

The effectiveness of the Right to Education (RTE) Act in unrecognised schools of Delhi, India

Gopalkrishnan Iyer

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Abstract

In 2009, the Government of India introduced a new Education Act known as the “Right to Education” (RTE). The Act was brought out with all good intentions that would focus on the provision of education to 6 –14 years of age. Focused heavily, on input based indicators the Act intended to improve learning outcomes of children enrolled in private and public schools. The RTE act is being imposed stringently on several low-cost private schools across Delhi, and they have been, threatened with closure in the case of non-compliance to the RTE indicators. This thesis investigates the possible consequences of the Act.

The current research using mixed methods attempts to understand the relationship between the various RTE input indicators and the academic outcomes of the children enrolled in the threatened private schools of Delhi. The study used two sets of instruments to measure the learning outcomes of students. First, a test for subject-specific competence was measured through a bespoke exam, known as the ‘diagnostic test’. Second, general intelligence was, measured through Raven’s standard progressive matrices test to control for innate ability. The background of children was also gathered using a questionnaire. Information on school RTE indicators were collected through a school questionnaire. Teacher data related to the RTE were gathered through a semi-structured teacher questionnaire. An in-depth interview was carried out to collect qualitative data and gained narrative accounts from school head teachers and principals to understand more deeply how the RTE indicators were impacting on student outcomes and low-cost private schools in Delhi. These data were analysed using linear regression models, to investigate the impact of the RTE on schools and student outcomes.

The study revealed that most RTE infrastructure indicators were not statistically significant regarding student outcomes. Only, two factors were positively significant first, the provision of mid-day meals and second the presence of a library. Teacher qualifications have a positive influence on student outcomes, however other factors mentioned in the RTE including job status of the teacher, the salary range or parent-teacher association meetings, were found not to influence test scores. Finally, regarding the core indicators of the RTE, only two factors affected academic outcomes positively and were found to be significant. First, practising inclusivity and second, allowing ‘hands-on-learning’ for students. Schools that charged a fee on a higher spectrum, as compared to those which charged fees on a lower range, were found to affect student outcomes negatively, at a significant level. Other RTE academic and institutional indicators seemed to have negative or no impact on student learning outcomes, however, they were not significant.

A major policy implication of this research is to provide feedback to the Government of India on the gaps that currently exist in the RTE act, that affect student's learning in low-cost private schools, threatened with closure notices. The study is unique as it gathered data from officially threatened schools, from the districts of New Delhi, that weakly comply with the RTE. The research provides insights generated from data and in-depth discussions with school owners on schooling inputs likely to affect student learning outcomes, teaching and the operation of low-cost private schools to inform future discussions around the RTE.

*Dedicated to
my late friend Paras Trivedi
&
the millions of children across the globe who struggle to get in schools*

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Statistical signs and symbols used

Symbol	Denotation
μ	mean
μ_l	mean of language scores
μ_m	mean of mathematics scores
μ_{evs}	mean of environmental studies (Evs) scores
σ_x	standard deviation
σ^2	variance
σ_{2l}^2	variance in language scores
σ_{2m}^2	variance in mathematics scores
$\sigma_{2\text{evs}}^2$	variance in evs scores
Σ	summation
₹	Indian national rupee
£	Pound sterling
R	sample correlation coefficient
r^2	coefficient of determination
R^2	square multiple correlation coefficient
ϵ	Error Term in regression/statistics. More, generally used to denote an arbitrarily small positive number

Glossary of terms

ASER	Annual Status of Education Report
B.Ed.	Bachelor of Education
BRICS	Brazil, Russia, India, China and South Africa
CABE	Central Advisory Board of Education
CCS	Centre for Civil Society
CSF	Central Square Foundation
CSO	Central Statistical Organisation
DD	Difference-in-Difference
DEO	District Education Officer
DISE	District Information System for Education
DOE	Department of Education
DSEAR	Delhi State Education Act and Rules
DVD	Digital Video Disc
EVS	Environmental Studies
EWS	Economically weaker sections
FY	Financial Year
IAEEA	International Association for the Evaluation of Educational Achievement
IMF	International Monetary Fund
INR	Indian National Rupee
IQ Test	Intelligent Quotient test
IRT	Item response theory
MDM	Midday meals programme
MHRD	Ministry of human resource and development
MOA	Memorandum of Association
NAPE	National Assessment of Progress in Education
NCERT	National Council for Education Research and Training
NCTE	National Council for Teacher Education
NGO	Non-Governmental Organisation
NLSY	National Longitudinal Survey
NOC	No objection certificate
NTTP	National Teacher Training Programme
OECD	Organisation for Economic and Co-operation and Development
OLS	Ordinary least squares

OPEPA	Odisha Primary Education Programme Authority.
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
PTA	Parent Teacher Association
PTR	Pupil teacher ratio
RCT	Randomised Controlled Trials
RDD	Regression Discontinuity Design
RTE	Right to Education Act
SD	Standard deviation
SDP	School Development Plan
SMC	School Management Committee
SMC	School Management Committee
ST	Scheduled Tribe
TIMSS	Third International Mathematics and Science Study
TLM	Teaching-learning material
UDHR	Universal Declaration of Human Rights
UEE	Universal Elementary Education
UGC	University Grants Commission
UNEB	Uganda National Examination Board
UNESCO	United Nations Educational, Scientific and Cultural Organization

Chapter One: Introduction to the RTE and Private sector education in India

1.1 Prologue – the story behind the research

In the year 2014, something happened to my wife and me which inspired my thinking and strengthened my intention to research the landmark act in India known as the Right to Education (RTE). We were newly married, settling down in our house and trying to adjust to the changes around us. Although I had lived there for quite a long time, my wife had moved in with me, and things were progressing well with our lives.

