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Education Workforce Supply and Needs in Sierra Leone

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Executive Summary

This paper is the third in a series developed by Fab Inc. (on behalf of the Education Commission), to help the Teaching Service Commission (TSC) strengthen further the education workforce. It is part of the wider Education Workforce Initiative (EWI) and builds on the *Transforming the Education Workforce* report. Sierra Leone has been a key partner in this initiative. This work builds on a phase one scoping study that focused on options to strengthen the workforce. The other papers in this series cover: Education Workforce Management, Education Workforce Spatial Analysis, Education Workforce Recruitment and Matching and Education Workforce Costed Options.

Sierra Leone faces a multitude of challenges, many of which are a product of successfully expanding access to schooling across the country; combined with recovery from conflict, natural disasters, and Ebola. This has resulted in a disparity in qualifications and subject specialisms across the country. In order to resolve some of these issues it is important to consider the workforce supply and compare this against workforce needs, and the workforce demand – the latter being a subset of the need, determined by affordability.

With the support of the Ministry of Higher and Technical Education, we reached out to each of the Teacher Training Colleges (TTCs) to try and gain a greater understanding of the current supply of trainee teachers coming through the system. This data is shown by qualification and by year of study. It shows the dominance of distance learners within the teacher training system, with the vast majority of students studying at distance – over three quarters for all courses, and as high as 91% for the Teaching Certificate.

Using this data on the TTC enrolment, we are able to compare supply (current workforce and TTC enrolment) with the need. The new data and evidence estimate that without additional actions the supply of teachers will not be enough to meet the needs of a fully qualified workforce by 2023, and the supply of maths and science specialised teachers will likely never be enough to meet the needs at secondary level.

Having highlighted the shortfalls in both current and future supply, we investigate each stage of the circular flow affecting these issues, from weak pre-service teacher preparation and weak deployment of teachers leading to weak student learning outcomes and a weak pipeline of student teachers. At each stage, possible policy responses are identified.

For pre-service teacher preparation, the picture is complicated by the fact that as well as the TTCs, five other institutions also have responsibilities in this area. Many of these mandates overlap or have unclear boundaries in the area of education workforce preparation. Another key aspect is the suitability of TTC exams, with concerns in terms of low pedagogical content, low marks required to pass, and significant variation between

subjects. In particular, both science and maths have the lowest pass rate at NCTVA exams. Moreover, there is often a double deterrent for science entrants with an additional fee to cover practical lab experiments.

For both learning outcomes and the pipeline of future teachers, WAEC exam data shows that whilst the number of exam entrants is increasing, average pass rates are decreasing at both BECE (junior secondary) and WASSCE (senior secondary) level, particularly in core subjects, and that this further limits the potential for the teacher pipeline in general and for prospective teachers to go on to specialise in those core subjects.

In terms of deployment of teachers, as well as the spatial analysis aspects that are covered in another paper, issues are raised in terms of the early grade teaching and female teachers. In terms of gender, Sierra Leone has the 6th lowest share of female teachers in the world. The gender disparity in the workforce, and in the teacher training pipeline, is greater than in the flow of potential teachers that have completed WASSCE exams, suggesting there is a particular issue in terms of attracting female teachers into the teaching profession.

For early grades of primary, not only are there fewer teachers per pupils but the teachers that are there are more likely to have no qualifications, or lower qualifications, than at other levels. This is a particular concern given the strength of evidence on the importance of foundational learning.

Due to the circular nature of the issues, this will need a broad spectrum of policy responses to solve the issues highlighted above. As a result, we highlight a number of potential options throughout the paper and conclude by summarising the key recommendations of collaboration, TTC curricula and exam review, improving data systems and sharing, bolstering the workforce pipeline and gaining agreement on the desired education workforce.

Education Workforce Initiative Overview

This paper is the third in a series developed by Fab Inc. (on behalf of the Education Commission), to help the Teaching Service Commission further strengthen the education workforce. It is part of the wider Education Workforce Initiative (EWI) and builds on the *Transforming the Education Workforce* report. Sierra Leone has been a key partner in this initiative. This work builds on a phase one scoping study that focused on options to strengthen the workforce.

The second phase provides succinct evidence products on specific research areas to guide a policy dialogue on aspects of the education workforce in Sierra Leone, to be held in Freetown. Figure 1 summarises the relationship of these papers to each other:

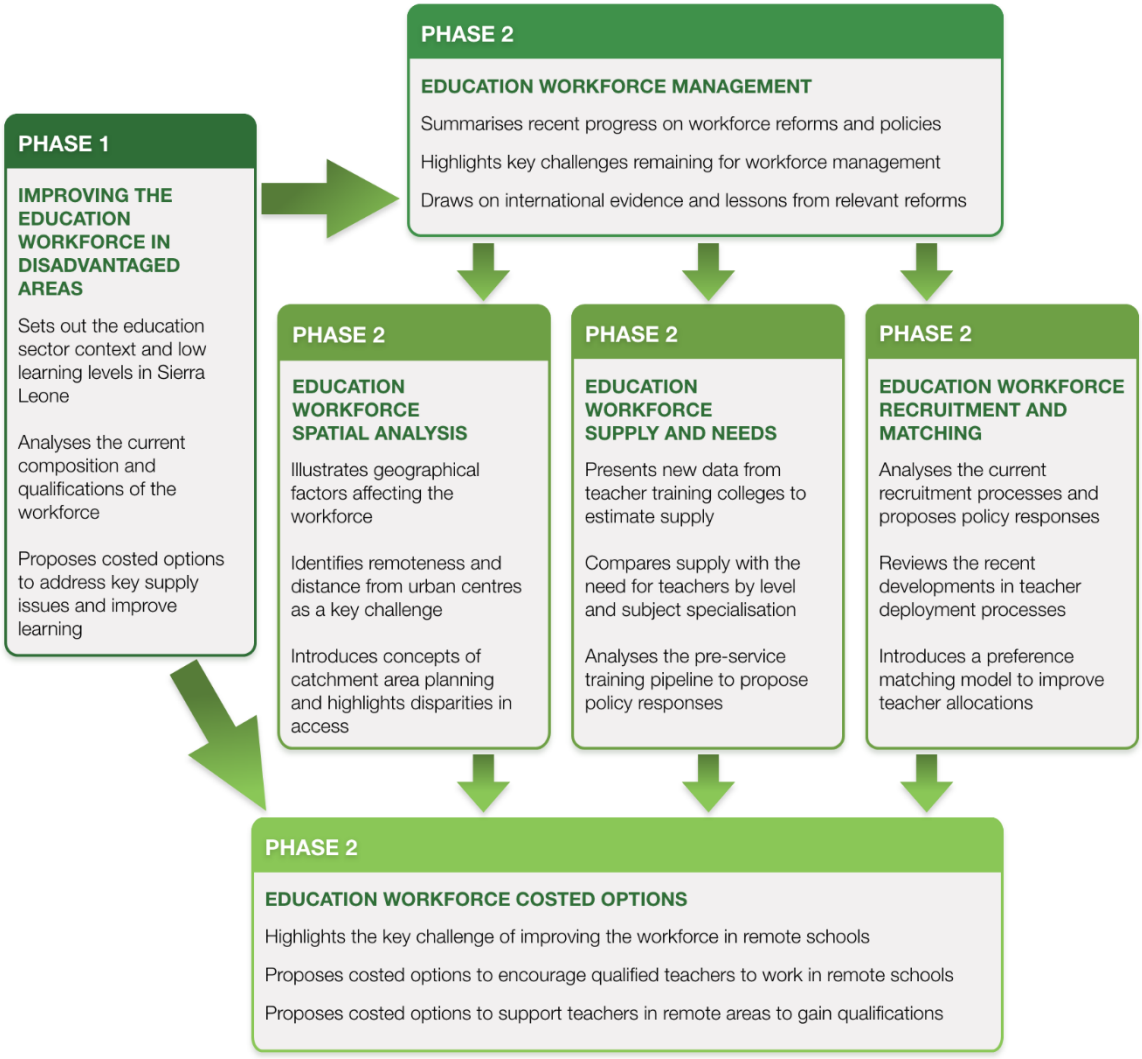


Figure 1: Education Workforce Initiative – Sierra Leone papers

Supply and Needs Overview

Sierra Leone has made significant strides in expanding access to education in recent years, initially in primary and, recently, with secondary as part of the Free Quality School Education (FQSE) policy. This expansion in access has occurred despite significant challenges of conflict, Ebola and limited resources. Compromises at the local level have led to a dilution of qualifications, often side-stepping the pre-service training process entirely.

Since its formation, the Teaching Service Commission (TSC) has undertaken a number of initiatives to professionalise the education workforce. However, this has typically focused on ensuring the attainment of qualifications, and less on the quality and nature of those qualifications. This paper investigates the current status of the education workforce, and then takes a detailed look at the future supply and needs of the workforce.

We distinguish between the workforce needs, and the workforce demand – the latter being a subset of the need, determined by affordability. This is an important distinction to make, particularly in resource-constrained contexts such as Sierra Leone where the need reflects the number and characteristics of the workforce required to meet certain targets or benchmarks, but the demand reflects the ability of the education system to afford this[1].

This paper examines the supply and needs for qualified and specialised teachers in Sierra Leone. It looks at the workforce supply chain and identifies possible policy responses to the challenge. We differentiate between ensuring sufficient quantity of teachers before looking at how the system can be strengthened to improve their quality.

We differentiate between needs at the primary and secondary levels of the system. Whilst this paper will still provide information on the primary level, the phase one report of the Education Workforce Initiative covers this in more detail. Here, we focus more on the needs at the junior and senior secondary levels, where the need has to take into account the different subjects taught at these levels, and for which new data has been accessed and analysed.

After comparing the supply and the need, we examine key areas in more detail by summarising the evidence underpinning the problem. We summarise any existing actions or policies in this space; and suggest additional cost-conscious policy levers the Sierra Leone government could consider for tackling the challenges within the system.

The five sections covered in this paper are:

Comparing Supply and Needs: sets out the key data sources, and new data collected, to map out and compare the supply and needs of the Sierra Leone education system, with particular consideration of the core subject specialisms at junior secondary and senior secondary level.

[1] For example, a system may need to hire 10,000 teachers to meet the necessary pupil-teacher targets but can only afford and therefore demand 5,000 teachers.

