Quality of Pre-service Teacher Education and Teacher Supply in India: An analysis of TET data from one state

Background paper 4:
State of Teachers, Teaching and Teaching Education Report for India 2023
CETE 2023

Citation: CETE. (2023). **Quality of pre-service teacher education and teacher supply in India: An analysis of TET data from one state.** Background paper 4: State of Teachers, Teaching and Teaching Education Report 2023.
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Abstract: TET data from Paper 1 (DElEd/DEd for Primary school teachers) and Paper 2 (BEd for subject teachers of science-mathematics and social science) from one state were analysed, to understand the relative performance of PSTE in DIETs, CTEs and IASEs and self-financed colleges. Applicants from DIETs and IASEs were found to have better performance than the applicants from self-financed colleges. Overall more candidates from DIETs and CTEs qualified in the exam as compared to self-financed colleges. The supply of science-mathematics teachers in the state was greater than that of social science teachers. Only 16% of qualifying primary and social science teachers and 24% of qualifying science teachers score more than 60% on the test. Mathematics content knowledge was found to be weak overall.

Keywords: *PSTE Quality, TET, DIET, IASE-CTE, Teacher Supply*

Acknowledgements: *The authors are grateful to the leadership of the Indian state that generously permitted us to use the TET data from the state to engage with this invaluable analysis. Their wisdom and trust, in recognising the value of the insights that can be generated on many invisible aspects of the teacher education sector which are important to understand, derive insights and inform policy has enabled a wealth of insights from empirical data to emerge. The meticulous and arduous efforts undertaken by Mr Sudheer Reddy, Ms Aishwarya Rathish, Ms Arpitha Jayaram and Ms Rujuta Warthi in coding data of PSTE Institutions of close to 5,00,000 candidates made the analysis reported in section 5 possible. The authors are also thankful to Diksha Rehal, Tejaswini Bhaskar, Avanish Singh and Uchita Bakshani for extending help to understand TET question papers across all pedagogies. The SOTTTER 23 editorial board–Prof. Saklani, Director NCERT, Mr Harshit Mishra, Niti Ayog, Prof. Amita Chudgar, Professor, Michigan State University, Dr Nidhi Gulati, Institute of Home Economics, University of Delhi, Ms Amrita Patwardhan, Tata Trusts, and Dr Carlos Vargas Tames, Teacher Task Force, UNESCO–provided invaluable perspectives on the analysis and reporting.*

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Contents

List of Tables

List of Figures

Abbreviations

B.Ed.	Bachelor of Education
BC	Backward Classes
CSSTE	Centrally Sponsored Scheme in Teacher Education
CTE	College for Teacher Education
CTET	Central Teacher Eligibility Test
D.El.Ed.	Diploma in Elementary Education
DIET	District Institutes of Education and Training
EVS	Environmental Studies
IASE	Institute of Advanced Studies in Education
ITEP	Integrated Teacher Education Programme
NCFTE	National Curriculum Framework for Teacher Education
NCTE	National Council for Teacher Education
PSTE	Pre-Service Teacher Education
PWD	Persons with Disabilities
PMMMNMTT	Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching
TET	Teacher Eligibility Test
SOTTTER	State of Teachers, Teaching and Teacher Education Report

1. Introduction

Over 92% pre-service teacher education (PSTE) programmes are enrolled in self-financed institutions/colleges of teacher education (UNESCO, 2021:100). The ballooning of self-financed institutions offering teacher education and the poor quality of teacher education provided by most teacher education colleges is recognised as a sectoral pathology in recent policy, echoed most recently in the National Education Policy 2020 (GOI, 2020:42). However the extent of government funding in the sector is limited. The last boost to funding teacher education came in the form of the Centrally Sponsored Scheme in Teacher Education (CSSTE) which led to the establishment of the Institutes of Advanced Studies in Education at Universities and Colleges of Teacher Education, to extend activities to in-service secondary teacher education and the establishment of the District Institutes of Education and Training (DIET) to strengthen elementary teacher preparation–making the two-year model leading to a Diploma in elementary education as a standard. This was followed by an extension of support from the University Grants Commission (UGC) in 2014 to strengthen or establish Schools of Education, especially in Central Universities which did not have such departments. Finally, the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) aimed at enabling higher education institutions to offer in-service professional development to teachers and faculty development (See UNESCO 2021: 22-24,98 for a short summary of key schemes and initiatives). Needless to say, it is only when support extends to creating faculty positions, that the sector of pre-service teacher education receives core support. The recent initiative to improve quality in the sector, primarily through the introduction of the Integrated Teacher Education Programme (ITEP) is notable for its silence on funding provisioning for faculty. The recent budget is also silent on allocations or the form of the PMMMNMTT in 2023.

In spite of the general commonsense that the burgeoning of self-financed colleges in most states is linked to a crisis in the quality of pre-service teacher education, in many states the policy of giving aid is being discontinued, and the number of government-aided teacher education institutions is either stagnant or shrinking. There is also a view expressed in many policy quarters that the DIETs need not be engaged with preservice teacher education when there are so many available providers, and they should instead focus on in-service teachers as their primary function in teacher education. However, there is little by way of empirical evidence of relative functioning and quality, informing these policy views and suggested directions.

The inability of the National Council for Teacher Education (NCTE) to regulate the self-financed teacher education sector, and to ensure quality has been frequently noted as the key marker of not only its failure as regulator, but also the extent of corruption in, and the limitations of the grant of recognition process. The NEP 2020 also laments the inability of the sector to attract talent. Most of these views are formed based on experience and anecdotes and have grown into a common sense about the sector. There are virtually no empirical studies examining how these different types of institutions are functioning, what their relative quality is, and what the relative quality is of students at different institutional types. In SOTTTER 23 we delve into the world of government, government-aided and self-financed teacher education institutions, their pre-service programmes, and their students–for secondary/subject teacher preparation (Bachelor of Education) and primary teacher preparation (DElEd). We provide data and analysis to understand who is coming into the profession, what their qualities are, what their motivations are, what kinds of institutions they are studying in, and what their relative quality is. We do this through analysis of primary data gathered from 68 teacher education institutions spread across eight states, and analysis data from the Teacher Eligibility Test (TET). The analysis and understanding emerging from

primary data is reported in background paper number 4 of SOTTTER-23. It includes, in addition to DElEd and BEd, the preparation of teachers in areas such as physical education, music and art education, early childhood education and special education. This background paper is focused on insights gained from the analysis of TET data from one state.

2. Teacher Eligibility Test

This is a background paper that has been prepared based on the analysis of data from the Teacher Eligibility Test (TET) conducted in one state in India. The data and analysis of TET enables us to examine questions of the demographic characteristics of those who are qualifying to become teachers, and their 'quality' as measured by the TET exam paper. It provides us with an understanding of the types of institutions from which they are coming and enables us to examine and compare the quality of the institutions from which they are acquiring their PSTE degree. We also try to understand the relative characteristics of aspirant teachers for Mathematics, Science and Social Studies and Language, with regard to supply and quality.

2.1 An Overview of the TET

Following the Right to Education Act, 2009 (RTE, 2009) the Government of India brought in regulations for a person to be eligible to be appointed as a teacher in the form of the Teacher Eligibility Test (TET). The Central Teacher Eligibility Test (CTET) started in 2011 and State level TETs introduced now by all states, are steps in the direction of teacher licensing based on testing. The test is expected to signal the knowledge, skills, attitudes and values that are important for teaching, relevant particularly to initial teacher education. (UNESCO, 2021:108). Most of state governments have now incorporated qualifications in either the CTET or respective state TET as a mandatory requirement in teacher recruitment into government schools (UNESCO, 2021:38).