One day while driving back, my wife asked me if I could help someone to gain admission to a government school, given my background in education consultancy. Not knowing what the case was, I probed further as both of us were keen to help others, especially those who came from economically challenged backgrounds. She said that a domestic help engaged at our neighbour's house had approached her and asked if we could assist her daughter in seeking admission in the nearby government school. I replied that I was glad to help. Having struggled to obtain a good education all my life due to challenging financial circumstances, I understood the value of education and the change it could bring about in one's life.

The next day, we met the domestic help and asked her about the assistance she would require. She told us that her daughter, who was enrolled in a village school in Uttar Pradesh (neighbouring state to Delhi) wanted to study further. However, the village school did not have a 10th grade¹ and therefore, she wanted our help to enrol her daughter in the government school. We agreed to help so the next day; we accompanied her to the nearest government school in our neighbourhood to request admission for her daughter. We met the principal at the school and explained the situation, but to our dismay, she refused, stating that there were no places and that the girl required a transfer certificate (TC).

We were shocked, and I quoted the country's landmark regulation – the 'Right to Education' Act and explained that it was her duty to ensure that the girl was enrolled in the school. Mocking the legislation, she said that the act is meaningless in reality and merely strong on paper. I felt hopeless as the child's dream of studying in school faded. A million thoughts ran through my mind, and deep in my heart, I wanted the girl to get a good education.

¹ 10th Grade in the Indian education system is the GCSE equivalent of the British system.

My wife and I approached the nearest private school which charged a nominal fee and enquired about the admission policy. The scenario was entirely different; the headmistress happily met us, explaining that she would be glad to enrol the girl in the school. Although the school was not as large as the government school or the premium private school, it was nevertheless functioning well.

Following discussion with the headmistress, I realised that there were many gaps in the RTE and that nothing was being done to bridge the gaps. We paid the initial admission fee to the school, and the domestic help told us that she would be able to afford the monthly fee from her savings. We were happy, but then something was indeed missing – I was unable to sleep that night, and the RTE kept playing on my mind. One thing was abundantly clear: this so-called landmark act introduced to raise the quality of human capital was indeed lacking something.

Having already applied for a doctoral programme, I was searching for a catalyst, and the incident hit me like a juggernaut. It made me realise how feeble the country's landmark act was and that its gaps engendered an unequal educational system by keeping the poor at bay. I was determined that I would study the law in detail to understand the gaps and what could be done to bridge them. Thus started my long journey to seek answers by deciphering a myriad of complex questions associated with the RTE.

Throughout the thesis, I study the RTE Act in detail, weave the research questions around it, present my findings and finally provide some concrete recommendations in the end as to how the gap could be bridged. The chapter has been divided into five main sections and includes information pertaining to the undertaking of this research project. The first section explores the historical basis of private sector involvement before the introduction of the RTE. It is crucial to understand how past events played a critical role in the government gaining control of education and laid out the basis for new experiments in the education sector.

The second section looks at the emergence of RTE and the historical framework behind the Act; it traces the timeline of the Act and discusses the two major components associated with it. These include education financing and the involvement of non-state actors in the provision of education.

The third section looks at the Right to Education Act and dissects its different sections. This enables a thorough understanding of the RTE Act. Examining the different sections of the Act assisted in designing the research instruments, employed during the data collection process.

The gaps prevailing across the different sections, along with the insights generated during the research were then used for drafting the recommendations in the concluding chapter. The fourth section investigates the growing evidence of the private sector by tracing the rising enrolment in private schools in India and tries to justify the involvement of the private sector in the field of education. It outlines the crucial role that the private sector can play in the regulation, provision and financing of education. Hence, it provides the necessary impetus to strengthen the case for investments in the private sector for education, which is currently threatened by the RTE act.

The story at the beginning of the thesis provided anecdotal evidence demonstrating how poor families resort to low-cost education. The fifth section explores the predominant rise of low-cost education providers across developing parts of the globe.

Delhi, the national capital of India, has created a maze of complex rules for private education providers. Moreover, the hostile environment, logistical convenience and professional networks which led to the selection of Delhi as the preferred location for the field work is outlined in the sixth section. The final section provides a brief on the quest for my knowledge by setting up the research questions and explains the layout and the structure of the thesis.