Pre-Service Training: looks at the pre-service training system and highlights some key areas for reform, with a particular focus on the mandates and accountability of the institutions involved in the system, and the methods of assessment of student teachers that are supplied.

Future Workforce Pipeline: looks further back at the potential pipeline into the pre-service training system using examination data from junior and senior secondary schools, and highlights how this affects the quantity and the quality of teacher training entrants.

Additional Supply and Needs Issues: this highlights some specific issues raised during the analysis that contribute to, and are exacerbated by, the ongoing challenges within the system including issues of early grades teaching, female teachers and the size of schools.

Conclusion and Recommendations: this brings together the key conclusions and policy options discussed throughout the paper and summarises the most pressing recommendations to improving the supply and meeting the needs for the education workforce in Sierra Leone.

1. Quantifying supply and needs

1.1 Overview of qualifications and specialisms

In order to understand the current levels of education workforce supply and needs within the system, it is important to first clarify how this data is collected, particularly as there appear to be different perceptions among stakeholders.

The data on current levels of teaching qualifications and subject specialisms (at junior secondary and senior secondary level) is retrieved from the 2018 and 2019 Annual School Census datasets. The 'Instruction Manual for School Respondents, Enumerators and Supervisors' provides the following guidance for completing these areas of the census:

- Highest Professional Qualification – 'Professional Qualification is a certificate awarded to an individual for successfully completing a teacher's course from a recognised teacher training college or a certificate in education awarded by a recognised university or polytechnic[2].'
- Subject(s) speciality – 'a teacher is said to be specialised in a given subject when he/she has completed a course for that particular subject and been certified by a renowned institution awarding the certificate.'

The distribution of professional, i.e. teaching, qualifications across the levels of education is shown in Figure 2 below, and highlights that there is a greater challenge in terms of unqualified teachers within the primary levels than secondary levels. Similarly, there is a large difference in the types of qualifications across levels, with a predominance of the basic Teachers Certificate (TC) at primary, compared to the Higher Teachers Certificate (HTC) and degrees at junior secondary and senior secondary level.

[2] This goes on to detail that 'If a teacher has a HTC and a B.Ed. his/her highest professional qualification is the B.Ed. On the other hand, if he/she has a HTC and a B.Sc. from a non-education college, his/her highest professional qualification is the HTC.'

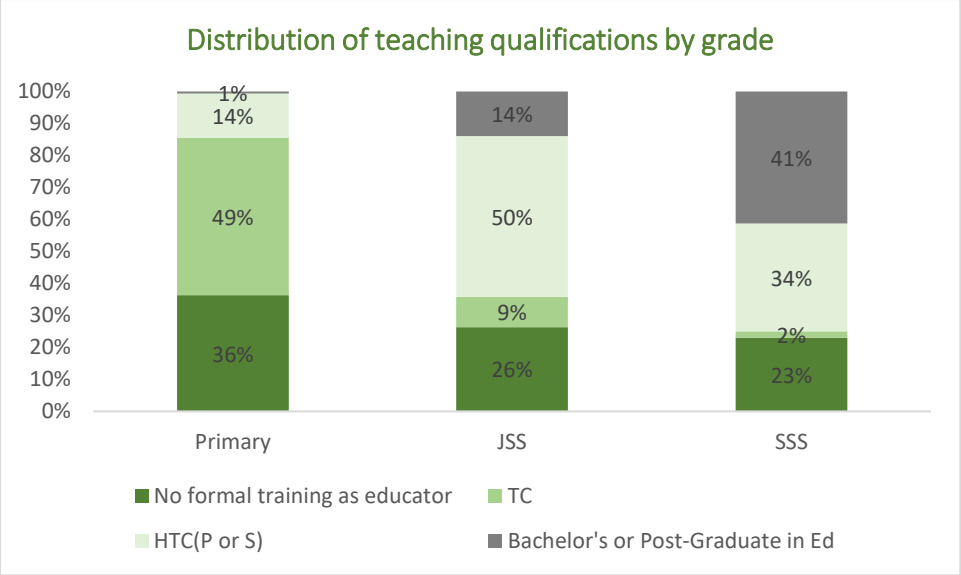


Figure 2: Teacher qualifications by grade

It is important to note that due to the time and financial constraints of the Annual School Census (ASC), the answers provided by the school respondents (usually head teachers on behalf of all their staff) are not verified by the enumerators and they do not ask to see the certificates confirming these qualifications and subject specialisms.

Typically, these specialisms are attained whilst studying for the Higher Teaching Certificate (Secondary) and above, although there are exceptions. These specialisms are usually decided at entry or early on in the enrolment at teacher training colleges. When graduating, the subject specialisms are clearly stated on the certificates[3].

However, during the ASC process, even teachers that are without teaching qualifications at all, or the basic TC, are able to answer as having a subject specialism. Therefore, whilst it is technically an objective measure of certificates, it is currently possible for subjective answers of vague teacher preference to be entered. We therefore clean the data to remove these subject specialisms, without having HTC or above qualifications, throughout this analysis.

Due to the observations in Figure 2, and also due to the subject-separated nature of teaching in secondary, we distinguish between the overall need for teachers, and in particular qualified teachers, in primary, and the need for subject specialist teachers (by definition also qualified) at junior secondary and senior secondary level.

[3] For example, 'This is to certify that [Teacher's Name] attended this College from [Year] to [Year] and pursued a three (3) year Programme for the Higher Teachers Certificate in Secondary Education, in the *[Subject Specialism]* Department… [Teacher's Name] having satisfied the Examiners and fulfilled all the requirements is awarded the Higher Teachers Certificate (Secondary) with a [Grade]'.

1.2 Compiling Supply Data

With the support of the Ministry of Higher and Technical Education, we reached out to each of the Teacher Training Colleges to try and gain a greater understanding of the current supply of trainee teachers coming through the system. We received comparable enrolment data on the TC, HTC(P), HTC(S) and BEd qualifications from four of the six TTCs[4] for both conventional and distance learners.

The data received was not completed in the same level of detail or format from every institution. For example, some institutions did not provide data disaggregated by gender or by subject. The data as it was received is summarised in Appendix A.

For the purposes of this analysis, as we had received data from four of the six TTCs, we multiplied the enrolment data by 1.5 to estimate the national supply, under the assumption of similar enrolment numbers across Teacher Training Colleges. Where data was lacking on gender or subject as mentioned above, we extrapolated this from the data we did have, again under the assumption of similar enrolment by gender and subject. Finally, where trainee teachers were studying two subject specialisms (making up approximately 5% of total HTC(S) enrolment) this was treated as 0.5 enrolment in each subject.

Table 1: Extrapolated estimates of total TTC enrolment using the data received from 4 TTCs

Qualification	Male	Female	Total	% Distance	% Female
TC	3563	2616	6179	91%	42%
HTC P	1483	1124	2607	91%	43%
HTC S	3251	1237	4488	78%	28%
BEd	880	286	1166	0%	25%
Total	9176	5263	14440	80%	36%

This data is shown by qualification and by year of study. It shows the importance of distance learners within the teacher training system, with the vast majority of students studying at distance – over three quarters for all courses, and as high as 91% for the Teaching Certificate. A perception exists that graduates of distance learning courses are of lower quality than counterparts who attend colleges in person. Analysis of 2017 NCTVA exam results suggests there is very little difference between the two pathways. In 2017, pass rates of NCTVA exams were 68% for conventional and 65% for distance learners, whilst a higher proportion of distance learners passed with the higher DIV1 and DIV2 grades[5] at 5% of the conventional cohort and 7% for distance learner cohort.

By subject specialisms, there is a very low share of students that are studying maths, English and Science at HTC(S) and BEd level. In contrast, there is an over-abundance of

[4] Enrolment data was gratefully received from: Freetown Teachers College, Milton Margai College of Education and Technology, Ernest Bai Koroma University of Science and Technology and Eastern Polytechnic Education Center.
[5] Passing grades at NCTVA exams consist of DIV1 (0.04% of total entrants), DIV2 (6.31%) and DIV3 (60.07%).

Social Studies and Business Studies students in particular. This lack of supply in key subjects will be compared to the need in the section below.

Table 2: Extrapolated estimates of Total HTC(S) and BEd enrolment at TTCs by subject and gender using the data received from 4 TTCs

Estimated Enrolment by Subject[6]	HTC(S)			BEd		
	Number studying	Subject share of course	Female share of subject	Number studying	Subject share of course	Female share of subject
Maths	104	2%	13%	39	3%	0%
English	317	7%	25%	92	8%	57%
Science	329	7%	12%	35	3%	0%
Social Studies	1536	34%	19%	358	31%	21%
Business Studies	1123	25%	43%	119	10%	30%
Agriculture	580	13%	26%	362	31%	12%
RME	225	5%	24%	0	0%	0%
Other	272	6%	43%	160	14%	50%
Total	4488		28%	1166		25%

The share of women studying HTC(S) and BEd, and particularly STEM subjects, is noticeably low. Only 28% of HTC (S) students and 25% of BEd students were female. Equally, when we look at this by year (excluding BEd which are four years), we find far fewer women in the third year than men. Overall, while we cannot say if this is due to differences in enrolment three years ago, or differences in drop out, it is worth investigating more as increasing gender balance is key to improving the share of female teachers going forward. This will be referred to in more detail in Section 4.1.

1.3 Estimating Needs

At the primary level, teacher need can be simply estimated by the difference in teachers between the current pupil-teacher ratio and the targeted pupil-teacher ratio. However, as highlighted in the Phase 1 report and the Spatial Analysis paper, this aggregate figure can hide significant variation at the more granular level.

A more useful estimate of the needs uses the disaggregated data by grades and by schools, and a maximum class size to identify how many more teachers are required to

[6] Note: Maths includes Maths with Computing (BEd only) English includes Literature and 'Language Education (General)' (BEd only), Science includes Integrated Science, Biology, Chemistry and Physics, Social Studies includes History, Government, Economics, Geography and Agriculture includes Agricultural Science, 'Community Development Studies / Agriculture' (BEd only) and Corn Studies.

ensure that no individual class exceeds this target. The 2019 'Teacher Deployment & Incentives in Sierra Leone' report cites evidence from 'i) the draft government policy document on targets 2019, ii) data from the World Bank for comparable countries and groups, and iii) from the focus group discussions' as targeting maximum class sizes of 30. However, the maximum class size target is not yet officially defined, and other documents seen by the team suggest that this target is still being debated, so we also show for a maximum class size of 40.

