu State have increased significantly since 2012 across all tests, except for Grade 2 numeracy, where we did not find any change. Pupils from schools with a greater degree of ESSPIN intervention score significantly higher than pupils from schools with a lesser degree of ESSPIN intervention. Again, this applies to all tests except for Grade 2 numeracy. However, looking at the change over time it emerges that pupils from medium intervention group schools already had higher test scores at baseline compared to pupils from minimum intervention group schools. They also had lower PTRs and more resources in terms of classrooms and teachers in general. Therefore, we estimated a regression model controlling for pre-existing differences in test scores as well as school characteristics to make sure they do not bias our results. After controlling for the different levels of test scores at baseline, we find a statistically significant effect of more years of ESSPIN intervention on Grade 4 literacy scores. This suggests that ESSPIN's Output Stream 3 interventions have contributed to an increase in Grade 4 literacy scores in Enugu. For the other tests, we do not find evidence for such a contribution.

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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 (minimum, medium, maximum). The data come from the Annual School Censuses from 2009/10, 2013/14 and 2014/15.

Enugu's schools by level of ESSPIN intervention	Total	Min.	Med.	Max.	Sign.
Distance from local government authority	10.6	10.9	9.9	-	
Age of the school in 2014	52.5	50.6	56.4	-	*
Urban (%)	2.7	3.4	0.0	-	-
Nomadic (%)	0.0	0.0	0.0	-	-
Islamic (%)	0.0	0.0	0.0	-	-
Double shift (%)	0.25	0.12	0.5	-	
Had parent-teacher association in 2014/15 (%)	96.7	96.1	98.0	-	*
Had SBMC in 2014/15 (%)	87.4	83.1	96.0	-	*
PTR in 2009/10	20.0	21.0	18.0	-	*
PTR in 2013/14	19.4	20.0	18.1	-	*
PTR in 2014/15	17.2	17.6	16.2	-	*
% change in PTR between 2009/10 and 2013/14	16.9	18.7	13.3	-	
% change in PTR between 2013/14 and 2014/15	7.2	6.0	9.7	-	
Number of classrooms in 2014/15	5.5	5.1	6.3	-	*
Number of teachers in 2014/15	9.5	9.1	10.4	-	*
Primary enrolment in 2009/10	200.2	198.4	203.9	-	*
Primary enrolment in 2013/14	154.5	150.0	163.6	-	
Primary enrolment in 2014/15	145.6	139.7	157.5	-	
% change in enrolment 2009/10-2014/15 (%)	-1.76	2.38	-10.1	-	
% change in enrolment 2013/14-2014/15	1.8	2.07	1.26	-	
% of teachers with academic diploma/degree	61.4	62.0	60.1	-	
% of teachers with PGDE, BEd or MEd	30.9	30.5	31.8	-	*
% of teachers with NCE, Grade II or equivalent	63.6	64.1	62.6	-	
% of schools with a power source (grid/other)	8.4	5.8	13.7	-	*
% of schools with at least one toilet	22.5	21.2	25.1	-	
% of classrooms with enough seating	21.8	20.7	23.7	-	*
% of classrooms with a good blackboard	28.0	25.2	32.5	-	*
% of classrooms in good condition/minor repairs	54.8	54.0	56.4	-	*
Number of schools	1,229	820	409	0	

Notes: (1) * indicates a significant coefficient when running a linear or logistic regression of the variable of interest (dependent variable) on the number of years of ESSPIN intervention (independent variable); (2) the 'total' column includes schools that do not have an intervention code; (3) the pupil–teacher ratios shown in the table are calculated as the average PTRs for schools in the state ($\frac{\sum P_i/T_i}{N}$), and not the PTR for the state as a whole ($\frac{\sum P_i}{\sum T_i}$).