The next section throws light on the importance of education for human capital and the change seen in the Indian education sector since its independence from the colonial rulers

1.2 Background - the Indian education sector

Human capital is a vital component of the progress of a nation, due to the emergence of technical changes, globalised structures and economic liberalisation (Becker, 2009; Taylor, 2012). To develop human capital, it is imperative that the production of social goods like education and healthcare be in capable hands (Shah and Miranda 2012). Given limited resources and tight legislation, developing nations of the world attempt to influence the production and delivery of social goods and key amongst them is education (Brende, 2015). Education is important in the generation of human capital (Delsen 2007) and is a merit good with externalities that are beneficial for society. Because of its dominant role, it is assumed that the state should provide education free at the point of delivery for all of its citizens and thus to a great extent states strive to maintain responsibility for this (Delsen, 2007; Shah and Miranda 2012). Shah and Miranda (2012) though challenge the notion that if the private sector can be entrusted with the production of economic goods, why it cannot subsequently be trusted with the ownership and delivery of social goods? Such is the conundrum that Indian governments, even after seventy years of colonial rule, are unable to decide upon.

The Indian education sector remained unchanged until the 1990s. However, since then, government policy has favoured liberalisation, privatisation and globalisation (Ravan, 2014). Advocacy for the private sector in elementary education and specifically for the schooling of the poor has gained ground (Nambissan, 2015) in recent years with the assistance of individuals, civil societies, social enterprises and some academic institutions (IDFC, 2012). Several factors, as well as market-based principles, have shaped the Indian economy. Market principles have driven efficiency, encouraged the spirit of competition, challenged public systems to realign themselves to suit the requirements of the consumers in the Indian education sphere and redefined education as a deliverable good (Batra, 2013; IDFC, 2012).

India has earned its place amongst the group of emerging nations due to its phenomenal growth in recent decades (Anderson and Strutt, 2013). The countries which formed the consortium of BRICS (Brazil, Russia, India, China and South Africa) have been among the most rapidly growing nations of the world and have accounted for a quarter of global gross domestic product (GDP). The Indian economy grew between 7 and 7.5 percent in the financial year 2016-17 according to the Central Statistics Organisation (CSO) and International Monetary Fund (IMF) (OECD, 2017). India's thriving private enterprise is reflected by the fact that in 2017 alone, the total investment value of the start-ups² in India amounted to US\$3.5 billion (Statista, 2015) placing India in third place as the most significant start-up base in the world. The propelling force behind India's progress is its labour force which is expected to reach 160-170 million by 2020 (IBEF, 2017).

Education will hold the key to fuel India's future growth (PwC 2014), and it will undoubtedly play a significant role as India projects itself as a knowledge economy. The spread of education undoubtedly impacts on the wellbeing of the population, brought about in part through high correlations with education, health and nutrition. Education will act as the cornerstone not only for social segments of the society but will also contribute to the economic transformation of the Indian society by building a healthy, active and democratic society (PwC 2014). Hence, it is crucial for India's young labour force to have access to quality education (Basu, 2013). The Indian education system can be divided into three main categories – schooling, higher education and vocational education (Nuffic 2015). Schooling can be further classified into elementary, secondary and higher whereas higher education is general and professional (Nuffic 2015).

² Start-ups, as defined by the Indian government includes any entity, less than seven years young with an annual turnover of less than 250 million rupees and headquartered in India (Statista 2015)

The principal agency for the education sector is the Ministry of Human Resource and Development. Other agencies at the central level that maintain the standards of the education system comprise the National Council of Educational Research and training, the University Grants Commission (UGC), the All India Council of Technical Education and the National Council for Teacher Education (NCTE). The State Council of Education Research and Training maintains standards at the state level (Madhavan and Sanyal, 2012).

The constitution of India enlists education as a 'concurrent theme', meaning that laws can be framed both at the federal and state level. Several states have introduced their laws that complement the RTE. These include the Delhi Primary Education Act, 1970; the Gujarat Compulsory Primary Education Act, 1961 and the Tamil Nadu Compulsory Elementary Education Act, 1994 (Juneja, 2003). The Supreme Court of India declared that education is a fundamental right of every child and hence instructed the centre to amend the constitution. In coherence with the instructions of the apex court, the constitution was amended in 2002 and Article 21A was added, requiring the state to provide free and compulsory education to all children between the age of 6 and 14 years. This formed the genesis of the RTE which was instated in 2010 (Madhavan and Sanyal, 2012).

1.3 Unfolding history –State of educational provision during the colonial rule

This section tracks the history of the Indian education from 1800 to 1937 and illuminates key developments during the period. The 137 years is divided into five stages outlining the most important events that occurred during this time (ref figure 1).