The benefits of using maximum class sizes over pupil-teacher ratios can be highlighted in an example of a primary school that has 50 pupils per grade, and currently has one teacher per grade. Using pupil-teacher ratios to reach an example target of 30:1 at the school level, the need would be 4 extra teachers[7]. However, if these teachers are received, this would still result in two grades with a class size of 50[8]. In contrast, using maximum class sizes the need would be 6 extra teachers and no class would exceed the maximum class size of 30.

At the secondary level, the picture is more complex. At its simplest, for example, it is easy to identify how many schools didn't have any specialists in the required core subjects as in Table 3. This is the method used in the Spatial Analysis paper in illustrating potential spatial solutions to mitigating shortages.

Table 3: Share of secondary schools without core subject specialists (Source: 2019 ASC)

Junior Secondary School		**Senior Secondary School**	
Core Subject	*Schools without a specialised teacher*	*Core Subject*	*Schools without a specialised teacher*
Maths	31% (507)	Maths	21% (129)
Language Arts (English)	22% (360)	English Language	4% (26)
Integrated Science	33% (535)		
Social Studies	19% (305)		

This method shows that the greatest need currently comes at Junior Secondary School, and for maths and science[9] subjects in particular, with nearly one third of schools having none of these specialist teachers. For English and social studies, one in five schools had no specialists. At Senior Secondary schools, these gaps are not as large, but of the two core subjects, maths again has a greater proportion lacking specialists than for English.

While it is simple to say which schools are entirely lacking in given specialists, it is more complex to estimate need – as this requires information on timetabling, and the size of the school. To facilitate this analysis, we developed a simple model of subject specialisms and school size based around a maximum class size. Similarly with primary, we use the

[7] Calculated by ((60pupils*6 grades)/30)-6 teachers = 4 extra teachers needed
[8] Assuming no mixing of students across grades.
[9] Making up a key part of the STEM (Science, Technology, Engineering and Maths) subjects that are particularly important in the 21st Century economy.

maximum class size of 30 for this estimation. The methodology of this is explained in more detail in Appendix C.

For this secondary analysis we also use the 2018 Annual School Census data due to the greater disaggregation of subject specialism (20 options for both JSS and SSS in 2018, rather than 8 for JSS and 12 for SSS in 2019). The number of teachers does not change drastically between the years.

We estimate two figures of need – the first looks at the current enrolment. The second estimates if the Net Enrolment Rate (NER) reaches 100%, i.e. if all those of secondary school age were enrolled in secondary schools.

1.4 Comparing Supply and Needs

Having explained the sources, methodology and assumptions behind the data, we can therefore present the number of teachers being supplied and those that are needed, as well as making comparisons between them. This is again presented differentiated at the primary level and the secondary level. As the supply of secondary teachers is likely to flow into both junior and senior secondary (despite a preference for degree qualifications particularly at upper secondary), these are combined into an overall secondary level here (see Appendix D for disaggregations by junior and senior secondary).

This is shown for primary in Table 3 below, highlighting that current levels of teacher supply and needs will not be sufficient to meet the aims of maximum class sizes and a fully qualified teaching workforce by 2023. In order to work faster towards these goals, options to support unqualified teachers to gain qualifications such as those costed and proposed in Phase 1 can be considered. The comparison of supply and needs under different assumptions of needs is shown in Appendix B; in no scenario does the supply meet the need for a fully qualified workforce by 2023.

Table 3: Comparing Supply and Needs at the Primary Level (non-private schools)	
Current Supply of Teachers	40,336
Current Supply of Qualified Teachers	25,577
Total Need Estimate 1 (maximum class size of 30)	70,304
Total Need Estimate 2 (maximum class size of 40)	57,365
Extra Need	
Estimate 1: Additional teachers required to meet maximum class size of 30 (qualified teachers only)	46,256[10]
Estimate 2: Additional teachers required to meet maximum class size of 40 (qualified teachers only)	34,285
Additional Supply	
Currently in the 3 year TC and HTC(P) programs	8,786
Average per year (e.g. above divided by 3)	2,929
Comparison	
Number of years until Estimate 1 would be met (assuming no dropout, attrition or retirement)	16
Number of years until Estimate 2 would be met (assuming no dropout, attrition or retirement)	12

[10] Note these estimates of extra need are slightly larger than Total Need minus Current Supply due to the occasional oversupply of teachers within and across schools. The Phase 1 report highlights the increase in efficiency possible through redistributing teachers within and across primary schools.

Table 4 compares the need against current supply by subject. This is shown for junior secondary and senior secondary combined. These are shown separated for each level in Appendix A. While it is useful to look at the 'now', we follow the wider EWI report and try to also look at this for the future – here we calculate spatial estimates of relevant populations within each school catchment area to estimate need to cover a system of universal access to 12 years of schooling, in line with the SDGs, i.e. with a net enrolment rate equal to 100%.

We find substantial gaps in subject specialists, with the exception of Social Studies and 'other' subjects which includes languages, home economics, religious and moral education, PE and creative arts. For 'other', even treating this as two subjects worth of need, we find there are more teachers than should be needed by the timetabling estimates.

Currently at secondary level there are only about half the required numbers of maths and science specialists. If all secondary school aged children are enrolled then the current number of specialists would only cover 27% and 34% of the need.

Table 5 then takes the shortage under each estimate in Table 4 as the need that is additional, and maps this against the future supply coming through the teacher training schools. This takes the HTC(S) enrolment and the BEd enrolment estimated in section 1.2 and divides this by the number of years of each course (3 years for HTC(S), 4 for BEd) to estimate the total number of subject specialists being produced on average each year. For example, only 45 specialist maths teachers are currently estimated as being produced each year (assuming full graduation and no dropout during the teacher training courses). The number of years it would take to meet the need is also visualised in Figure 3 after the tables.

Table 4: Current Supply and Needs at Secondary level (Junior Secondary and Senior Secondary combined)								
		Maths	English	Science	Social Studies	Business Studies	Agriculture	Other
	Current Supply	1714	3299	2153	4842	1789	1940	5126
Estimate 1: Now	Total Need	3474	3474	3474	3474	2282	2282	4564
	Shortage	1760	175	1321	-1368	493	342	-562
	% Covered	49%	95%	62%	139%	78%	85%	112%
Estimate 2: At full NER	Total Need	6365	6365	6365	6365	4127	4127	8254
	Shortage	4651	3066	4212	1523	2338	2187	3128
	% Covered	27%	52%	34%	76%	43%	47%	62%

Table 5: Comparing the TTC enrolment (additional supply) to the shortage (extra need) estimated in Table 4							
	Maths	English	Science	Social Studies	Business Studies	Agriculture	Other
Additional Supply							
Currently in the 3 year HTC(S) programs	104	317	329	1536	1123	580	498
Currently in the 4 year BEd program	39	92	35	358	119	362	160
Average per year - sum of HTC(S) divided by 3 and BEd divided by 4	45	129	119	602	404	284	206
Extra Need							
Estimate 1: Now	1760	175	1321	-1368	493	342	-562
Estimate 2: At full NER	4651	3066	4212	1523	2338	2187	3128
Comparison of Additional Supply and Extra Need							
Number of years until Estimate 1 would be met (assuming no dropout, attrition or retirement)	40	1	11	-2	1	1	-3
Number of years until Estimate 2 would be met (assuming no dropout, attrition or retirement)	104	24	35	3	6	8	15

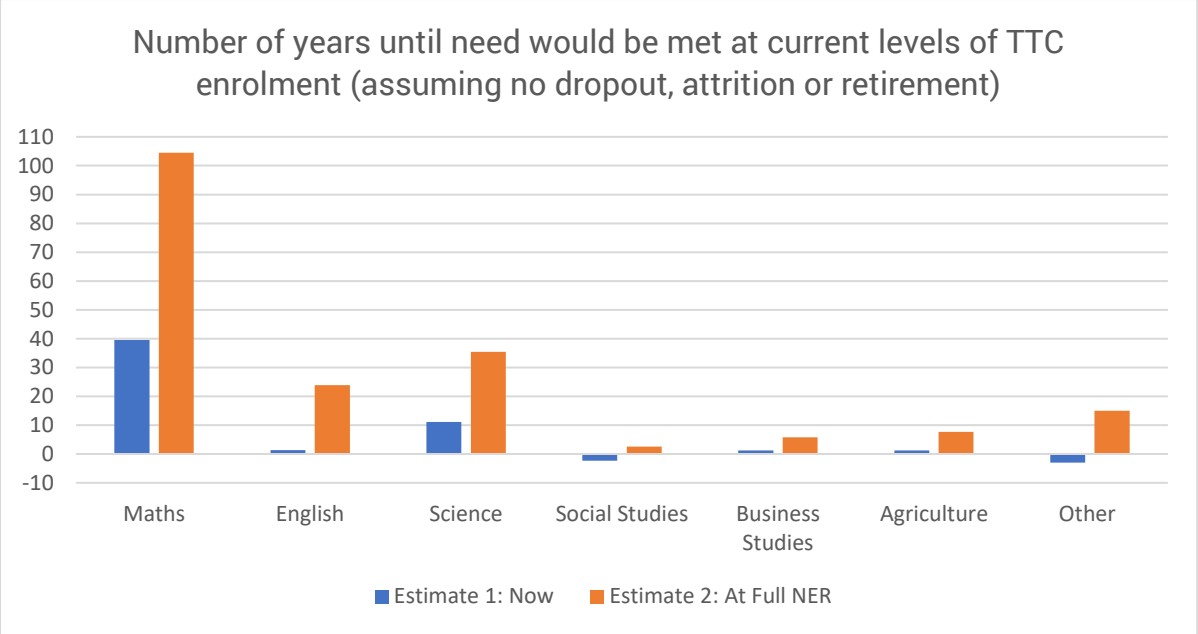


Figure 3: Number of years until need would be met at current levels of TTC enrolment by subject

Figure 3 visualises these assumptions to show that even under the unrealistically optimistic scenario of full completion of teacher training courses, and no attrition or retirement of existing specialist teachers, it would take 40 years to meet even the current need of maths specialists and 11 years for science. In other words, it is unlikely that the need of maths and science specialists will ever be met under the current levels of enrolment in subject specialisms at teacher training colleges.