Following the pattern established by the CTET, the CTET involves two separate papers. Paper 1 is for primary teachers and Paper 2 is for subject teachers for middle and secondary school level–with optional parts based on the subject teaching specialisation of the applicant. In general, since the CTET and TETs introduction, results have shown an overall low in overall percentage of applicants who are successful in qualifying for the exam (UNESCO, 2021:109), a matter that is widely reported and discussed in newspapers. For example, CTET 2022 data shows about 30% qualified the Paper 1 and 17% qualified for Paper 2 (Source: Shiksha.com).

2.2 TET design

The CTET and TET papers are generally designed to assess candidates who are already teachers, who have just acquired their professional degree or who are in the final semester of their professional teacher education programme in content knowledge, pedagogical knowledge, understanding of child development and educational aims etc., broadly informed by the National or State Curriculum Framework of Teacher Education. An analysis of the 2019 CTET paper showed that the test privileged content knowledge (50% of paper 1 and 60% of paper 2), with about 30% to 50% items of remembering type, and about 3 to 7% of higher order thinking type (UNESCO, 2021:110).
The 2019 CTET data cycle shows that both tests for primary and subject school teachers privilege items that test content knowledge (50 per cent of paper 1 and 61 per cent of paper 2). Items testing knowledge of pedagogy and pedagogical content knowledge are limited to about 25 per cent of the paper. The remaining aspects of NCFTE receive very limited attention – less than 3 per cent of each type. The tests on the whole seem to privilege content knowledge rather than professional knowledge associated with and arising out of

content knowledge. (UNESCO, 2021:110). Based on Bloom's Taxonomy framework's categories the tests for primary teachers and subject teachers are found to have items spread over four cognitive categories: about one-third of the items test remembering, between 34 per cent and 39 per cent test understanding, 14 per cent to 21 per cent assess application, and between 12 per cent and 14 per cent assess analysis. In the subject knowledge tests, about 50 per cent of items test remembering. Overall, items assessing higher cognitive abilities such as analysis, evaluation and creation are very low (between 3 per cent and 7 per cent). The CTET and TETs are paper-pencil tests and do not include ways of assessing the practice of teaching. It is well known that the assessment of teaching quality is complex and requires observation, review and discussion with teachers to assess their pedagogical content knowledge, their lesson plans, and through observation of their practice. The CTET and TET are acknowledgedly incomplete as measures of teacher quality and also limited as the basis of teacher licensing (UNESCO, 2021:113).

2.3 TET results and quality

Admittedly, the test is limited in its scope and the range of what it tests. As one of the necessary though not sufficient conditions of teacher quality, and recognising the limitations of the test as reflecting teacher quality, marks obtained in the test are used as a proxy for quality, to compare and understand the relative performance of institutional types in providing quality teachers, and to compare and understand overall quality of teacher supply.

2.4 Analysis of TET data from one state

Data pertaining to candidates appearing for the TET examination in one state was obtained and analysed to understand the characteristics of candidates appearing for the examination, their performance in various subject components of the examinations and relate these to the types of TE colleges/institutes/ departments in which they had obtained their professional teaching qualification.

The State is not revealed as the intention of this paper is not to examine specifically insights from TET relevant to that state but used more to illustrate the power of the analysis and to draw insights and conclusions that are likely to be of general interest and relevance. Hence, numbers where they are reported are approximated, and data is mostly reported in the form of proportions only.

Design of the Test: Like all other States conducting the TET, (same as CTET), two separate papers are conducted respectively for primary school teachers and for secondary school teachers with optional components depending on whether the aspirant is for science, mathematics, social sciences or language teaching.

Paper 1 is for a total of 150 marks, with 30 marks each for five compulsory components: Child development, regional language, English, mathematics, science and social studies. Each of the components has 25 marks for content knowledge and 5 marks for related pedagogical knowledge. The minimum qualification to be eligible to take the paper 1 test is to be in the final year or have completed the DElEd. By qualifying in Paper 1 the candidate is eligible to be a primary school teacher. As the primary school teacher is expected to teach all subjects (generalist teacher), the paper is designed to assess knowledge of all subject areas: language, mathematics, science and social science.

Paper 2 which is taken by middle/secondary subject teachers is also for a total of 150 marks. This paper has three common components of 30 marks each for child development, regional language and English. Teachers of mathematics or science are expected to take the science

and maths option for a total of 60 marks: 30 each for science and mathematics. Social science teachers are expected to take the social science component for 60 marks.

The cut-off to qualify is defined based on the social category of the applicant: General: 90 marks (60%); BC: 75 marks (50%), and SC/ST/PWD: 60 marks (40%), overall.

Categories for analysis: The TET application form requires candidates to provide the name of the college from which they acquired their PSTE qualification. Gender and social category are also collected in the application form.

College/Institution type: Based on information gathered from the NCTE website on recognized programmes and the State's information on the type of institution, all institutions were categorised into seven types: self-financed, Aided, DIETs, Govt CTEs or IASEs, Central Government University Department, State Government University Department, Government Society run TE institutions (e.g. tribal welfare etc.), and Government University run Distance Education Programmes. As the number of applicants appearing from most Government run institutions was very small, in the case of analysis of primary teachers, DIET data was separated and the remaining were clubbed into 'government other' and in the case of secondary/subject teacher, data of IASEs and CTEs was kept separate and the remaining were clubbed into 'government other'. Given the interest in understanding the dynamics of distance education teacher education programmes, this category has been kept separate (see Table 2.1).

Table 2.1: Classification of College/Institute types and approximate numbers

		DElEd	BEd	Total
I	Self-financed Institutions/Colleges	approx 400	approx 500	approx 900
II	Aided institutions/colleges			less than 5
III	DIETs/IASE-CTEs (Funded by the Department–District Institutes of Education and Training (DIETs) or Institute of Advanced Studies in Education (IASEs)/Colleges of Teacher Education (CTEs))	DIETs approx:10	IASE/CTEs approx:6	approx 15
IV	Government Other (Central or State University Departments, and other Government Societies)			approx 10
V	Distance Education (offered by Universities)			

Source: Authors, data from NCTE website and state database.

Candidate's social category: The TET data for each candidate was organized to identify gender and social categories were clubbed into Scheduled Caste/Scheduled Tribe/PWD, BC and General categories. The social categories were grouped in this manner as they also reflect the respective cut-offs for each category i.e. 40% overall for SC/ST/PWD; 50% for BC and 60% for General (see Table 2.2).

Table 2.2 Candidate type: Gender, Social Categories and test-related information		
Gender/Women	Data pertaining to women is reported most TET applicants tend to be women.	Cut-off mark for qualifying
SC/ST/PWD	Scheduled castes, scheduled tribes and persons with disability.	60 out of 150 (minimum)=40%
BC	Backward Castes	75 out of 150 (maximum)=50%
General	General category	90 out of 150 (maximum)=60%
Source: Authors, based on data in TET papers 1 and 2.		

Teacher type: Candidates were classified based on the test they took into three types:

- primary teacher aspirant,
- maths/science teacher aspirant, and
- social science teacher aspirant.