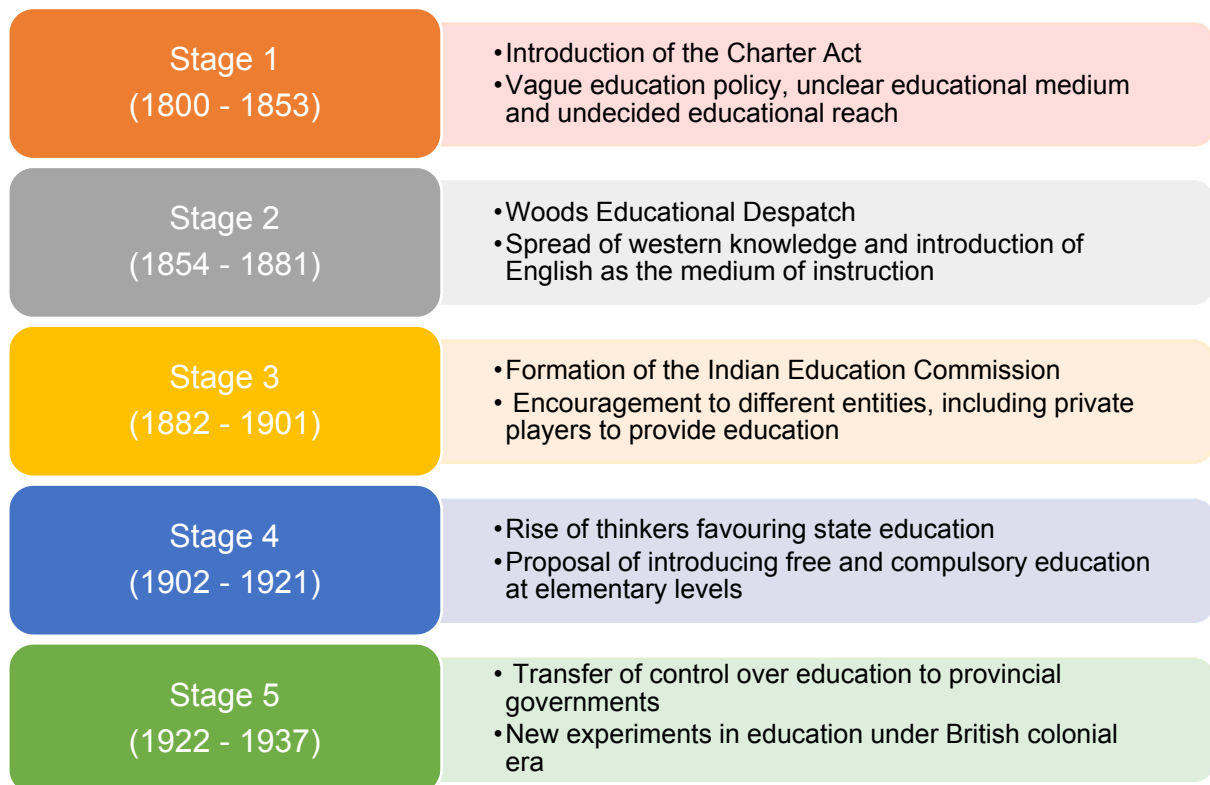
The first stage (1800-1853) commenced in the early 18th century and introduced the Charter Act in 1813 which paved the way for the modern education system in India (Sharp, 1920). The second stage (1854-1881) began with 'Woods Educational Despatch' in 1854, a move intended to strengthen the British education system in India. During the third stage (1882-1901), the Indian Education Commission was formed which encouraged private entities to provide education. The fourth stage (1902–1921) saw the rise of thinkers who favoured state education who laid the foundation for a state-based education system in India. Autonomy was given to the Indian provinces during the final stage (1922–1937) leading to the beginning of educational experimentation in a decolonised India

At the beginning of the first stage (the first half of the nineteenth century), the system did not provide clarity on certain pertinent issues. Firstly, the objective of the education policy was quite vague, and it was unclear amongst scholars whether to spread Western knowledge or to preserve Eastern learning. Secondly, the medium of instruction to be adopted was also not clear – whether it should be English or the vernacular language spoken across India.

Thirdly, it remained undecided whether education would be made available to everyone or just to a selected few. Finally, the extent of government involvement in education provision compared to that of the private sector was unclear.

The initial stage of the Indian education system attempted to resolve the above issues and was put to rest with the promulgation of the Woods Despatch Act in 1854 (Nururllah and Naik, 1943; Sharma and Sharma 2012).

Figure 1 - Historical stages in the Indian Education system



The second stage brought some level of clarity with the introduction of the Wood's Educational Despatch Act. The Woods dispatch was introduced to cover up the failure of 'filtration theory', believed to promote education amongst the upper echelons of Indian society (Chand, 2007). The primary intent behind the Woods Educational Despatch was to spread Western knowledge and introduce English as a medium of instruction in the Indian education system (Sharma and Sharma, 2012)

Education historians Nururllah & Naik (1943) have captured the essence of the 'Woods Educational Despatch' Act in the following words:

"The Despatch of 1854 declared that the main object of the educational system was to spread Western knowledge and science.

The Government could never have the funds to provide for all the educational needs of the country, the bulk of its educational institutions would have to be organised by private bodies” (Nurullah and Naik 1943, p. 17)

It is evident from the Despatch that private participation was supported. The Despatch acknowledged the role that private bodies could play an important role in shaping the Indian education system. It is unequivocal that even during those times, the state alone could not bear the responsibility of education as its resources were not adequate to support such an endeavour.

The third stage marked the formation of the Indian Education Commission which considered that the British government should withdraw itself from the direct provision of education and allow distinct agencies to spearhead the propagation of education in India. These agencies included schools run by missionaries, the government department and a small effort by a group of private entrepreneurs. Nurullah and Naik (1943) outline the reason as to why the private sector seemed to be the silver lining of the cloud amongst all of them.