2. Pre-Service Training

The previous section has highlighted an urgent need to correct the disconnect between the supply, and needs of the workforce. In this section we highlight some of the associated policy issues, and systemic issues which underpin these and try to suggest potential policy solutions and areas for consideration.

2.1 Accountability of TTCs and other institutions

2.1.1 Context and Evidence

While TTCs are responsible for designing and delivering training to new entrants to the education workforce that they have selected, they are not the only institutions involved in pre-service teacher preparation. Five other bodies have responsibilities in this area:

- The Tertiary Education Commission (TEC) governs TTCs as providers of further education;
- The Ministry of Training and Higher Education (MTHE) governs all higher education institutions;
- The National Council of Technical, Vocational and other Academic Awards (NCTVA) is responsible for quality control of training courses;
- The TSC is responsible for licensing new teachers and deploying them in the workforce;
- The Ministry of Basic and Senior Secondary Education (MBSSE) is responsible for learning in schools.

Many of these mandates overlap or have unclear boundaries in the area of education workforce preparation. This is not an uncommon issue in public service delivery systems, but can, if not well managed, result in contradictions in policy, or gaps, or both. In the case of TTCs and preparation of the education workforce, it is clear that:

- Learning outcomes in senior secondary schools, managed by MBSSE, are generally weak (see Section 3). This contributes to a pipeline of poorly prepared candidates entering TTCs;
- Governance and oversight of TTC operation, courses and learning assessments, severally the responsibility of TEC, MTHE and NCTVA is weak. This contributes to low and variable quality in pre-service training provision;
- The TSC currently focuses on building compliance to legally required qualifications for entrants to the workforce, rather than questioning the underlying integrity of those qualifications.
- There is little or no incorporation of TSC policy documents such as the '2017 Professional Standards for Teachers and School Leaders in Sierra Leone' into the teaching practices or curriculums at TTCs.

Some of these issues are understandable, given the history of the sector and Sierra Leone, the complexity of fixing a sector like education, and individual institutional interests. However, strengthening collaboration will be key to improving the pipeline of new educators.

2.1.2 Policy Responses

We recommend exploring four further policy responses. These will require cross-institutional working and are likely to be politically highly sensitive. One features as a policy response that is also linked to other areas (marked with a ^).

1. **Establish a Memorandum Of Understanding (MOU)^** – A succession of consultants and advisers have recommended establishing an MOU between the six institutions identified above to clarify mandates and responsibilities, and for mutual holding to account to maintain and improve standards in pre-service teacher education. This has proved difficult to discuss and implement to date. We recommend revisiting this as part of the wider Governance discussions under the new leadership in the Ministry.
2. **Greater engagement with TTCs to ensure that supply is meeting the need** – As highlighted above, there has currently been little interaction between the TTCs and TSC/MBSSE around the attributes and professional standards of teachers that are needed. Greater alignment would benefit all sides, including TTCs and their students. For example, in Nigeria, the Teacher Development Programme is institutionalising relationships in each state between the colleges of education and the State University Basic Education Board (SUBEB) to ensure that colleges are training teachers to meet the subject, level, and skills needs of the SUBEB.
3. **Establish an annual TTC ranking:** One way to drive up standards and accountability would be to review and rate the quality of all six institutions on an annual basis. Ranking places where candidates can go to gain a teaching qualification would likely have some effect on the distribution of applications and therefore increase incentives to improve in the TTCs. Another option would be to produce a rating system for all higher and further education institutions in Sierra Leone and include TTCs in this. The recent census of higher education institutions undertaken by MTHE as part of the Education Sector Analysis could provide a basis.
4. **Rationalise institutional players in this space –** As highlighted above, six separate institutions have responsibilities in the area of pre-service training (TTCs, TEC, MTHE, NCTVA, TSC, MBSSE). In the medium term, it is worth considering the skillsets and capacity of each institution, as it may be more efficient and effective to reduce the number of institutions involved, rather than rely on a self-policing MOU.

2.2 Quality of Student Teacher Assessments

2.2.1 Context and Evidence

The NCTVA is responsible for designing and administering Teaching Certificate and Higher Teaching Certificate examinations for those who have studied in TTCs (see above). Review of these learning assessments, the results of which drive TSC's selection and licensing of new entrants to the profession, is significantly overdue.

One issue is that the proportion of marks required to pass the exams are very low, at just 35% for TC and 40% for HTC. This is further complicated as 45% of the marks are awarded internally by TTCs and 55% by NCTVA exams. Theoretically, this means it is possible that someone could achieve 0% in the NCTVA exams but still pass through the internal marking. Whilst there is no evidence this is happening, discussions with TTCs appear to show a higher rate of passing the course overall, than in the NCTVA component of the exams suggesting that this is a potential loophole that is worth closing.

The most recent attempt to look fundamentally at TC and HTC exams was planned as part of a 2009 IRC-funded program. There was a specific focus within this on facilitating a move towards assessing teaching skills as well as subject content. However, this work did not materialise, and so NCTVA personnel were not trained in assessing competence focused courses. Therefore, NCTVA appears to be drawing on a considerably outdated question bank for these exams.

The team studied a sample of NCTVA exam papers covering four subjects and noticeable differences in content and difficulty. There was a significant range in the intensity of the pedagogical component. The majority of papers do not include any questions related to pedagogy or teaching methods at all, or include weakly defined pedagogical questions; while a minority do include relatively challenging questions on pedagogy and teaching methods.

The over-reliance on technical content questions, over pedagogical questions, within the NCTVA exams is not necessarily surprising given the majority of the courses that NCTVA examines are of a technical nature (such as for motor vehicle mechanics). However, this is being reflected in the teaching at TTCs, with a low focus on pedagogical content and a lack of in-classroom experience. The importance of teacher training within the education sector and wider national priorities will likely require greater support, or specialisation, in the examination process.

2.2.2 Policy Responses

We recommend exploring two further policy responses. This will require cross-institutional working and a level of capital investment (marked with an *) to achieve.

1. **Establish a Memorandum Of Understanding (MOU)^** – As with the issue of institutional accountability, this is an area that would benefit from revisiting the possibility of an MOU or similar agreement (see above), in this case between the TSC, TTCs and NCTVA specifically to ensure suitability of assessments.

2. **Plan and deliver a combined review of TTC curricula and HTC/TC examinations*^**: Ensuring alignment between what is taught in TTCs and what is examined when deciding whether to award a teaching qualification is fundamental. At the same time, a review of the teaching assessments could take on the issue of including teaching skills in exams, as well as lead to development of a new bank of exam questions and topics. This is an area with strong potential to involve development partners planning new investments in the sector in Sierra Leone. For example, Transforming Teacher Education and Learning (T-TEL) in Ghana works to change delivery of pre-service education, including increasing opportunities to teach in classrooms throughout the course rather than just in the final year and developing curriculum in conjunction with key stakeholders (T-TEL, 2020).

2.3 Variation in difficulty between subjects makes STEM courses less attractive

2.3.1 Context and Evidence

As highlighted above, the sample of NCTVA exam papers studied varied considerably. This inconsistency was also noticeable in the subject knowledge-based questions. Questions in STEM subjects are consistently more difficult than those set in social sciences. Table 6 illustrates this comparing the first questions for TC Religious and Moral Education, with the HTC (Primary) Environmental Science. The science questions are relatively harder, and also significantly more complex than would be required to teach primary grade students, even accounting for the difference between TC and HTC qualifications.

Table 6: First Questions from Sampled NCTVA Exam Papers	
TC Religious and Moral Education 2019	**HTC (Primary) Environmental Science 2019**
1a. State two (2) merits of Christian marriage.	1a. Write the chemical symbol of the compound tetra-oxosulphate vi acid.
1b. State four (4) sources of belief systems as presented by the main religions of Sierra Leone.	1b. Give the SI unit of the velocity ratio of a machine.
1c. What is the Holy Bible?	1c. Plasmolysed cells are often surrounded by [-] solutions.
1d. Give two (2) reasons why Jesus taught in parables.	1d. What is the relationship between chlorine-37 and chlorine-35?

The data on low enrolment in STEM subjects highlighted in Section 1 is borne out by the NCTVA exam data received by the team, which confirmed that student teacher entrants are much lower for STEM subjects that for Social Science. However, this is also confounded by the lower pass rates in these subjects as shown in Figure 4, which are noticeably lower for

maths and science than other subjects and is consistent with the content being more difficult.

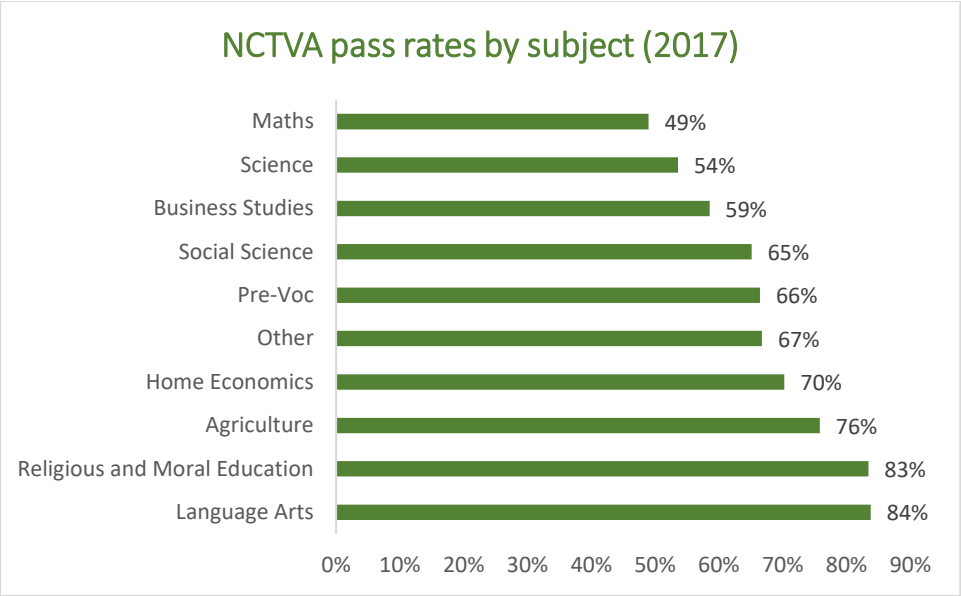


Figure 4: NCTVA exam pass rates by subject

In discussions with the review team, students and TTCs raised the higher difficultly levels as a reason why there are low enrolment rates in STEM subjects. We are not aware of any existing policy response on this issue in recent years. While we are not suggesting that standards be arbitrarily lowered, it is worthwhile reviewing the content to ensure it is at a level that is necessary for the curriculum requirements and that it combines both foundational knowledge as well as pedagogical approaches relevant to the context.