Performance on the test: Based on their performance in the TET, candidates have been categorised further as follows:

- **Applicant:** a candidate who applied for and took the test
- **Qualifying candidate:** a candidate who qualified for the test, based on the cut-off marks for the relevant category.
- **Performance on the test** has been categorised based on the following: the mean marks in the overall test (with standard deviation). Mean marks in specific components of the test were selected based on the focus of the analysis. performance in regional language, English and Mathematics content knowledge (25 marks) have been selected for specific focus of analysis. **Test performance is used as a proxy for 'quality'.**

Reporting: Only the proportion of candidates and mean marks (with standard deviation) are reported college type-wise and social category-wise. The analysis presented below is presented separately for paper 1: The TET qualifying examination for primary school teachers, paper 2: The TET qualifying examination of science-mathematics subject teachers for middle and secondary schools and the TET qualifying examination for social science subject teachers for middle and secondary schools.

Approximately 3,00,000 candidates appeared for paper 1 (primary teacher), 1,30,000 for paper 2 (science and mathematics) and 1,15,000 for paper 2 (social sciences).

3. Analysis of Primary School Teacher TET Data

3.1 Applicants and their Profile

Approximately 3,00,000 candidates appeared for the Paper 1 examination. 65% of the applicants were women. The proportion of women applicants in DIETs and Aided colleges was higher at 78% and 75% respectively. 57% of applicants were from BCs, 34% were from scheduled castes, and scheduled tribe communities, and 8% were from the general category. 92% of candidates were from self-financed programmes, followed by 4% from DIETs, about 2% from other government programmes, 1.1 % from aided programmes and only 0.4% from government university-run distance education programmes. The proportion of women applicants from aided programmes and distance education programmes were higher at 78% and 80% respectively. The proportion of SC/ST/PWD candidates in DIETs and distance education programmes was lower at 21% and the proportion of general category candidates was higher in distance programmes at 17%.

The proportion of SC/ST/PWD candidates was 34%, BC: 57% and General: 8%. Compared to the demography of the State, the proportion of SC/ST/PWD candidates was higher than the state average of about 24% and of General candidates was lower (see Table 3.1).

Table 3.1 Comparison of demographic profile of candidates with state demography

	Women	Social Category			Overall
		SC/ST	BC	General	
State demography (approx.)	49.7%	24%	-	-	-
TET applicants	65%	34.4%	57.2%	8.5%	100%
TET proportion of total qualifying candidates social category wise	61%	49%	49%	3%	32%

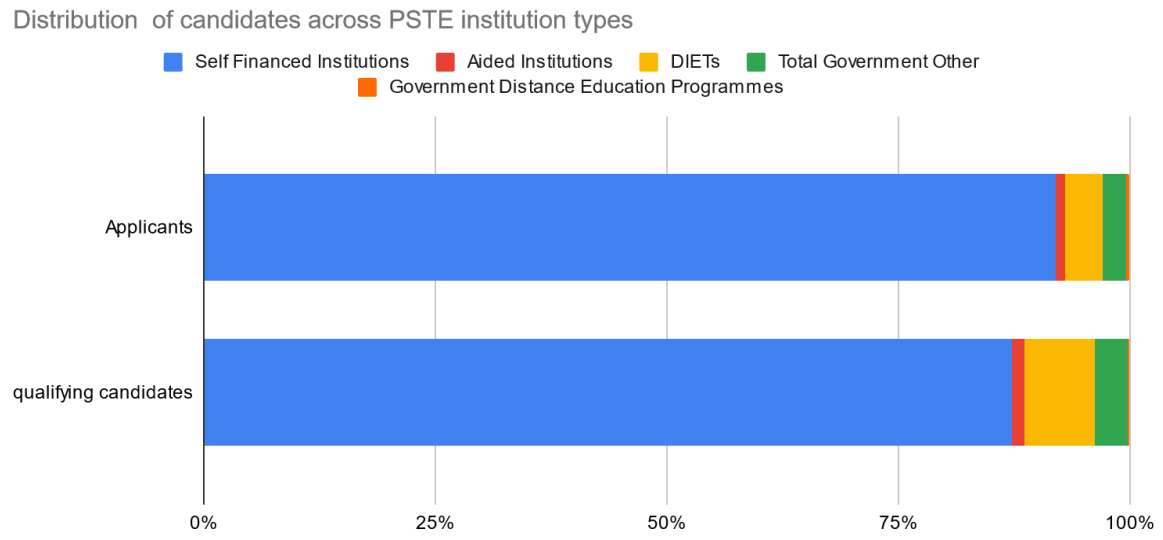
Source: Authors, based on analysis of TET paper 1 data.

3.2 Qualifying candidates and their profile

About 32% of all applicants qualified in the TET-Paper 1. Among all, 61% of qualifying candidates were women. In terms of social category, 49% of qualifying candidates were SC/ST/PWD, 49% were BC, and 53% were from the general category. Women applicants qualifying paper were about 30%. 46% of SC/ST/PWD candidates qualified, 27% of BC candidates and 10% of general category candidates qualified.

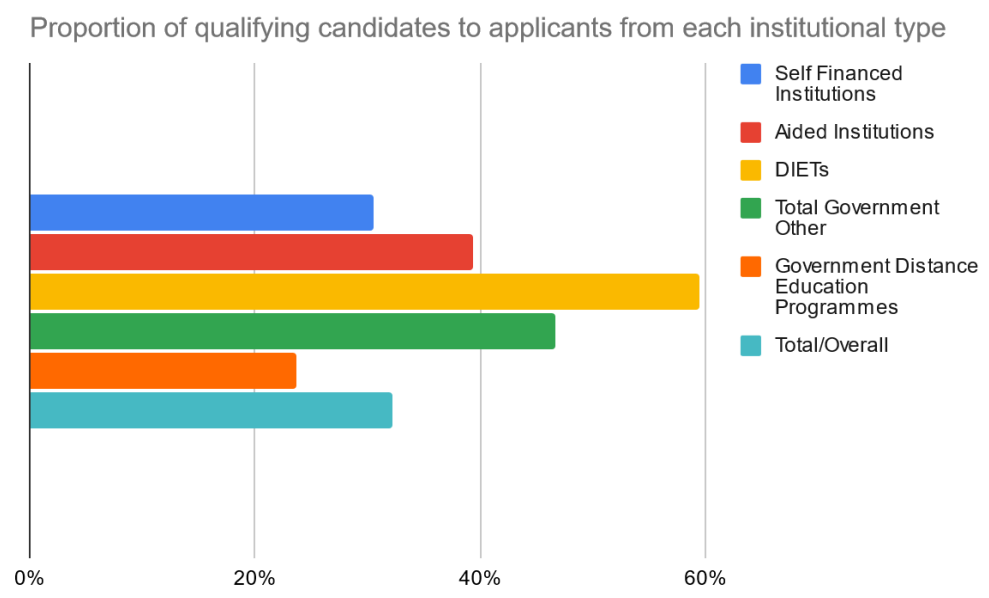
The largest proportion of qualifying candidates were from self-financed Institutions i.e. 87% followed by 8% from DIETs, 1.4 % from aided institutions and 4% from other government-run PSTE institutions. About 4% were from distance education programmes (see Figures 3.1 and 3.2).

Figure 3.1 Distribution of candidates across PSTE institution types: Applicants and qualifying candidates



Source: Authors, based on analysis of TET paper 1 data

Figure 3.2 Proportion of qualifying candidates to applicants from each PSTE institution type



Source: Authors, based on analysis of TET paper 1 data

3.3 Comparison of proportion of applicants qualifying by institution type

Overall, almost 60% of all students from DIETs qualified, followed by 49% of students from PSTE programmes in other government-run institutions, 39% from Aided institutions, 31% from self-financed institutions and only 24% from distance education programmes. Comparing the proportion of candidates qualifying by their gender and social category in each type of institution it is important to note that the largest proportion of candidates from DIETs qualified, followed by government other and aided institutions. The proportions of qualifying from self-financed and distance education programmes were the least across all categories.