“The Indian Education Commission....opined that departmental institutions were too costly to be multiplied; that it would be in the best interests of a poor country like India to close them or transfer them to private enterprise; and that the efforts of Government should be mainly directed to the encouragement of private Indian enterprise.” (Nurullah and Naik 1943, p19)

The fourth stage in the Indian education system (1902-1921) saw the predominance of thinkers who advocated state education. This led to Gopal Krishna Gokhale's³ bill which introduced compulsory elementary education. However, the British government ignored the bill, promising to provide better curricula in primary and secondary schools, improve the higher education facilities and raise the number and standard of the existing institutions (Jain, 2007; Biswas & Agarwal, 1994).

³ Gopal Krishna Gokhale was one of the founding social and political leaders during the Indian Independence Movement against the British Empire in India. Gokhale's bill to the Imperial Legislative Assembly was one of the first attempts to confer the Right to Education on the Indian people see (Dabholkar, 2010, Wikipedia , 2015)

Gokhale's bill is viewed as one of the early seeds sown for the demand for free and compulsory education for children in the Indian subcontinent. The final stage in the history of Indian education history saw the transfer of control of education to various provincial state governments. During this time, different schemes were introduced by the Provincial Governments, and some new experiments under British control were trialled (Nurullah and Naik, 1943). The next section looks at the evolution of the RTE and traces the historical timeline since its inception and implementation across India.

1.4 How did the Right to Education (RTE) evolve and why look at it?

The history of the Right to Education Act can be traced to 1911 when Gopal Krishna Gokhale, an Indian freedom crusader, presented the Free and Compulsory Education Bill in the Imperial Legislative Assembly. The Acharya Ramamurti committee sought the first official recommendation for the inclusion of a fundamental right to education in 1990. After that, several political changes influenced the course of free and compulsory education (CCS; CSF 2013). The Right to Free and Compulsory Education for Children Act 2009 has had a lengthy history, subjected to numerous rounds of heated debate and philosophical and semantic alterations.

Some historians like Desai (1953) state that the roots of the Right to Education Act emanate from the education act passed in Britain in 1870 which demonstrated a commitment to the provision of education on a national scale. According to Desai (1953), educated Indians started demanding similar laws in India to benefit children labouring in factories and being manipulated to perform other unsuitable work (Desai, 1953).

India's participation in the international sphere also raised the pressure on its initiatives to introduce free and compulsory education. The political urgency of considering education as a right was felt in the early nineties when the Supreme court of India assured to provide early childhood care and education for all children until they completed the age of six years. The primary trigger to introduce an Act came with three significant changes in the 86th Amendment to the constitution in 2002 (Centre for Civil Society, n.d).

The bill, introducing free education first drafted in 2003, and a redraft of the same by Central Advisory Board of Education (CABE) was presented to the MHRD (Ministry of human resource and development) in 2005. In the subsequent years, a participatory process of inviting comments from members of the public yielded several different drafts of the bill until finally, in 2008, the Union Cabinet stamped its seal of approval on it and presented it before the 'Rajya Sabha' which passed it in July 2009. The bill then proceeded to the 'Lok Sabha', where it was passed in August 2009.

The president and the MHRD minister gave consent, and in 2010, the act was enforced by the central government (Centre for Civil Society n.d). To understand the timeline and the chronology of the historical events table 1 illustrates the landmark events that occurred over a century before the RTE was finalised and enacted as a law.

Table 1 – Chronology of events leading to the RTE

Year	Landmark events occurring during the years
1906	Gopal Krishna Gokhale's plea to the imperial legislative council for free and compulsory education
1917	The first law on compulsory education passed (popularly known as Patel Act)
1918-1930	Compulsory Education Act in the British province of India
1930	Hartog committee for quality primary education
1944	Sargent plan for achieving UEE (Universal Elementary Education) by 1984
1948	The United Nations adopted the Universal Declaration of Human Rights UDHR and declared education as a fundamental right in Article 26.
1949	Advisory committee rejected free and compulsory education as a fundamental right and defined it as 'Directive principles of state policy.'
1950	Article 45 of the directive principles of state policy of the newly adopted constitution of India assures free and compulsory education for all children until completion of 14 years
1975	Central government declares primary education as a joint state/centre responsibility and puts it on the "concurrent list" in an amendment (the 42 nd) to the Constitution.
1990	Acharya Ramamurthi's first official recommendation to include education as a fundamental right.
2003	First draft of the Right to Education bill circulated for public review
2005	Redraft of the bill by Central Advisory Board of Education (CABE) committee and its submission to MHRD
2008	Right of Children to Free and Compulsory Education Bill introduced in the 'Rajya Sabha' ⁴ , and the bill referred to Parliamentary standing committee
2009	<ul style="list-style-type: none"> • 'Rajya Sabha' (Upper house) cleared the Bill with minor changes to the 2008 draft bill. • On August 4, the 'Lok Sabha'⁵(Lower house) clears the Bill. • President of India permits the Bill on August 26 and brings the bill into force as an act

⁴ Rajya Sabha or Council of States is the upper house of the Parliament of India. Membership of Rajya Sabha is limited by Constitution to a maximum of 250 members (Wikipedia, nd)

⁵ Lok Sabha also known as the house of the people is the lower house of the Indian parliament. The members are the representatives of people and it comprises of 545 members spread across the Indian states and union territories see (National Informatics Centre n.d)