In the case of science specialisation, we also find a further deterrent that TTCs often charge additional fees (up to 30% above the tuition cost) to cover 'laboratory and practical experiment' costs. In many cases, discussions revealed that student teachers do not feel they see any return on this in terms of equipment or examples.

Finally, discussions with the TTCs also highlighted the fair degree of influence that they have over the subject specialism choices of their students, which tend to be agreed in discussions between the TTCs and their student teachers, often based on the previous grades of the students. There is currently no interaction of this choice with country need.

2.3.2 Further Policy Responses

We recommend exploring three policy responses in this area. These will require cross-institutional working and a level of capital investment to achieve. Both also feature as policy responses in other areas.

1 **Plan and deliver a combined review of TTC curricula and HTC/TC examinations*^**: Ensuring alignment between what is taught in TTCs and what is examined when deciding whether to award a teaching qualification is fundamental. At the same time, a review of learning assessments could take on the issue of including teaching skills in exams, as well as leading to development of a new bank of exam questions and

topics. This is an area with strong potential to involve development partners planning new investments in the sector in Sierra Leone.

2 **Broadening the scope of this review of NCTVA exams to include consideration of (a) alignment with the curriculum to be taught by candidates in the future; and (b) ensuring equivalence across subjects*^**: Just as it is important to ensure there is a strong link between what is taught in TTCs and the exams student teachers take to gain qualifications, so it is equally vital to ensure alignment between pre-service training and the work educators will do in the future. This will be a critical step in strengthening the supply chain at this stage, and also in the area of improving learning outcomes in schools. Similarly, work is needed to ensure NCTVA exams all include appropriate questions covering subject knowledge, pedagogy and teaching methods, and are equivalent in terms of difficulty across all subjects. This is important to remove one obstacle to the supply of science and maths teachers in particular.

3 **Greater engagement with TTCs to ensure that supply is meeting the need^** – By highlighting the current shortages in subjects such as maths and science, TTCs could use their influence over subject specialism choices and emphasise the potential benefits in terms of job security and future policy prioritisation to encourage greater enrolment in these subject specialisms.

3. Future Workforce Pipeline

As well as the immediate pre-service training, another important aspect of education workforce supply concerns the future workforce pipeline of school students into student teachers. Whilst clearly a circular issue, a lack of focus on the issue of the future workforce pipeline can lead to significant bottlenecks in the future.

3.1 Performance in Secondary School Exams

3.1.1 Overall Entrants and Performance

Data was received for 2017-2019 from the West African Examinations Council (WAEC), which governs the lower secondary (BECE) and senior secondary (WASSCE) exams. Sierra Leone has seen a significant rise in the number of exam entries at both BECE and WASSCE levels between 2018 and 2019, partly as a result of the Free Quality School Education (FQSE) policy. However, this impressive feat of administration has not been matched in terms of qualifications attained by students.

Figure 5 compares three years of BECE exam entries, passes and pass rates. Between 2018 and 2019, entries increased by 22.5%. However, there were more than 27,300 fewer passes in 2019 than in 2018, and the overall pass rate, steady at 70% in 2017 and 2018 fell to just 54% of entries. Working on the assumption that the average entry is for 8 subjects, this suggests more than 20,000 additional students sat BECE exams in 2019 than was the case the previous year. Using the same assumption, the 2019 results imply that the average student entering BECE exams passed 4.3 of their subjects. By comparison, the 2018 results suggest the average student entering BECE exams passed 5.6 of their subjects. While far from conclusive, this finding suggests it will be important to ensure the Free Quality School Education policy does not have unintended consequences for learning outcomes as has been the case in many countries seeking to expand access to school quickly and at scale.

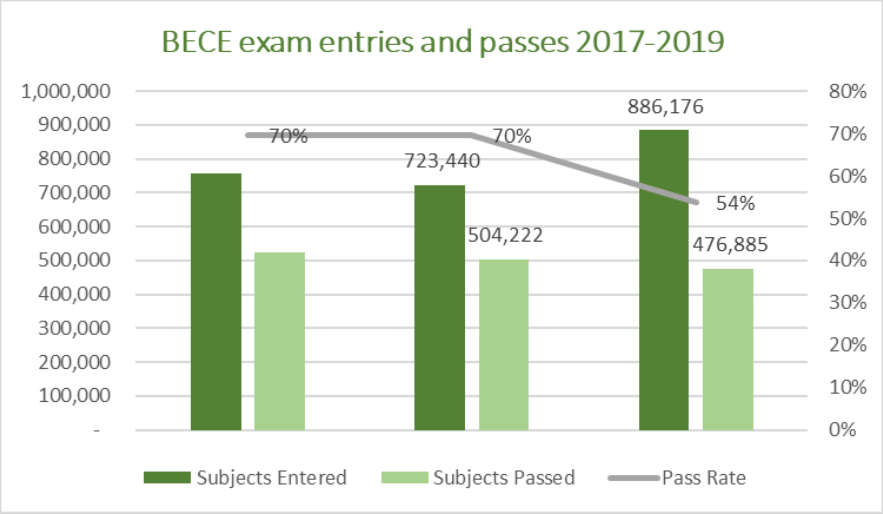


Figure 5: BECE Exam entries and passes 2017-2019 (Source: WAEC data)

The situation is even more marked at WASSCE level. Figure 6 compares the same three years. Between 2018 and 2019, there was a massive 243% increase in the number of entries, reflective of the policy decision to reduce senior secondary school grades from four to three. But total passes only increased by 104,421, and the overall pass rate, very low but steady in previous years, dropped 8 percentage points to 18%. Working on the assumption that the average entry is for 8 subjects, this suggests more than 88,500 additional students sat WASSCE exams in 2019 than was the case the previous year. Using the same assumption, the 2019 results imply that the average student entering WASSCE exams passed 1.5 of their subjects. By comparison, the 2018 results suggest the average student entering WASSCE exams passed 2.1 of their subjects.

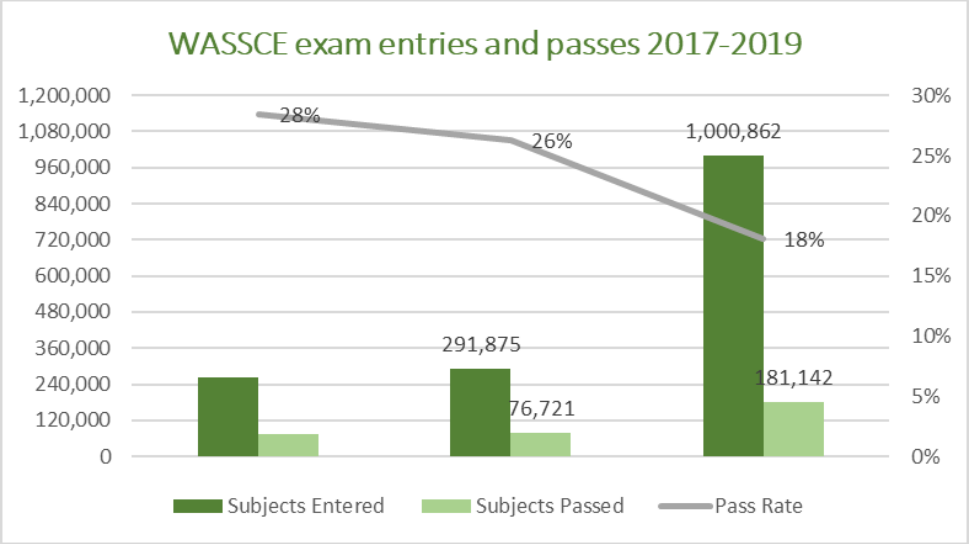


Figure 6: WASSCE Exam entries and passes 2017-2019 (Source: WAEC data)

Setting aside specific questions and circumstances around the 2019 exams[11], these average levels of qualifications gained per student are concerningly low. As discussed in more detail later in this section, entry to a TTC to study for a teaching qualification requires five WASSCE credits at a minimum, and these requirements are less stringent than for other higher education options. Based on these data, the average student graduating from senior secondary school is far from prepared or qualified to enrol as a trainee teacher.

3.1.2 Performance in Core Subjects

In Section 3 we discussed shortages of specialist teachers in core subjects. However, this is not the only reason performance at WASSCE level in maths and English language is

[11] The team notes significant and concerning variations in year-to-year pass rates for specific core and non-core subjects at BECE and WASSCE level. While this paper is not the place to investigate this in detail, it is difficult to explain why, for instance pass rates for BECE maths dropped from around 85% in 2017 to 31% in 2019. Both core subjects at WASSCE levels have seen dramatic reductions in pass rates between 2017 and 2019, reaching 5% (maths) and 3% (English language) in 2019. While the FQSE policy may have some impact, and in the case of WASSCE some of this may be attributable to the impact of shortening the senior secondary school period, it seems unlikely these are the only causes.

important. These are markers of the functional numeracy and literacy of future teaching candidates, and without credits in these two core subjects, students are not considered to have passed the WASSCE at all. The pass rates of 5% and 4% respectively in 2019 are therefore deeply concerning, as shown in Table 7 below. This also shows the WASSCE results in science are similarly concerning.

Table 7: 2019 WASSCE results in maths (Core), English (Core) and science subjects			
2019 WASSCE	Numbers Entered[12]	Numbers Passed	Pass Rate
Maths (Core)	115,098	5,592	5%
English Language (Core)	115,098	4,182	4%
Biology	49,226	323	1%
Chemistry	24,790	554	2%
Physics	21,584	933	4%

Even if all those who passed maths but failed English made up their requirement with an equivalent qualification (as discussed later in this section), the maximum possible pool of senior secondary school graduates who could be eligible to enter a TTC from the class of 2019 is 5,592. Moreover, this number has fallen from 9,140 in 2018 and 13,045 in 2017 as shown in Table 8.