Table 3.2 Percentage of qualifying candidates: Overall, by gender and SC/ST/PWD

Rank Order		Overall	Female	SC/ST/PWD
1	DIETs	59%	56%	78%
2	Government Other	49%	45%	64%
3	Aided Institutions	39%	38%	57%
	State overall	**32%**	**30%**	**46%**
4	Self-financed	31%	28%	44%
5	University Distance TE programmes	24%	21%	44%

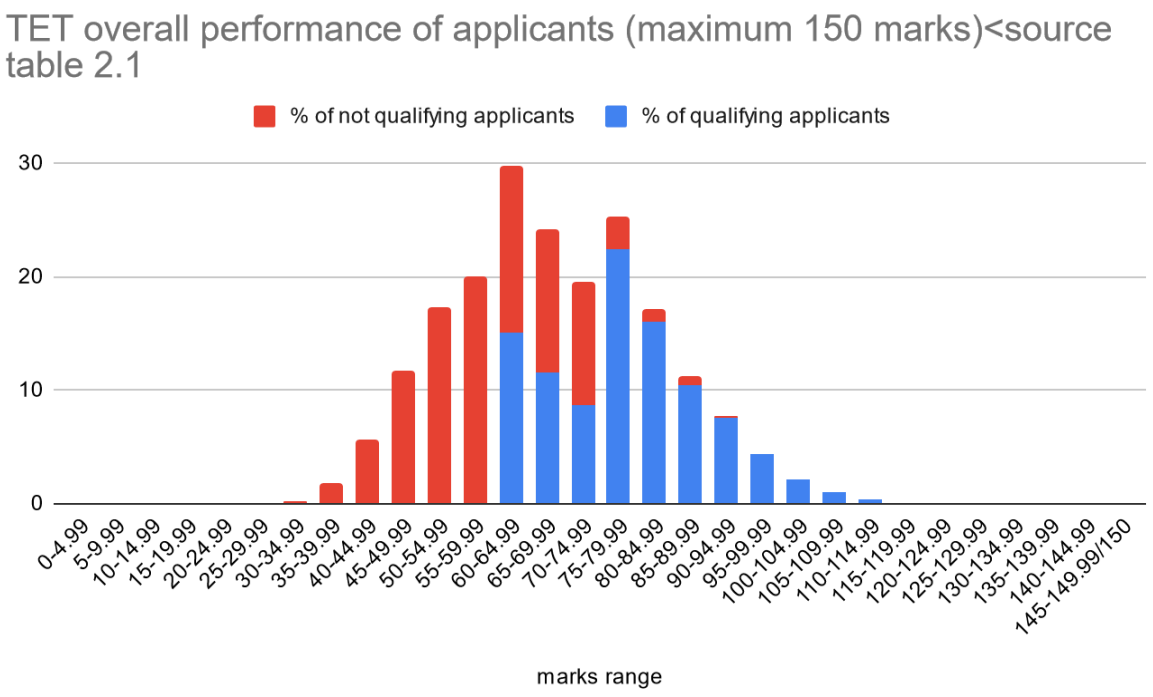
Source: Authors, based on analysis of TET paper 1 data

Around 56% of women students from DIETs qualified as opposed to only 28% from self-financed colleges, 78% of SC/ST/PWD candidates from DIETs qualified as compared to only 44% from self-financed colleges (see Table 3.2).

3.4 Quality of candidates as reflected in the overall marks obtained in TET

The mean marks obtained by candidates qualifying in the TET was 78 out of 150, which is about 52%.

Figure 3.3 Overall performance of all applicants (qualifying and not qualifying) in Paper 1



Source: Authors, based on analysis of TET paper 1 data

Table 3.3: Proportion of qualifying candidates by marks range in Paper 1

Marks range (max 150)	Pass mark	Marks range in %	% of qualifying candidates in marks range	Notes
60-74.99	SC/ST/PWD: 40%	40% -49.99%	35.4	SC/ST/PWD mean: 71 (9)
75-89.99	BC: 50%	50%-59.99%	48.9	Overall mean 78 (52%) BC mean 84 (8)
90-104.99	General: 60%	60%-69.99%	14.2	General mean 97 (6)
105-119.99		70%-79.99%	1.6	
			100%	

Source: Authors, based on analysis of TET paper 1 data

About 35.4 % of candidates qualifying obtained between 40 and 50% marks and another 50% obtained between 50 to 60% marks. Close to 85% of qualifying candidates were below the 60% mark level in the TET paper 1. Nearly, 15.8% of candidates obtained marks between 60% and 80%. Arguably, the overall right skew in performance is on account of three sets of cut-off marks at 40%, 50% and 60% (see Table 3.3).

Table 3.4 Component wise mean marks in Paper 1			
Selected Sections of the Question paper	Max marks	Mean (SD) for qualifying candidates	Mean (SD) for non-qualifying candidates
Child Development	30	13.37 (3.22)	10 (2.76)
Regional Language	30	17.74 (3.87)	12.76 (4.17)
English Language	30	11.69 (3.68)	9.38 (3.16)
Mathematics content knowledge	24	11.05 (4.68)	7.45 (3.12)
Overall	150	77.97 (11.32)	58.56 (10.09)
Source: Authors, based on analysis of TET paper 1 data			

Section wise performance indicates that the key areas where candidates performed poorly were the English language with qualifying candidates achieving a mean score of 11.69 (3.68) out of maximum 30; i.e. 39% and Mathematics content knowledge with qualifying candidates achieving a mean score of 11.05 (out of a maximum of 24) ie 46% (see Table 3.4).

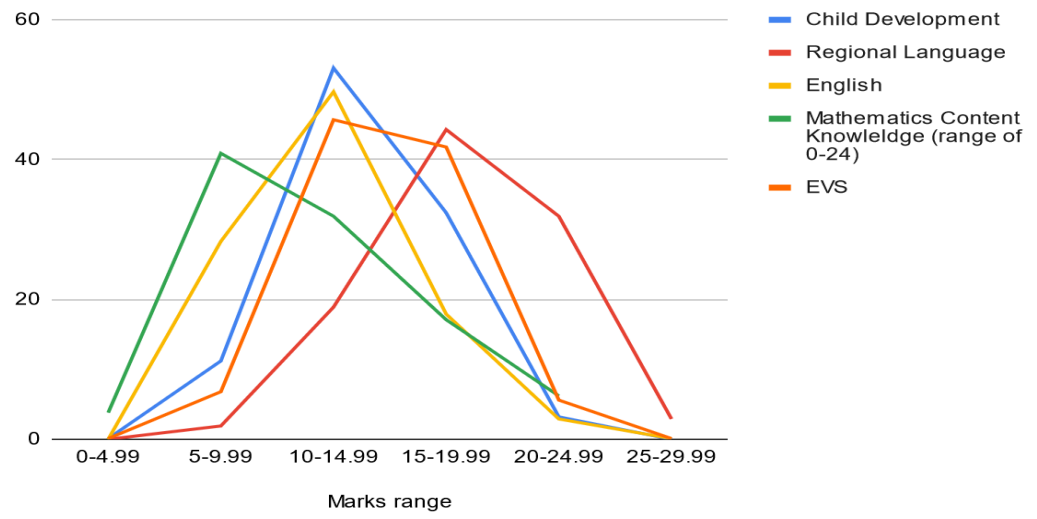
Figure 3.2 also provides a comparison of the performance of qualifying candidates institution type-wise. This information is reorganized in Table 3.5 to enable comparisons to be made among institutions. Here, it can also be seen that students from DIETs outperform than students from self-financed colleges in particular, overall, and also within female candidates and candidates from SC/ST/PWD.