2010	<ul style="list-style-type: none"> • Minister for Human Resource Development approved the Model Rules for the • Right to Education which state governments will use for their implementation of the Act (Jan 29) • RTE Act enforced by the central government on April 1st.
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Primary government interventions in India over the past decades were, aimed at increasing access (through capacity creation) and improving equity. However, to a large extent, the quality issue remains unaddressed (Madhavan and Sanyal, 2012). The private education sector has responded to these issues (both access and equity) through low-cost private schools, but itself faces a massive challenge in this case due to the extreme regulatory environment imposed by the government. Private players although allowed to set up schools and participate in the education sector are, however, debarred from making profits; any surplus has to be ploughed back into the school or institution (Basu, 2013). A regulation like this poses a considerable challenge to the entrepreneurs, as restricting the distribution of profit in the form of a dividend could discourage individuals from further investment in new educational entities.

In the case of India, it is essential to examine the RTE from the two critical perspectives. First the expenditure behind elementary education and second, the non-state actors involved in providing education to the millions of children in India.

India's education budget rose from ₹⁶ 687.1 bn to ₹ 972.5 bn from (£ 7.5bn – £ 9.7bn) 2007-08 to 2009-2010 an increase of 41.5% after the introduction of the RTE. (Aiyar, 2013). The increased budgets and the regulations in place have no doubt raised the enrolment levels by placing significant weight on infrastructure (almost every habitation in the country now has a school building) however the learning levels seems to be increasingly low (Aiyar 2013).

Data indicates an increase in the overall expenditure on elementary education increased by 26% between FY 2011–12 and FY 2014–15. Some of the Indian states like Tamil Nadu, Haryana, Uttar Pradesh, Rajasthan, and Gujarat witnessing the highest increases in both nominal and real expenditure (Dongre and Kapur, 2016). Expenditure estimates collated from the state budget documents, and government portals by Dongre and Kapur, (2016) show that the per-student expenditure has risen positively across most states.

⁶ ₹ - Indicates the currency symbol Indian National Rupee. Exchange rates for currency conversions are as on Oct 2017

Table 2 shows that per-student spending in government and private schools increased by 37% between 2011–12 and 2014–15 (Dongre and Kapur 2016).

Analysing the table shows that there is a wide disparity in different states' spending per student. For example, Himachal Pradesh spent around ₹39,343 (approx. £455) whereas Bihar spent only ₹5298 (approx. £61.73) per student (Dongre and Kapur, 2016).

Table 2 – Per annum Student Expenditure

States	2011–12	2014–15	Change	2011–12	2014–15	Change
	Nominal Expenditure in (£)		(%)	Real expenditure in (£)		(%)
United Andhra Pradesh	143.11	154.957	8.2	143.11	128.348	-10.3
Bihar	49.9	58.278	16.9	49.885	44.968	-9.8
Chhattisgarh	131.9	177.661	34.7	131.857	150.447	14.1
Gujarat	143.4	188.166	31.2	143.396	164.549	14.7
Haryana	190.5	298.793	56.8	190.465	247.885	30.2
Himachal Pradesh	300.2	432.773	44.2	300.19	381.161	26.9
Jharkhand	62.9	88.22	40.1	62.975	76.076	20.8
Karnataka	141.4	186.054	31.6	141.372	150.634	6.5
Kerala	152.4	213.609	40.1	152.438	177.639	16.5
Madhya Pradesh	87.5	131.197	50.0	87.461	106.92	22.3
Maharashtra	124.9	161.832	29.6	124.861	137.698	10.3
Odisha	88.7	103.037	16.2	88.605	86.295	-2.6
Punjab	79.7	100.562	26.1	79.706	85.602	7.4
Rajasthan	127.3	213.301	67.5	127.325	178.42	40.1
Tamil Nadu	108.0	186.054	72.2	108.053	156.519	44.8
Uttarakhand	211.9	288.596	36.2	211.948	251.339	18.5
Uttar Pradesh	91.9	144.122	56.8	91.894	115.236	25.4
West Bengal	65.3	77.011	17.8	65.329	NA	NA
Total	92.8	126.753	36.6			

The Annual State of Education Report (ASER) also provides similar findings and associates it with the learning outcomes. For instance, the state of Maharashtra allocated ₹12,075, (approx. £138) whereas Andhra Pradesh spent close to ₹8390 (approx. £95). However, learning levels in both states seem to be similar. Nearly 60% of the children in both states at grade five were able to read a class two textbook (ASER, Centre 2013).

All these figures indicate that the principal challenge at this juncture is to cement the link between increased financial outlays and learning outcomes.

The RTE is a crucial aspect in the link as the core component of the law guarantees the provision of 'age-appropriate' mainstreaming for all children (Aiyar, 2013). The second piece of the puzzle is the non-state actors in India involved in the provision of education.

With more than 220 million children struggling to receive quality education, critiques the provisions of the Act by arguing that they exclude critical non-state education providers and thereby eliminate schooling options for millions of children (Brinkman, 2013).