Table 8: 2017-2019 WASSCE passes in maths (Core), English (Core) and science subjects			
Numbers Passed	2017	2018	2019
Maths (Core)	13,045	9,140	5,592
English Language (Core)	11,437	4,875	4,182
Biology	2,988	328	323
Chemistry	2,590	1,258	554
Physics	1,131	1,807	933

This is also the likely maximum pipeline for English and maths specialist teachers. Given competition from other, often more lucrative or prestigious options for top performers, this illustrates a concern of the pipeline for student educators in general, as well as for core subject specialists who are in particularly weak supply.

3.1.2 Policy Responses

The Phase 1 report of the Education Workforce Initiative recommended and costed two options for improving learning of core subjects. These were described at the primary level, where benefits in foundational learning could help to flow through the system, but could also be adapted for the secondary level:

1. **Use technology to get expert teaching into rural classrooms** – Based on both international evidence, as well as success in Sierra Leone during the Ebola crisis,

[12] Approximately 97% of the candidates that were entered actually sat the exam, consistent across subjects.

highly accomplished teachers record high-quality audio lessons focused on foundational skills in numeracy and literacy. Recorded audio lessons are distributed to teachers by SD card. The teachers receive coaching and act as facilitators during the lessons.

2. **Boost learning outcomes through intensive remedial study camps** – Building on the Teaching at the Right Level literature, highly accomplished teachers, trained in remedial teaching, lead in-school learning camps, supported by teams of teachers. These learning camps focus on the key foundational skills in numeracy and literacy.

Moreover, the associated Education Workforce Spatial Analysis paper highlights another policy that can help to provide key subject specialists to boost core subject teaching:

1. **Sharing under-utilised subject specialists across nearby schools in need** – Use spatial analysis to identify subject specialists with less than 20 hours of timetabled teaching hours per week, to visit schools within 5km that don't have any specialist teachers in those subjects. Using conservative criteria, this identifies specialists that could cover more than one quarter of the schools lacking any specialists highlighted in Table 3 in Section 1.3.

Recommendations that could be made on the fitness for purpose of the school curriculum, school management practices, or the content of public exams are not for this paper with its focus on the education workforce. Nevertheless, these are also key factors likely to affect the future workforce pipeline from school students to entering TTCs as student teachers.

3.2 Entrants to TTCs

3.2.1 Context and Evidence

The entry requirements for Sierra Leone's six TTCs are lower than for degree courses. For example, the Freetown Teachers College requires candidates for a Higher Teacher's Certificate Secondary qualification to have 4 WASSCE credits, or equivalent, to include either English language or an HTC Primary. Further, those candidates without an English language WASSCE credit can still enrol, but are required to sit the Freetown Polytechnic Matriculation English exam. It is unclear at present whether this is of an equivalent standard to the WASSCE qualification. By contrast, all degree courses in Sierra Leone require five WASSCE credits, to include English language and Maths[13].

While the data is not available to test this hypothesis, it is possible that entrants to TTCs have weaker qualifications than those going on to a degree - this will influence the quality of the education workforce pipeline. The contrast with many of the world's highest performing education systems is stark, where the four top performing systems in the OECD (Finland, Singapore, South Korea and Canada) recruit teachers from the top 30% of

[13] Currently there are a small number of courses that do not require maths, such as Peace and Conflict Studies and Law, but these are anticipated to change to also require maths going forwards.

university graduates. This is also the case in high performing education systems from lower income groups such as Vietnam, where a steady increase in the pre-service standards required for teachers has led to 92% of science teachers having a university degree and a major in science[14].

The TSC has begun working on these issues to some extent. For example, the 2019 Teacher Management Policy requires all new entrants to the education workforce to apply for a **three-year licence to practice**, renewable on a rolling basis. This gives the TSC, in theory, stronger controls over which graduates of TTCs to prioritise for licensing and deployment. Operationalising the licensing system and linking it to the forthcoming Human Resource Management system under development, should be a priority.

3.2.2 Policy Responses

We recommend exploring four further policy responses, all will require cross-institutional working. Two will require capital investment. Three also feature as possible responses to other issues.

1. **Assure equivalence of qualifications*^ –** It is important that alternative qualifications that allow candidates to enter TTCs are of equivalent standing. At present this is not clearly the case for the alternative to the English language WASSCE credit, for example. By working through the range of possible entrance qualifications with TTCs and ensuring equivalence, TSC could reduce the possibility of weaker candidates entering training to become educators.

2. **Review entry requirements for TTCs** – In the long-term, it will be important to review the entry requirements for TTCs to ensure high-quality candidates. However, this must be balanced with the realities of the pipeline to ensure that these do not overly restrict supply as in the case of Sudan[15]. Instead, promising initiatives from a range of countries including Malawi are aiming to identify and select the soft skills, attributes and dispositions related to effective teaching, which should also be considered. If entry requirements are raised, it is important to align with other reforms that also increase the attractiveness of the teaching profession.

3. **Use scholarships as a "nudge"*^** – One effective way to improve the quality of entrants to TTCs could be to offer a limited number of scholarships on a competitive basis, potentially working with a development partner. This kind of approach is a flexible policy lever for governments, allowing them to signal the importance of quality (and qualifications), but also to engineer other aspects of the workforce, such as incentivising specialists in areas of shortage, or encouraging more women or other minorities into the workforce. For example, Chile, Peru and

[14] McAleavy, T., Tran, T. H., & Fitzpatrick, R. (2018). Promising practice: Government schools in Vietnam. Education Development Trust.

[15] Naylor, R., Jones, C., & Boateng, P. (2019). Strengthening the Education Workforce Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation. Education Commission. https://educationcommission.org/wp-content/uploads/2020/02/strengthening-the-education-workforce.pdf

South Africa offer scholarships to high-performing secondary students to pursue a career in teaching[16].

4. **Support high-potential current teachers without qualifications to enter TTCs –** The Phase 1 report recommended and costed an option of supporting high-potential current teachers (i.e. those with demonstrated aptitude and/or sufficient WASSCE results) without qualifications to gain a teaching qualification through distance learning. This support was proposed as the government paying for 50% of their tuition fees and providing them with a loan to cover the remaining 50%. This would enable them to continue teaching, and gain their qualification, with ongoing coaching to support them to implement what they learn in the classroom.

[16] Wolfenden, F., Buckler, A., Santos, C., & Mittelmeier, J. (2018). *Education Workforce Initiative: Initial Research*. The Education Commission.

4. Additional Supply and Needs Issues

During the analysis of the supply and needs of the education workforce in Sierra Leone, three further issues become apparent. On the supply side, there are noticeably fewer female teachers in the current workforce, and the teacher training colleges, than male teachers. Intersecting both supply and needs, there are particular issues affecting early grades teaching in that there is a large current need, and a lack of promotion of specialised supply for these crucial foundational years.

4.1 Female Teachers

4.1.1 Context and Evidence

Only 28% of the current teaching workforce is female, and this has not advanced since the mid-1970s[17]. In many developing countries, female participation in the teaching workforce has been permanently transformed, but this is not the case for Sierra Leone. Across primary, junior secondary and senior secondary levels combined, Sierra Leone has the 6th lowest share of female teachers in the world.

Further, the distribution of female teachers across sub-sectors is heavily skewed towards primary and particularly pre-primary grades, which are lower paid and at lower grades, where remunerated at all. In the case of pre-primary grades, the line between education and childcare is often blurred. 85% of pre-primary teachers are female, but only 8% of senior secondary school teachers are women.

Table 9: Gender Parity Index scores during supply process	Gender Parity Index
WASSCE exam entries	0.87
WASSCE pass rates	0.97
TC course	0.73
HTC (P) course	0.76
HTC (S) course	0.40
BEd course	0.30
Total (excluding BEd) Year 1	0.69
Total (excluding BEd) Year 3	0.53
Total (excluding BEd) Conventional	0.99
Total (excluding BEd) Distance Learning	0.60
Current TTC Enrolment Total	0.64
Current Teaching Workforce Total	0.39
Current Teaching Workforce Government Payroll	0.41

[17] https://data.worldbank.org/data-catalog/ed-stats - with the exception of a temporary peak of 38% in 2001, reached towards the end of the civil war but quickly eroded.

Moreover these significant disparities in the serving workforce are not reflective of the proportion of girls taking and passing WASSCE exams, nor even of enrolment in TTCs. Table 9 uses data from WASSCE entries for 2017 to 2019, and the new TTC enrolment data discussed in section 1.2 to highlight a number of areas of concern in terms of attracting and retaining female teachers through the education workforce supply.

Firstly, the gender parity of TTC enrolment is lower than that of taking and passing WASSCE exams. Secondly, the gender parity of TTC enrolment decreases further for HTC(S) and BEd courses which then tend to lead to higher paying teaching roles in secondary schools. Thirdly, the gender parity across TC, HTC(P) and HTC(S)[18] decreases between Year 1 and Year 3 suggesting there is a factor causing greater dropout of females from TTCs.

Less concerning, but also interesting to note, is that there is equal gender parity in the conventional form of TTC study, but it is the pathway of distance learning that contributes the largest number of teachers where female enrolment is not equal. The reasons for this are not clear. Moreover, there is a similar gender parity in the current teaching workforce as the share of teachers on government payroll, suggesting that female teachers are not being discriminated against in terms of access to payroll once they have become teachers.

While global evidence for the impact of employing female teachers on access to education and stronger learning outcomes for girls remains patchy, there is an argument to be made for providing strong female role models in the classroom. Meanwhile from a labour equity perspective, there is much to do to increase women's participation in the education workforce even to comparable levels with the rest of the region, or other low-income countries. We are not aware of any existing policy response on this issue.

4.1.2 Further Policy Responses

We recommend exploring two policy responses. Both will require cross-institutional working. Both will require capital investment, and one features as a possible response to other issues.

1. **Conduct further research on outcomes in TTCs by gender***: The team was able to gather information on the gender of Year 1 entrants to four of six TTCs during the research period. Further work would be useful, including: (i) completing the picture for Year 1 entrants for all six TTCs, ideally adding a longitudinal dimension; (ii) understanding the reasons why females are less likely to consider a career in teaching and enrol in TTCs; (ii) examining drop-out rates and reasons during the course through a gender lens; (iii) examining qualifications studied by level and by gender; (iv) examining NCTVA exam passes, by level and by gender, preferably over a period of time; and (v) looking at the experience and retention of female teachers in the first five years after qualifying. This research could be folded into the review of TTC curricula and NCTVA exams recommended in Section 2.