Table 3.5 Comparison of performance (mean marks) of candidates from different institution types				
Rank Order		Overall	Female	SC/ST/PWD
1	DIETs	86 (12)	86 (11)	78 (12)
2	University Distance TE programmes	80 (11)	80 (11)	72 (10)
3	Aided Institutions	79 (11)	80 (11)	72 (9)
	State overall	**78 (11)**		**71 (9)**
4	self-financed	77 (11)	77 (11)	70 (9)
Government other category has been left out of this as the means have not been calculated for this group of institutions. Individual institution type means range between a maximum of 82 (9) for University Departments and 72(9) for Institutions run by Tribal Welfare Society.				
Source: Authors, based on analysis of TET paper 1 data				

Analysing section-wise and institution-wise performance, we note that low performance in mathematics content knowledge is an area of concern; candidates from self-financed colleges who qualified had mean scores as low as 9 (max 24) or about 37.5% in Mathematics and about 37% in English language.

The overall section-wise performance can be seen in Figure 3.4 below which shows the overall negative skew in performance in mathematics and English language as compared to regional language and EVS where performance is positively skewed.

Figure 3.4 Performance of students in components of TET Paper 1



Source: Authors, based on analysis of TET Paper 1 data

4. Secondary and Subject Teacher TET Examination (Science-Mathematics, and Social Sciences)

4.1 Profile of Applicants

About 1,30,000 candidates appeared for the TET science and mathematics subject teacher qualification examination and approximately 1,15,000 candidates appeared for the TET social science subject teacher qualification examination.

About 95% of candidates for science-mathematics and social sciences were from self-financed colleges, about 1% from government-aided colleges and about 3% from IASEs. About 1% each were from other government and distance education programmes.

Among all, 67% of applicants for the science-mathematics option, and 64% for the social science option were women. The proportion of SC/ST/ PWD, BC and General candidates were more or less the same for both options at about 28-31%, 60% and 11%. Compared to applicants for paper 1, the proportion of SC/ST/PWD was lower and the proportion of General candidates was higher. Compared with the demography of the state, the representation of candidates from the BC category was slightly higher, from the General category was lower and for SC/ST was approximately the same (see table 4.1).

Table 4.1 Demographic profile of candidates (all applicants and qualifying) in Science-Math and Social science

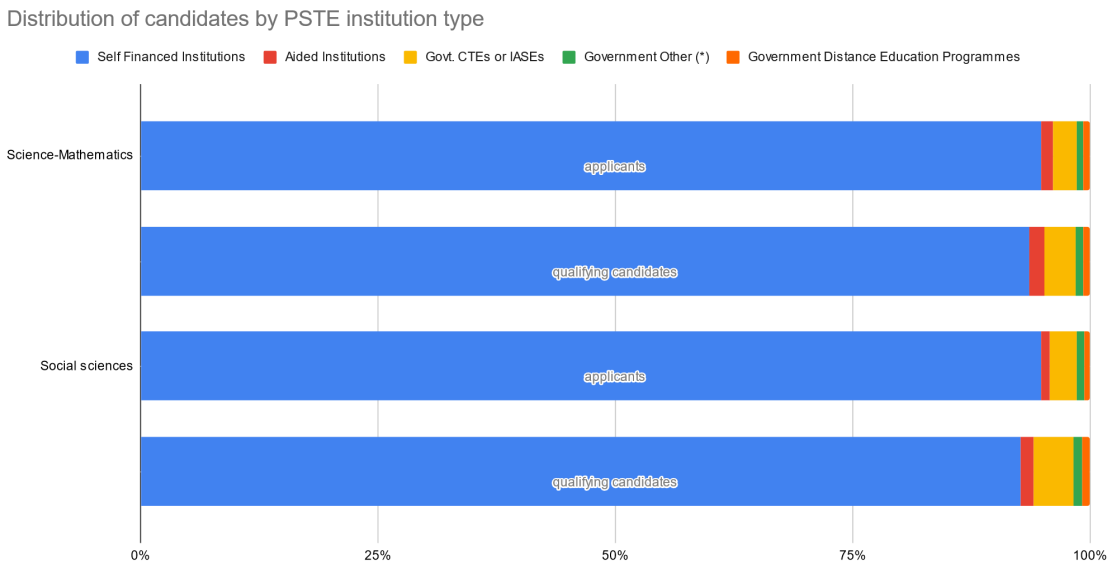
		All	Women	SC/ST/PWD	BC	General
State demography		-	-	approx 25%	approx 50%	approx 25%
Science and Mathematics	TET applicants		67%	28%	60%	11%
	TET qualifying candidates	58%	61%	48%	49%	2%
Social Sciences	TET applicants		64%	31%	59%	10%
	TET qualifying candidates	38%	61%	56%	42%	1.5%

Source: Authors, based on TET Paper 2 data

4.2 Qualifying candidates and their profile

The percentage of students qualifying for science-mathematics were 58% while for Social Sciences it were only 38%.

Figure 4.1 Distribution of candidates by PSTE institution type for Science-Mathematics and Social science



Source: Authors, based on TET Paper 2 data

Overall distribution of qualifying candidates institution-wise for both science-mathematics and social science, followed the expected pattern of applicants with the largest proportion being from self-financed colleges, followed by the IASEs and CTEs, government-aided colleges and other government programmes (including distance education) (see Figure 4.1 and table 4.2).

Table 4.2 Distribution of candidates by PSTE institution type for Science-Mathematics and Social Science

		Self-financed Institutions	Aided Institutions	Govt. CTEs or IASEs	Government Other	Government Distance Education Programmes
Science-Mathematics	Applicants	95%	1.3%	3%	0.7%	0.7%
	Qualifying candidates	94%	1.59%	3.35%	0.7%	0.8%
Social Science	Applicants	95%	1%	3%	1%	1%
	Qualifying candidates	93%	1%	4%	1%	1%

Source: Authors, based on TET Paper 2 data

4.3 Comparison of proportion of applicants qualifying by institution type

However, within each institution type, analysing the proportion of qualifying candidates to applicants, the IASEs-CTE institutions saw the highest proportion of their candidates qualifying. In science-mathematics, 78% (TET overall 58%) qualified and in Social Science 57% qualified (TET overall: 38%). The same was noted in the case of students from government-aided institutions (73% for Science-Mathematics and 55% for Social Science).

The overall proportion of students from self-financed colleges qualifying was the lowest at 57% in Science-mathematics and 38% in Social science (see Figure 4.2 and Table 4.3).