Major schools run by non-state players in the Indian education system include:

- Low-cost private schools
- Schools run by non-governmental organisations
- Alternative schools
- Non-formal schools

One of the major players in the non-state sector is what have become known as budget private schools or low-cost private schools. According to Chavan (2011), there are more than 40 million children in India enrolled in low-cost private schools, although the official census District Information System for Education (DISE) lists only 26,000 schools reaching out to 2.7 million children in India (Chavan, 2011). Nearly 65 percent of the children in Andhra Pradesh attend private unaided schools. Research from North Shahadra, East Delhi shows that out of the 265 schools, private unaided schools constitute 66% of the total (175 schools). A large-scale census in Bihar reveals that there are 1,574 schools – approximately 4.5 times more than the figure reported by government sources (Rangaraju, Tooley and Dixon 2012). According to Tooley and Dixon (2005), the low-cost schooling movement is so imperative that it is central to any progress in the Indian education system.

Supporters of low-cost private schools have argued that such schools are more efficient than state schools (Dixon, 2005). In their defence, they contend that these schools often charge low fees, allowing low-income families to access good quality education (Tooley, 2009). This is often in English medium and is capable of generating demand from the community (Baird, 2009).

'Choice and competition' theories also favour low-cost private schools and make them more accountable towards parents, offering an alternative to the state-based system (Basu, 2013).

De et al., (2002) find that although smaller and low-cost schools do not offer adequate infrastructure, they still generate demand from parents when compared with government-aided schools. Teachers in private schools are less inclined to absenteeism and more likely to be engaged in teaching activity.

Similarly, an earlier study by Muralidharan & Kremer (2009) finds that students in private schools have high attendance rates and better test scores, even after controlling for family and school characteristics. Most recent evidence from one of the world's most extensive RCT voucher programmes conducted by Muralidharan and Sundararaman (2015) reports positive effects in the Hindi language in favour of private schools which deliver better achievement outcomes at a substantially lower cost per student. Further evidence by Dixon et al. (2015) reports that voucher programmes in schools allow students to gain better test scores as compared to non-voucher students.

Those that oppose the private sector argue that private schools may not be an appropriate means of providing education to the poor especially in cases where states and governments subsidise education to a great extent (Colclough 1996, 1997). Global monitoring report (2009) (2013) for education deems education to be a fundamental human right and hence, education provided by private players will deprive the poorest and most vulnerable with those rights (EFA Global Monitoring Report 2009, 2013). Several others like Dyer and Rose (2005) and Rose (2006) are of the view that private players should partner with the state and limit themselves as wholly separate providers of education (Dyer and Rose, 2005, 2006). Nambissan (2012) argues that much of the evidence in favour of low-cost private schools is quite bleak and inconclusive. She further reports that low-cost private schools, in their quest for profit, curtail necessary investments including teacher training and investment in infrastructure to improve learning. This could have detrimental effects on teachers and can defeat the very purpose of education (Nambissan, 2012).

The RTE Act is imposed on both public and private schools across India. However, mandating the RTE norms across the country magnifies the risk of making albeit well-intentioned errors as said error would be subsequently be imposed across the entire country (Muralidharan, 2013). The RTE is a crucial act, capable of influencing the education system positively and negatively. The next section examines the different legal sections of the act to understand any existing gaps. My knowledge of the act allowed me to design the research instruments and frame recommendations in the concluding chapter.

1.5 Examining the sections of the RTE Act

The legal Act enacted by the government of India comprises seven chapters, and 38 sections mainly focused at the elementary levels.

The in-depth and thorough understanding of the RTE Act enabled in understanding the gaps prevalent in the legal document⁷ brought by the Ministry of Human Resource Development (MHRD). In the subsequent paragraphs, the various sections of the RTE are discussed. A snapshot summary of the RTE Act and its various sections have been provided in Figure 2.

Figure 2 - Snapshot summary of the RTE sections

Section 3	Section 4	Section 5	Section 6	Section 7	Section 8 & 9	Section 10	
provide free and compulsory education to all 6-14 year olds in a neighbourhood school	Children to be inducted into age appropriate grade after special training by teachers	issuance of transfer certificates to children without any procedural barriers	provision of education facilities within reasonable reach	outlines financial responsibilities of state and central government	reimbursement of the cost of education to children, and outlining the responsibilities of the local government	directions to parents/guardian, to admit their children in schools, to ensure that children are not deprived of their right to elementary education	
Section 11	Section 12	Section 13	Section 14	Section 15	Section 16	Section 17	Section 18
mandates that the appropriate government may make necessary arrangements for pre-school education	enables the admission of children from economically disadvantaged sections of the society	prohibits 'capitation fee' charged by schools during admissions	states that children cannot be denied in the absence of an age certificate	mandates schools to provide admission to children, irrespective of the time in the academic year in which admission is sought	outlines schools and institutions are, restricted from holding back or expelling children till the attainment of elementary education	ensures the healthy development of children's potential by protecting the child's dignity and freedom of expression	private schools cannot be established or function without procuring a certificate of recognition
Section 19	Section 20	Section 21 & 22	Section 23 to 26	Section 27 & 28	Section 29 & 30		
determines the stated norms and standards in section 18 to be adhered by Government, as well as private schools	enables the federal government to amend the schedule on norms and standards	enables the formations of school management committee and a 'school development plan'	discusses the norms on teaching regulations including the qualification, employment condition terms and maintenance of appropriate 'pupil teacher ratios' in schools	discourages the deployment of teachers for non-academic purposes	enlists rules about the curriculum, as well as completion of primary education of children enrolled in the schools		
Section 31 & 32	Section 33 & 34	Section 35	Section 36 to 38				
calls for an institutional body in the form of National and State Commissions responsible for the protection of children's rights	formation of advisory councils to give expert advice for the implementation of the act	outlines the central government to issues guidelines as well as directions for appropriate local authority for effective implementation of the Act	deals with the prosecution of offences, and provide powers to the appropriate governments to take action in good faith				