[18] Excluding BEd as this is a four year course and does not contain a distance learning element.

2. **Use scholarships as a "nudge"*^**: One effective way to improve the quality of core subject teachers could be to offer a limited number of scholarships to TTCs on a competitive basis, potentially working with a development partner. This kind of approach is a flexible policy lever for governments, allowing them to signal the importance of quality (and qualifications), but also to engineer other aspects of the workforce, in this case the importance of having more and better qualified female teachers in the system.

4.2 Early Grades Teaching

4.2.1 Context and Evidence

There is clear literature highlighting the importance of learning key foundational literacy and numeracy skills in the early grades of primary to enable learning throughout the education system. However, there are often a number of contrasting incentives that negatively affect early grades teaching, particularly in weaker education systems.

These incentives typically take the form of lower teaching loads, smaller pupil-to-teacher ratios, and frequently higher grades of pay, at higher grades and higher levels of education. There is often also a reputational aspect with a false perception that it is easier to teach early grades.

In Sierra Leone, we find many of these to be the case. Early grades teachers, in this case considered as those teaching grades 1-3 of primary[19], typically have the highest workload, the highest pupil-to-teacher ratios and are most likely to be unqualified.

The pupil-teacher ratio is 34 in the later grades of primary, compared to 44 in the earlier grades. Figure 7 shows that there is a far higher share of unqualified teachers in early grades as well, which raises the pupil to qualified teacher ratio from 47 in the later grades to 77 in the earlier grades. Using the assumptions of estimating teacher need in Section 1.3, we find that more than two thirds of the need for qualified teachers at primary level is in the early grades.

[19] Estimates were constructed by comparing the number of teachers who said they teach a particular grade against the number of students on roll for that grade. In the case of teachers who said they teach more than one grade the team made the conservative assumption of assigning them to the lowest grade they said they taught.

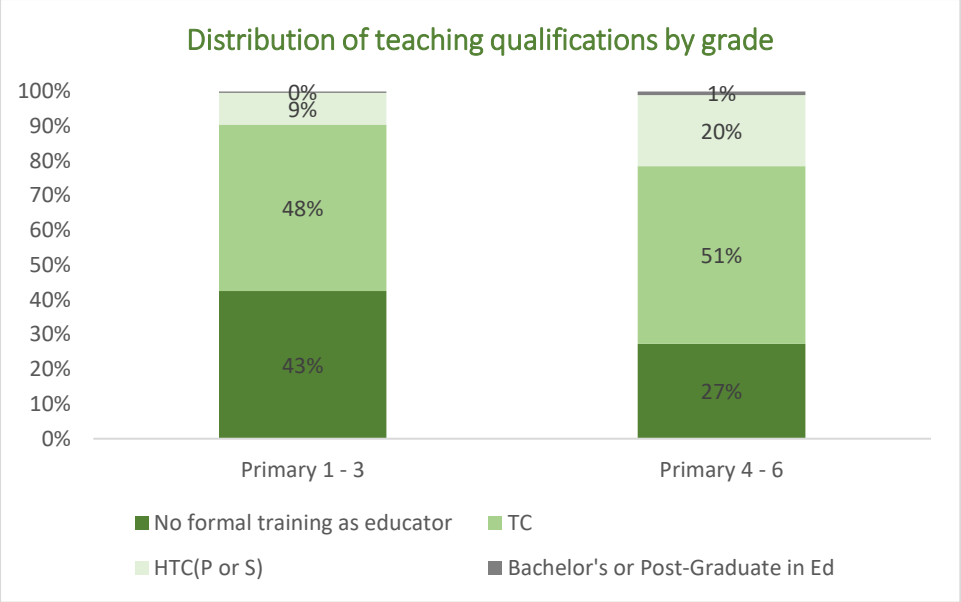


Figure 7: Teacher qualifications by early and later grades of primary schools (Source: ASC, 2019).

By contrast, the most successful education systems such as Finland see foundational and early grades teaching as an important specialism and emphasise strong pedagogical skills and knowledge at this level particularly. This importance is also evident across Africa[20]. In Ghana, the differentiation of key skills has been demonstrated through the introduction of a new new four-year Bachelor of Education degree program for initial teacher education that includes subject and level distinctions such as early grade primary and upper primary.

4.2.2 Further Policy Responses

We recommend exploring three further policy responses. All will require cross-institutional working. Two will require capital investment and also feature as possible responses to other issues:

1. **Use scholarships as a "nudge"*^**: One effective way to improve the quality of teachers could be to offer a limited number of scholarships to TTCs on a competitive basis, potentially working with a development partner. This kind of approach is a flexible policy lever for governments, allowing them to signal the importance of quality (and qualifications), but also to engineer other aspects of the workforce, in this case the importance of having more and better qualified early grades teachers in the system.
2. **Re-introduce the BEd Primary degree:** Reviving this specialist qualification would be a second important "nudge" towards early grades teaching for those considering training to enter the education workforce, as has been the case in Ghana[21].This could be designed in coordination with a scholarships program as discussed above.

[20] Gove et al. (2017). Assessing the impact of early learning programs in Africa.

[21] Education Commission. (2019). Transforming the Education Workforce: Learning Teams for a Learning Generation. Education Commission.

3. **Redistribute teachers within schools**: The Phase 1 report highlighted that the Annual School Census data finds that more than 3,500 teachers could be redistributed within schools to produce more balanced class sizes. In the majority of cases, this imbalance is negatively affecting the earlier grades. TSC and MBSSE could work with head teachers to bring about this redistribution whilst also highlighting the importance of having qualified teachers in these crucial early grades.

5. Conclusion & Recommendations

In this paper, we have analysed existing and new data to identify where the education workforce need is greatest, particularly in terms of qualifications and specialisms, and where the supply is weakest.

The new data and evidence presented in Section 1 estimates that without additional actions:

- the supply of teachers will not be enough to meet the needs of a fully qualified workforce by 2023
- the supply of maths and science specialised teachers will likely never be enough to meet the needs at secondary level

In analysing the education workforce supply, we have sought to test assumptions with available evidence from Sierra Leone, and comparable international examples, and identify actionable policy recommendations that can help to reduce these challenges.

The importance of intervening at the pre-service level is emphasised by the experience of South Korea and Vietnam, as well as a growing body of evidence from Sub-Saharan Africa, that finds that investing in pre-service supply is a more cost effective approach than subsequent interventions of in-service training.

We have five broad conclusions to draw from this process, which incorporate the recommendations made throughout this paper[22]:

- **It is critical that all principal actors in the sector work collectively** – The most important aspect for improving supply of the education workforce is collaboration. While the TSC has legal responsibility for all matters pertaining to teachers, its policies on workforce management or professional standards will not succeed without, for example, successful collaboration with TTCs and their governing bodies on pre-service training, NCTVA on professional qualifications, MTHE for providing data and oversight, and MBSSE on issues such as school curricula and exams.

  Agreeing and defining areas of responsibility through MOUs, and regular engagement across institutions are required to make use of much of the good work that has already been done. This can take the form of incorporating TSC policies such as the Teacher Management Policy (2019) and Service Standards (2017) into the teacher training curriculum[23]. Similarly, this can take the form of working with TTCs to support enrolment and progression of student teachers in areas of shortage such as STEM specialists and female teachers.

[22] The individual recommendations, and their likely costs, priority and potential for development partner support are summarised in Appendix E.

[23] For example, in the case of the professional standards, it will be important both to explain how teachers demonstrate their growing competencies as they seek to attain proficient, highly experienced, or distinguished status formally, and to ensure they can access relevant CPD opportunities to improve their practice and gain the required credits to progress.

- **TTC curricula and examinations require urgent review and reform** – It is important to ensure that what is examined when deciding whether to award a teaching qualification is aligned with what is being taught in TTCs and what is needed for a high-quality teaching workforce. International evidence, particularly from low-capacity contexts, highlights the importance of building robust pedagogical and subject knowledge and incorporating classroom experience[24].

  This must also be reflected in the exams that student teachers take to gain qualifications. These should include appropriate questions covering subject knowledge, pedagogy and teaching methods, and ensure equivalence in terms of difficulty across subjects. It is important that the examination process receives greater support, or specialisation, going forwards. This is an area with strong potential to involve development partners planning new investments in the sector in Sierra Leone.

- **Improving and sharing the data available to underpin policy is vital** – No systematic tools exist for planning for the education workforce. The team worked with a patchwork of data collected over the research period from multiple sources. Our observation is that data collection, storage, sharing, and analysis is a significant issue both within and across institutions.

  While the overall sector planning module does include estimates of teacher need, it is based on simple estimates of the pupil-teacher ratio, and does not take into account the pipeline or subject specialisms of teachers. This should be expanded in two ways. Firstly, the data systems should move to capture all parts of the workforce – including those working in district offices and non-teaching roles.

  Secondly, the data for the TTCs should be fully compiled, alongside data from the Universities and Polytechnics on students enrolled in bachelor's and higher education degrees. The recent census of higher education institutions undertaken by MTHE as part of the Education Sector Analysis could provide a basis for this, but this must be captured annually, and contain subject specialisms, alongside or as part of the Annual School Census.

  The Annual School Census itself could be strengthened and developed, to enable verification of the qualifications and subject specialisms of the current education workforce. It would also be useful to understand which teachers are currently studying for teaching qualifications as part of a distance learning course alongside their teaching job, and any in-service training they have received in the past year.

- **Boosting learning outcomes in the short-term can support wider reform** – The supply of the education workforce does not begin at the teacher training colleges but incorporates the wider pipeline of secondary school students and their career

[24] Education Commission. (2019). *Transforming the Education Workforce: Learning Teams for a Learning Generation*. Education Commission. https://educationcommission.org/wp-content/uploads/2019/09/Transforming-the-Education-Workforce-Full-Report.pdf

ambitions. The falls in absolute numbers of students passing English and Maths WASSCE exams in recent years highlights the importance of this pipeline. Whilst successful long-term reform is a key aim, it is possible for shorter term interventions to provide the space for this reform by boosting learning outcomes, such as suggested in the Phase 1 report, and mitigating localised subject specialist shortages, as suggested in the Spatial Analysis paper.