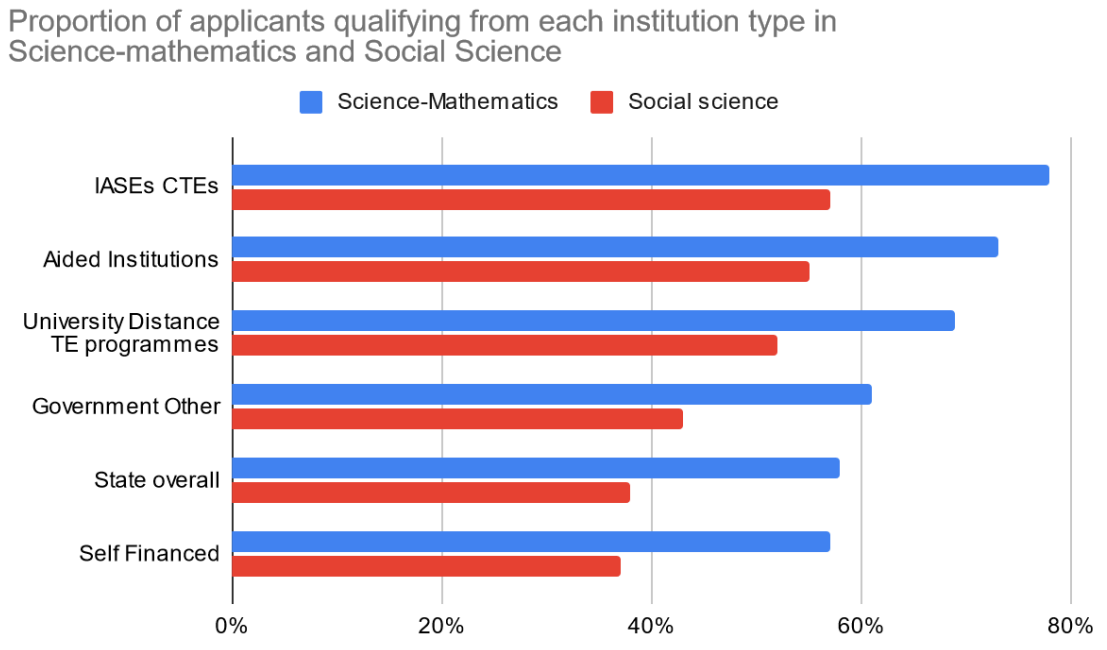
Table 4.3 Proportion of applicants qualifying based on their PSTE institution

Rank Order		Science and Mathematics			Social sciences		
		Overall	Female	SC/ST/PWD	Overall	Female	SC/ST/PWD
1	IASEs CTEs	78%	78%	94%	57%	57%	84%
2	Aided Institutions	73%	71%	95%	55%	53%	89%
3	University Distance TE programmes	69%	67%	91%	52%	48%	76%
4	Government Other	61%	58%	89%	43%	43%	71%
	State overall	**58%**	**54%**	**88%**	**38%**	**36%**	**68%**
5	Self-financed	57%	54%	88%	37%	35%	68%

Source: Authors, based on TET Paper 2 data

In order to examine if higher qualification in IASEs and CTEs or aided institutions was on account of a higher proportion of SC/ST/PWD candidates, we disaggregated the SC/ST/PWD candidates overall and institution-wise to examine the proportion of applications who qualified. Overall, a high proportion of SC/ST/PWD candidates qualified: 88% in Science-Mathematics and 68% in Social Science. In both cases, about 30% points higher than the overall qualifying percentage of 58% and 38% respectively. Within each institution type also the proportion of SC/ST/PWD qualifying from IASEs, CTEs and government-aided institutions was higher than the proportion from self-financed institutions. In Science-Mathematics 94% vs 88% and in Social Science: 84% vs 68%.

Figure 4.2 Proportion of applicants qualifying from each institution type for Science-Mathematics and Social science



Source: Authors, based on TET Paper 2 data

4.4 Quality of candidates based on overall marks and section-wise performance

In order to examine the overall performance of candidates and their quality, the mean score of qualifying and non-qualifying candidates was computed and used as a proxy for quality. Overall the marks achieved by candidates for science and mathematics subject teachers were better than the performance of primary teachers with an aggregated mean of 82 (i.e., 55%) as opposed to 78 (i.e., 52%) for social science teachers and 51% for primary school teachers.

Table 4.4 Performance (mean marks) of qualifying candidates in paper 2 by institution type

Rank Order	Institution type	Science and Mathematics			Social Science		
Qualifying students							
	(max 150)	All	Female	SC/ST/PWD	All	Female	SC/ST/PWD
1	Govt. CTEs or IASEs	88 (11)	88 (11)	85 (12)	84 (12)	84 (12)	79 (13)
2	Aided Institutions	86 (10)	86 (11)	83 (12)	82 (10)	82 (10)	78 (11)
3	Government Distance Education Programmes	88 (12)	88 (13)	84 (13)	83 (13)	84 (13)	78 (14)
4	Self-financed Institutions	82 (11)	82 (11)	77 (11)	78 (11)	79 (11)	73 (10)
	Overall Qualifying students	**82 (11)**	**82 (11)**	**78 (11)**	**78 (11)**	**79 (11)**	**74 (10)**

Source: Authors, based on TET Paper 2 data

Further disaggregating performance by institutional type, in Science-Mathematics, students from IASEs and CTEs performed the best with a mean score of 88 (i.e. 59%), while those from self-financed institutions had a mean score of 82 (i.e. 55%). Examining the effect of affirmative action on quality, it is noted that the mean score of Science-Mathematics students from SC/ST/PWD social categories in IASEs and CTEs was 85 (i.e. 57%) which is higher than the overall mean (see Table 4.4).

In the case of Social Science, students from IASEs and CTEs performed the best with a mean score of 84 (i.e. 56%), while for those from self-financed colleges, the mean score was 78 (i.e. 52%). The mean score of social science students from SC/ST/PWD from IASEs and CTEs was 79 (i.e. 53%).

Performance was disaggregated by test components with a focus on languages (regional and English languages) and mathematics content knowledge. Overall, comparing scores of primary and secondary TET tests, scores of primary teacher TET were lower than that of secondary teachers in regional language (18 vs 21 i.e. 60% vs 70%) and while it was comparable in the English language (12 to 13 ie approx 40%) and mathematics content knowledge (11 to 12 ie about 36-40%) (see Table 4.5).

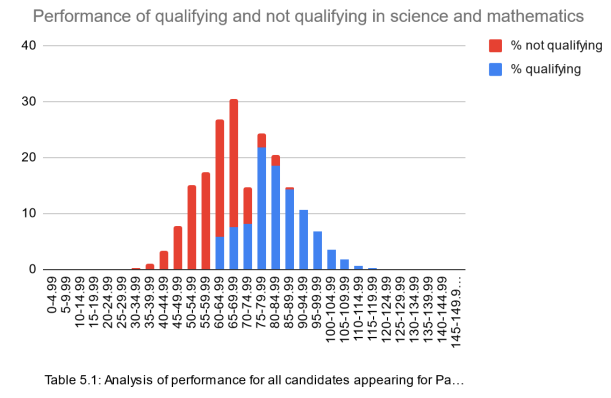
Table 4.5 Comparison of mean marks obtained in selected components of the TET paper 2

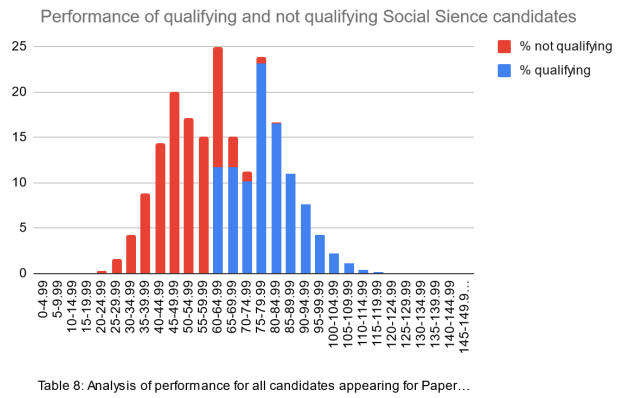
	Maximum	TET primary	TET maths and science	TET social sciences
Overall	150	78 (11)	82 (11)	78 (11)
Child Development	30	13 (3.2)	-	-
Regional language	30	18 (4)	21 (4)	21 (4)
English language	30	12 (4)	13 (4)	12 (4)
Mathematics content knowledge	24	11 (5)	12 (5)	-

Source: Authors, based on TET Paper 2 data

Overall, scores of the entire applicant pool, qualifying and non-qualifying candidates in both Science-Mathematics and Social sciences were plotted and analysed (see Figure 4.3).