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	2014/15			2015/16			CS3
		L	T	SV	L	T	SV	L	T	SV		L	T	SV	L	T	SV		L	T	SV	L	T	SV	
Minimum (1)	820																								
Medium (2)	11							6	3	9		6	3	9	3		9								
Medium (2)	307													6	3	9				3	2	9	3	2	9
Medium (3)	91							6	3	9		6	3	9	3		9			3	2	9	3	2	9

Note: 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 4 intervention	Number of schools	2010/11			2011/12			CS1	2012/13			2013/14			CS2	2014/15			2015/16			CS3
		S	P	M	S	P	M		S	P	M	S	P	M		S	P	M	S	P	M	
No intervention	820																		1			
Pre-CS1	307									7		2			5	4	5					
Post-CS1	91				7		4		1			6	4		3	2	8					

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 Regression results – Pupil learning outcomes

Test	Treatment variable	Model	coefficient	SE	P value	N	R-squared
L2	pu_exposure	Simple model with survey weights	14.56	5.09	0.005	391	0.041464
L2	pu_exposure	No survey weights but clustered SEs	11.56	1.43	0	2836	0.064225
L2	Intervention_binary	Binary exposure variable	39.34	13.55	0.005	391	0.040507
L2	pu_exposure	Full covariates, survey weights	9.73	3.83	0.013	323	0.190225
L2	pu_exposure	Full covariates, no weights	9.52	4.18	0.025	323	0.143829
L2	intervention_binary	Full covariates	13.64	12.49	0.278	323	0.124831
L2	pu_dexp13	Lagged school-level learning outcomes	5.06	4.75	0.29	257	0.169127
L2	pu_dexp13	Lagged outcomes and covariates	6.47	6.28	0.308	201	0.227976
L4	pu_exposure	Simple model with survey weights	4.73	2	0.02	397	0.017715
L4	pu_exposure	No survey weights but clustered SEs	6.78	0.64	0	3202	0.098513
L4	intervention_binary	Binary exposure variable	28.07	8.67	0.002	397	0.035192
L4	pu_exposure	Full covariates, survey weights	6.59	1.76	0	327	0.167604
L4	pu_exposure	Full covariates, no weights	4.62	1.73	0.009	327	0.121874
L4	intervention_binary	Full covariates	22.06	7.72	0.005	327	0.118735
L4	pu_dexp13	Lagged school-level learning outcomes	3.39	1.66	0.045	262	0.063196
L4	pu_dexp13	Lagged outcomes and covariates	5.18	2.18	0.021	204	0.154093
N2	pu_exposure	Simple model with survey weights	-0.89	4.72	0.85	377	0.000165
N2	pu_exposure	No survey weights but clustered SEs	11.62	1.47	0	2801	0.057978
N2	intervention_binary	Binary exposure variable	-2.29	12.21	0.851	377	0.000157
N2	pu_exposure	Full covariates, survey weights	-2.04	4.86	0.675	310	0.105158
N2	pu_exposure	Full covariates, no weights	-1.14	3.68	0.758	310	0.058697
N2	intervention_binary	Full covariates	-14.79	12.87	0.254	310	0.064758
N2	pu_dexp13	Lagged school-level learning outcomes	-0.87	3.21	0.788	251	0.009128
N2	pu_dexp13	Lagged outcomes and covariates	-1.4	3.84	0.717	195	0.118339

N4	pu_exposure	Simple model with survey weights	5.49	1.81	0.003	390	0.022844
N4	pu_exposure	No survey weights but clustered SEs	6.9	0.7	0	3177	0.085963
N4	intervention_binary	Binary exposure variable	24.19	7.97	0.003	390	0.025146
N4	pu_exposure	Full covariates, survey weights	5.92	2.03	0.004	321	0.085163
N4	pu_exposure	Full covariates, no weights	4.26	1.83	0.023	321	0.090743
N4	intervention_binary	Full covariates	18.48	7.93	0.022	321	0.084723
N4	pu_dexp13	Lagged school-level learning outcomes	2.18	1.79	0.226	257	0.066577
N4	pu_dexp13	Lagged outcomes and covariates	2.55	2.36	0.285	201	0.09221