- **Agreement is needed on what the education workforce should look like** – A key issue hindering education workforce planning in Sierra Leone is the lack of an agreed consensus on what the desired education workforce would look like. In terms of quantity, different institutions, models and reports often have wide variations in the projected numbers of teachers and qualified teachers.

  This is an important concern, particularly given the TSC's ambition to reduce and remove unqualified teachers from the classroom by 2023. Whilst an important aspiration, given findings on the weak quality of the education workforce pipeline and its impact on learning, there are other considerations that will be critical to creating a realistic and stable model. These include, for example, projections of fiscal space to pay teachers, the capacity of TTCs to train new teachers and the characteristics in terms of types of qualifications, subject specialisms, locations and gender demands.

  If the characteristics of the desired education workforce can be agreed across stakeholders, policymakers and researchers would then have a clearer picture to work towards and to evaluate potential policies against their ability to reach this.

Appendix A

TTC Data as it was received

Total Studying	Male	Female	Unspecified Gender	Total	% Distance	% Female (of confirmed gender)
TC	2375.0	1744	0	4119	91%	42%
HTC P	985.0	747.0	6.0	1739.0	91%	43%
HTC S	1410	567	1015	2992	78%	29%
BEd	242	73	462	777	0%	23%

HTC S	Male	Female	Unspecified Gender	Total	% Distance	% Female (of gender confirmed)	% of Total HTC S
Maths	19	2.5	26	47.5	93%	12%	2%
Science	80	9	40	129	78%	10%	4%
English	52	15.5	71	138.5	84%	23%	5%
Social Studies	291	60	305	656	67%	17%	22%
Business Studies	188	120	88	396	64%	39%	13%
Agriculture	98	30	121	249	64%	23%	8%
RME	51.5	13.5	16	81	90%	21%	3%
Other	44.5	28.5	25	98	91%	39%	3%
Unspecified	586	288	323	1197	92%	33%	40%

BEd	Male	Female	Unspecified Gender	Total	% Distance	% Female (of gender confirmed)	% of Total HTC S
Maths	15	0	7	22	0%	0%	3%
Science	14	0	6	20	0%	0%	3%
English	13	17	22	52	0%	57%	7%
Social Studies	52	14	136	202	0%	21%	26%
Business Studies	0	0	67	67	0%	0%	9%
Agriculture	23	3	178	204	0%	12%	26%
RME	0	0	0	0	0%	0%	0%
Other	22	22	46	90	0%	50%	12%
Unspecified	103	17	0	120	0%	14%	15%

Appendix B

Primary teacher need under different assumptions

	30	40
Current Supply of Teachers	40,336	
Current Supply of Qualified Teachers	25,577	
Total Need (maximum national level PTR)	53,770	40,327
Total Need (maximum school level PTR)	56,713	43,306
Total Need (maximum class size)	70,304	57,365
Extra Need		
Estimate 1a: Additional teachers required to meet maximum national level PTR	13,404	-39
Estimate 1b: Additional teachers required to meet maximum national level PTR (qualified teachers only)	28,193	14750
Estimate 2a: Additional teachers required to meet maximum school level PTR	18,816[25]	8,256
Estimate 2b: Additional teachers required to meet maximum school level PTR (qualified teachers only)	32,004	19,793
Estimate 3a: Additional teachers required to meet maximum class size	32,942	21,673
Estimate 3b: Additional teachers required to meet maximum class size (qualified teachers only)	46,256	34,285
Additional Supply		
Currently in the 3 year TC and HTC(P) programs	8,786	
Average per year (e.g. above divided by 3)	2,929	
Comparison		
Number of years until Estimate 1a would be met (assuming no dropout, attrition or retirement)	5	0
Number of years until Estimate 1b would be met (assuming no dropout, attrition or retirement)	10	5
Number of years until Estimate 2a would be met (assuming no dropout, attrition or retirement)	6	3
Number of years until Estimate 2b would be met (assuming no dropout, attrition or retirement)	11	7
Number of years until Estimate 3a would be met (assuming no dropout, attrition or retirement)	11	7
Number of years until Estimate 3b would be met (assuming no dropout, attrition or retirement)	16	12

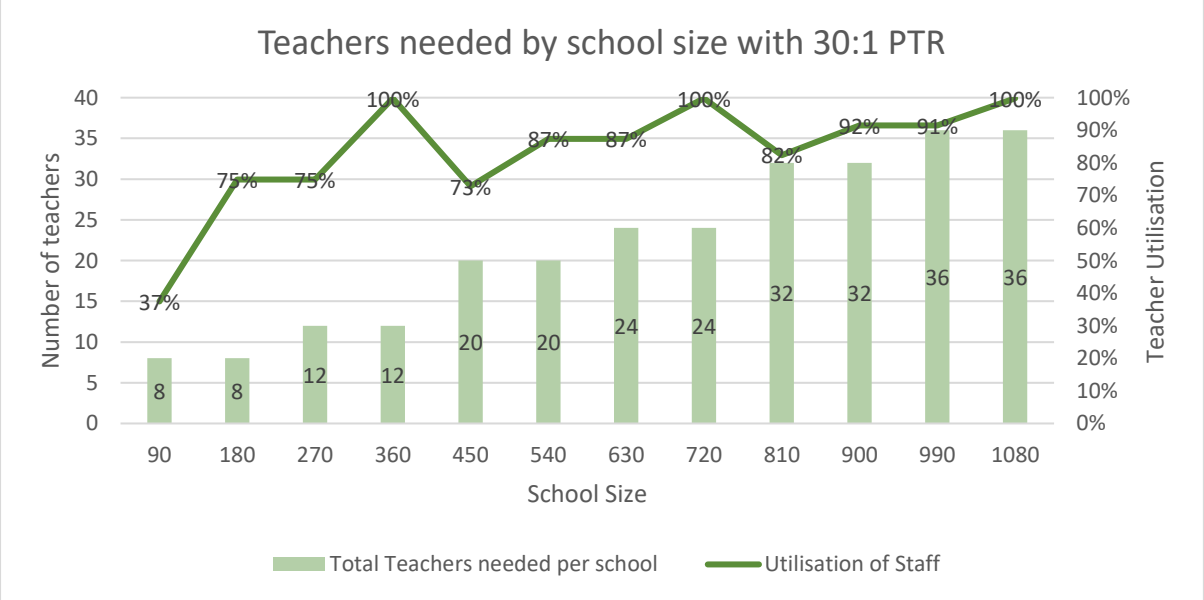
[25] Note these estimates of extra need are slightly larger than Total Need minus Current Supply due to the occasional oversupply of teachers within and across schools. The Phase 1 report highlights the increase in efficiency possible through redistributing teachers within and across primary schools.

Appendix C

For a maximum class size of 30

Assuming	4	Core subjects
	4	Non-core subjects
Core subject allocation	2	Times teaching time
Non-Core Subject allocation	1	Times teaching time
So for each core subject	16.67%	of teaching time
For each non-core subject	8.33%	of teaching time
Additional core teacher needed every	180 students	
Additional non-core teacher needed every	360 students	
Minimum number of specialist teachers needed	8	

Total students	Total Teachers needed per school	De Facto PTR	Utilisation of Staff
90	8	11.25	37%
180	8	22.5	75%
270	12	22.5	75%
360	12	30	100%
450	20	22.5	73%
540	20	27	87%
630	24	26.25	87%
720	24	30	100%
810	32	25.3125	82%
900	32	28.125	92%
990	36	27.5	91%
1080	36	30	100%



Appendix D

Specialist Teacher needs at Junior Secondary								
		English (includes Literature)	**Maths**	**Science (includes Biology, Chemistry and Physics)**	**Social Studies (includes Government, History and Economics)**	**Business Studies**	**Agriculture**	**Combined Other**
	Teacher Supply	1834	1020	1168	2653	1228	1371	3508
Now	Teacher Need	2238	2238	2238	2238	1539	1539	3078
	Teacher Shortage	404	1218	1070	-415	311	168	-430
	% Coverage	82%	46%	52%	119%	80%	89%	114%
Full NER	Teacher Need	3473	3473	3473	3473	2389	2389	4777
	Teacher Shortage	1639	2453	2305	820	1161	1018	1269
	% Coverage	53%	29%	34%	76%	51%	57%	73%

Specialist Teacher needs at Senior Secondary								
	Subjects grouped as for JSS	English	Maths	Science	Social Studies	Business Studies	Agriculture	Combined Other
	Teacher Supply	1465	694	985	2189	561	569	1618
Now	Teacher Need	1236	1236	1236	1236	743	743	1486
	Teacher Shortage	-229	542	251	-953	182	174	-132
	% Coverage	119%	56%	80%	177%	76%	77%	109%
Full NER	Teacher Need	2892	2892	2892	2892	1738	1738	3477
	Teacher Shortage	1427	2198	1907	703	1177	1169	1859
	% Coverage	51%	24%	34%	76%	32%	33%	47%

Appendix E

Recommendation	Financial resources	Issues affected	Potential for DP involvement	Priority
Upgrade entry requirements for TTCs in line with other higher education courses	Low	Pre-service	Low	Mid/High
Assure equivalence of entry qualifications for TTCs (e.g. WASSCE against Freetown Polytechnic English qualification)	Low	Pre-service	Low	Mid/High
Use scholarships to incentivise better quality candidates, or "nudge" towards areas of poor supply	Mid	Pre-service Deployment Learning Pipeline	High	High
Establish and publish an annual ranking of TTC performance	Low	Pre-service	Mid	Low
Rationalise the number of institutions working on pre-service training, freeing up resources	Low	Pre-service	Low	Low
Plan and deliver a combined review of TTC curricula and HTC/TC examinations to ensure alignment and quality.	Mid	Pre-service Deployment Learning Pipeline	High	High
Extend review to include alignment between NCTVA exams and school curriculum, and ensure equivalence across subjects	Mid	Pre-service Deployment Learning Pipeline	High	High
Reintroduce the BEd Primary degree	Low	Pre-service Deployment Learning	Mid	Mid/High
Develop and implement recommendations on "sharing" core subject specialists through a learning teams approach, as outlined in the companion Spatial Analysis paper	Mid	Deployment Learning	High	Mid/High
Commission or conduct further research into outcomes in TTCs by gender	Low	Pre-service Deployment Pipeline	High	Mid