Figure 4.3 Overall Performance of candidates (qualifying and not qualifying)





Source: Authors, based on TET Paper 2 data

Table 4.6 Performance of qualifying candidates in Science-Mathematics and Social science

Marks range in % (150 items for overall performance and 24 items for mathematics)	Science-Mathematics qualifying candidates			Social Science qualifying candidates
	% of qualifying candidates in marks range (150 items)	%qualifying candidates with maths content knowledge marks in range (24 items)	Remarks	% of qualifying candidates in marks range (150 items)
Less than 40%		Approximately 40%	40% of candidates qualifying in the TET for maths and science scored less than 40% in mathematics component.	% of qualifying candidates in marks range
40% -49.99%; pass percentage SC/ST/PWD: 40%	21.50%	Approximately 33.6%	SC/ST/PWD mean: 71 (9)	33.60%
50%-59.99%; pass percentage BC:50%	54.80%		Overall mean 78 (52%) BC mean 84 (8)	50.70%
60%-69.99%; pass percentage general: 60%	21.10%	Approximately 17.4%	General category mean 97 (6)	14.10%
70%-79.99%	2.60%			1.60%
80%-99.9%		Approximately 8.6%		

Source: Authors based on analysis of TET data

In Science-Mathematics, 21.5% of qualifying candidates and in social science, 33.6% of qualifying candidates scored less than 50%. Overall, in Science-Mathematics, 76% of qualifying candidates and 84% of qualifying candidates scored less than 60%. 24% of Science-Mathematics qualifying candidates and 16% of social science qualifying candidates secure more than 60% on the test. About 40% of candidates qualifying in the TET for maths and science scored less than 40% in the mathematics component (see Table 4.6).

5. Comparison of Institutions based on Overall Performance

Institutional performance was examined using the **overall percentage of candidates qualifying from the pool appearing from that institution as the indicator.** A comparison of the percentage of candidates qualifying separately for paper 1, i.e., primary generalist teacher and secondary subject teacher was made. Data pertaining to a total of 428 institutions from where secondary subject teacher applicants (paper 2) completed their PSTE, and 525 institutions for primary teachers (paper 1) was examined, institution-level pass percentage computed, and data compiled into the table (see Table 5.1 and 5.2).

About 54% of colleges from where paper 2 candidates appeared and close to **90% of colleges from where paper 1** candidates appeared, were found to have low to very low levels of overall performance with less than 50% of candidates appearing qualifying in the TET examination. The overall quality of DElEd programmes seems to be far lower as compared to the quality of BEd programmes. In only 9% of colleges offering BEd and 2% of colleges offering DElEd was the pass percentage found to be 60% or more. **All IASE/CTEs in the secondary teacher test pool were noteworthy in that 60% or more of candidates who had completed PSTE qualified, and all DIETs were noteworthy in the primary teacher test group in having more than 50% of applicants in TET qualify.** Only 10% of self-financed colleges offering BEd and only about 0.8% of DElEd were found to have higher levels of qualifying candidates.

Table 5.1 Summary of the overall performance of institutions

	More than 50% applicants qualifying	More than 60% applicants qualifying
Paper 2 CTEs and IASEs: 5 self-financed: 403 Govt aided and govt other: 20	100% of CTEs and IASEs (total 5) 45% of self-financed institutions (total 171) 72% of all govt or govt aided institutions	100% of CTEs and IASEs (total 5), 13% of self-financed (total 59)
Paper 1 DIETs: 11 self-financed: 497 Govt aided and govt other: 17	100% DIETs (total 11); 7% self-financed (total 36) 60% govt or govt aided	57% DIETs (total 4); 1% self-financed (total 4)

Source: Authors, based on TET Paper 1 and Paper 2 data

Paper 2 had 50% or more candidates qualifying. Paper 1, had more than 50% of candidates qualifying.

Table 5.2 Frequency table of performance of institutions based on the percentage of qualifying candidates

	college type												
secondary school/subject teacher													
% of candidates from respective insttituion qualifying in TET	aided	Govt-DIET	Govt-CTEorIASE	Govt-St-Univ-Dept	Govt-St-Univ-Dist	Govt-Tri-Wel	Govt-C-Univ-dept	Govt-C-Univ-dist	Self Financed Colleges	**Grand Total**	% of institutiions by overall pass percentage falling into relevant class	% of institutiions by overall pass percentage falling into relevant class	notes
0-9.9									3	**3**	0.70%		
10-19.9									12	**12**	2.80%		
20-29.9									30	**30**	7.01%		
30-39.9									53	**53**	12.38%		
40-49.9				1		1		1	134	**137**	32.01%		
50-59.9	1	1			1			1	130	**134**			100% of CTEs and IASEs, 72% of all govt or govt aided institutions; 45% of Self financed institutions
60-69.9	1	1	3	1	1	1			32	**40**			
70-79.9	2	1	2	1					7	**13**			
80-89.9				1	1		2		2	**6**	45.09%	9.35%	
Grand Total	**4**	**3**	**5**	**4**	**3**	**2**	**2**	**2**	**403**	**428**			
Primary school generalist techer													
0-9.9									12	**12**	2.29%		
10-19.9			1						61	**62**	11.81%		
20-29.9			1		1			1	159	**162**	30.86%		
30-39.9	2				1			1	129	**133**	25.33%		
40-49.9	1		1		1				100	**103**	19.62%		
50-59.9	1	7	2			1			32	**43**			100% DIETs; 60% govt or govt aided programmes; 7% self financed institutions;
60-69.9		3					1		3	**7**			
70-79.9				1					1	**2**			
80-89.9		1								**1**	10.10%	1.90%	
Grand Total	**4**	**11**	**5**	**1**	**3**	**1**	**1**	**2**	**497**	**525**			

Source: TET data, analysis authors; data pertaining to institutions where there were between 1 and 4 candidates only appearing were left out. Data from 57 institutions for paper 1 and 106 institutions for paper 2 has been excluded.

6. Concluding observations and recommendations

6.1 Overall superior quality of DIETs, IASEs as compared to self-financed PSTE Institutions

The analysis of TET data from a state establishes the overall superior quality of PSTE offered by government-funded and managed or aided colleges over the self-financed colleges on several parameters. In terms of the overall percentage of candidates appearing and qualifying, in terms of the mean marks obtained by candidates, in terms of the overall pass percentage and mean marks obtained in the disaggregated performance in all social categories, and finally in terms of the overall pass percentage of students from respective colleges.

In terms of overall institutional quality as reflected in the proportion of applicants from each institution who qualify, DIETs, IASEs, CTEs and government-aided and government other institutions perform better with more than 50% of applicants qualifying in 100% of these institutions and more than 60% qualifying in at least 60% of these institutions. This could be taken as a reflection of the preference of good candidates to study in these institutions as their institutions of choice, as well as the institution's ability to provide better quality education as compared to the vast majority of self-financed colleges. The overall poor quality of colleges and likely also candidates from these colleges is noted in the case of 70% of institutions in the DEd space, and 72% of self-financed colleges where only 40% or less applicants passed the test.

A small but significant proportion of self-financed colleges seem to be more effective in enabling their students to qualify in TET, particularly in the BEd space. The factors that enable these self-financed institutions to succeed where most others fail, can be studied so that regulation and policy on self-financed institutions in the sector can be better informed.

6.2 Variation in the supply of teachers for levels and subjects

While the numbers of applicants and qualifying candidates are not taken to indicate adequacy for the State's education needs, these numbers from a given year could be taken as a snapshot picture indicative of overall teacher supply in absolute terms. For 10 primary school teachers, there are 8 science-mathematics teachers and 5 Social Science teachers (see Table 6.1). Arguably, assuming that science-mathematics teachers teach two subjects: science and mathematics, and social science teachers are allocated two subjects: Regional language and Social Science, the supply in the social science pool is low. It is on account of lower applicants but mostly on account of the overall low pass percentage.

Table 6.1 Teacher supply through TET

	Applicant pool (approx)	Pass %	Qualifying pool (approx)	Ratio
Primary teacher	3,00,000	32%	96,000	10
Science-mathematics teacher	1,30,000	58%	75,400	8
Social science teacher	1,15,000	38%	43,700	5

Source: Authors, based on TET Paper 1 and paper 2 data

6.3 Concerns regarding the proficiency of teachers

The test does have a filtering function. It seems that the overall quality of teachers receiving professional qualifications as primary teachers (DEd/DElEd) or Social Science teachers (BEd) is low, with only 32% and 38% of such professionally qualified graduates passing the TET. The overall quality of Science-Mathematics teachers is better with 58% of them qualifying for the TET. Comparing the mean score of candidates qualifying in the TET to those who do not qualify, the difference in overall performance mean score is about 15% for primary school teachers and Social Science teachers and about 11% for science teachers. In the case of mathematics, the difference is about 17% (see Table 6.2).

Table 6.2 Overall teacher quality as measured by marks on the TET

	Overall (max: 150)		Regional Language (max: 30)		Mathematics content (max:24)	
	Qualifying	Not Qualifying	Qualifying	Not Qualifying	Qualifying	Not Qualifying
Primary teacher	78 (11)	58 (10)	18 (4)	12 (4)	11 (4)	7 (3)
Science-mathematics teacher	82 (11)	65 (9)	21 (4)	18 (4)	12 (5)	8 (3)
Social science teacher	78 (11)	60 (10)	21 (4)	16 (4)	NA	NA

Source: Authors, based on TET Paper 1 and Paper 2 data

The analysis of TET also draws attention to the overall low mean and notes that a smaller percentage of candidates secures more than 60% in the test. Among primary teachers, there seems to be a poor level of mathematics content knowledge; a large proportion of those qualifying to become teachers do not have adequate mathematics knowledge as reflected in the mean marks in that component. That is also true in the case of secondary Science-Mathematics teachers. It may be desirable for the test to include a component-wise cut-off/qualifying mark, in addition to the overall qualifying mark, to ensure subject competence in qualifying candidates. The difference in performance in regional language proficiency is largest for primary school teachers (20% difference). These low levels of proficiency as measured in this test raise a flag concerning those who are acquiring qualifications to teach without having adequate language or mathematics proficiency.

The large percentage of teachers qualifying with between 40 and 50% marks is of concern and curricular reforms are essential to put into place to ensure that knowledge gaps leading to this poor performance are addressed during preservice. Deploying teachers with poor levels of content knowledge has implications for the system's ability to address quality education for vulnerable and socially marginalised groups.

Table 6.3 Ratio of teacher supply for different school requirements (level and subject)

	Primary: Science-Mathematics: Social science
Teacher supply	10: 8: 5
Quality teacher supply as measured by those who secure > 60% on test	10: 12: 4.5
Ratio of supply to quality	10: 1.6:: 10: 2.4: : 10: 1.6

Source: Authors, based on TET Paper 1 and Paper 2 data

6.4 Data from an analysis of TET: Possibilities and limits

One state responded positively to our request for the entire data set from end to end of their TET examination. They saw the potential of analysis from this data that can yield important insights regarding the quality of teacher education that can inform overall policy as well as give direction to curricular reform efforts and the design of the test itself. The analysis in this paper has shown the immense value in the analysis of this rich data.

The process of organising the data and extracting relevant information for analysis was arduous given how the data is captured in the application form used in TET. Identities of colleges had to be manually identified, mapped, assigned and coded for about 5,00,000 applicant entries overall. These also had to be rechecked to ensure no errors crept in, still, the process is not error-free. The data capture of PSTE institutions in which candidates are completing their qualifying professional degree can be captured more systematically and unambiguously. Additional data regarding candidates that are relevant to understanding their qualify and academic qualifications can be sought in the form of academic programme marks, etc. and subjects studied in the academic stream to understand additional matters of who is opting to enter into the teaching profession. For example, it would be valuable to know whether candidates who had undergone primary school PSTE had studied science and mathematics in their grades XI and XII.

The papers and candidate performance were not analysed at the item level. This is also possible in order to examine specific areas of strength and weakness of the teacher pool and to find ways to address this in preservice teacher education.

The TET examines only primary school teachers appointed and responsible for teaching regional language, English language, Mathematics and Environmental Studies (EVS) and 'Trained Graduate Teachers' (TGT) for Science-Mathematics and Social Science. The analysis therefore sheds no light on teachers of other subject areas of the school curriculum, including physical education, art and music or special educators.

6.5 Recommendations

1. Continuing and expanding Pre-Service Teacher Education in DIETs, IASEs and CTEs is essential to ensure the supply of good quality teachers in the system, and reduce wastage. In addition, other government-supported teacher education institutions offering PSTE can also be expanded and strengthened.
2. Pre-service curricula must be reviewed to ensure greater proficiency is developed in language and especially in mathematics, as well as in English language considering the growth of English teaching in all school sectors.
3. It may be desirable to introduce a cut-off at the component level in addition to the overall qualifying cut-off to ensure there is adequate subject knowledge in all relevant areas that the teacher is required to teach.
4. Special efforts to expand government and government-aided institutions in primary school teacher preparation are essential as they show greater potential for quality in candidates and overall performance. Social justice is also more effectively addressed in these institutions.
5. The supply of Social Science teachers as a whole and specifically the quality of Social Science teachers is a matter of concern and specific incentives and measures to strengthen the quality of candidates through curricular efforts are required to address this.
6. Special curricular efforts to overall raise the levels of proficiency for students from marginalised communities are necessary through specialised inputs in the curriculum so that they are better prepared as teachers when they enter the system.
7. The large proportion of students from DElEd and BEd Social Sciences who do not qualify (between 60 -70%) is a matter of concern and special efforts will be needed to raise the quality of these programmes to lead to better preparation of teachers.
8. The very large proportion of DEd institutions that seem to be functioning at low levels of efficiency should raise an alarm and lead to more investigation and research into what is taking place in these institutions and the reasons for their low levels of performance.
9. The small but significant self-financed institutions that are more successful and able to ensure better teacher preparation as identified by this study must be researched more so that learning on how they succeed where others fail, can inform policy and regulation.
10. Improvements can be made in the application form filled by applicants which can render coding and analysis more efficient and effective, and yield more valuable insights into aspirant teachers.

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(authored by Padma M. Sarangapani, Ruchi Kumar, Bindu Thirumalai, Mythili Ramchand and Anusha Ramanathan).