⁷ The actual legal document for further reading can be found in the link [here](#)

The first chapter of the Act commences with definitions, and hence, those sections have not been included in the explanation here. The second chapter of the Act comprises sections 3, 4 and 5. Section 3 directs the state to allow every child, between the ages of six to fourteen years, the right to 'free and compulsory education' in a 'neighbourhood school' until the completion of elementary education. MHRD (2013) defines 'neighbourhood schools' as a common space which enables all children from different castes, class, gender lines to learn together inclusively.

The section further connotes that 'free education' means that no child is liable to pay any fee or charges that otherwise prevent them from pursuing elementary education (MHRD, 2013). Issues relating to children over six years who have either not been admitted to any school or having been admitted, have failed to complete primary education due to extenuating circumstances is addressed in section 4. This section also states the right of the child to be accepted into a school in a class appropriate to his or her age for completing elementary education (MHRD, 2013).

The Act provides the right to seek a transfer from any institution including government or government-aided school to another such school to complete elementary education through the issuing of a transfer certificate. Section 5 directs the elimination of procedural barriers (MHRD, 2013).

Chapter 3 of the Right to Education Act is comprised of sections 6-11. Section 6 deals explicitly with the provision of access to elementary education which includes necessary schooling facilities within reasonable reach of the children. The rationale of the act is that if schools are not located near to their dwellings, they may not enrol or finish schooling due to the distance factor (MHRD, 2013).

The financial responsibilities of the Central Government and the State Governments for undertaking the provisions of the proposed Act are directed under Section 7. It outlines the ratio of the amount spent by the centre and the state. (MHRD 2013).

Section 8 directs the appropriate government to reimburse the cost of education where a child is admitted to a school which is established, owned, controlled or substantially funded by the necessary government or local authority. Section 9 outlines the responsibility of the local governments including rules about discrimination, monitoring admissions, attendance and completion of elementary education, provision of infrastructure and acceptance to children of migrant families (MHRD 2013; Centre for Civil Society 2013).

Directions to parents and guardians to admit their children to schools and ensure that children are not deprived of their right to elementary education is stated in Section 10.

This section directs the state to impose penal provisions upon parents and guardians who do not admit their children to schools as penalising the parents would drive families towards poverty and deprivation (MHRD, 2013). Section 11 of the RTE provides mandates that the appropriate government may make necessary arrangements for pre-school education.

Chapter 4 of the Right to Education Act comprises of sections 12 to 28. Section 12 covers three aspects mentioned in the subsequent sections:

- a) Firstly, it directs all government schools to provide free and compulsory education to all children between 6-14 years of age.
- b) Secondly, institutions/schools aided by the government must provide free and compulsory education to a proportion of students, equivalent to the funds it receives from the government, subject to a minimum of 25%.
- c) Thirdly, unaided institutions, as well as special category schools, shall reserve 25% of their seats for children from disadvantaged or marginalised groups. Section 12 clarifies that schools would be entitled to receive reimbursement 'on the basis' of per child cost by the government.

RTE's section 12 enables the admission of children from an economically disadvantaged section of society. The rationale behind this is to enable institutions to develop the professional capacity to respond to the intellectual and emotional needs of children from diverse backgrounds. It is envisaged that, due to this provision of the act, children from underprivileged backgrounds will not only have an opportunity for quality education but will also mingle with children from other sections of society, thus narrowing existing societal divisions.

Some schools in India provide admission to students instead of payments made towards the school's infrastructure fund. Termed as 'capitation fees', these are deemed illegal under section 13 of the RTE. The section outlines an appropriate penalty on schools and educational institutions that violate this rule.

Section 14 directs that children cannot be denied admission if they lack their age certificate. The rationale for this is that relevant documents including birth certificates, marriage and death certificates are often not obtained easily, and parents often struggle to procure children's age proof (MHRD, 2012).

Section 15 of the RTE Act mandates schools to provide admission to children, irrespective of the time in the academic year during which admission is sought. Although children should ideally be admitted at the start of the academic session, under challenging circumstances

like migration and displacement of labour, schools need to accommodate children at any time.

Schools and institutions are restricted from holding back or expelling children until the attainment of elementary education, as per section 16. The rationale of this section is that coercing a child to repeat a grade or class dilutes their motivation to pursue further studies. The RTE directs schools to put in place a continuous, comprehensive evaluation which will be non-threatening, thus freeing children from the trauma of failure and encouraging teachers to focus instead on their learning and performance. Schools are strictly instructed to refrain from any form of physical punishment or mental harassment. This ensures the healthy development of children's potential, protecting their dignity and freedom of expression. Physical punishment and mental trauma are counterproductive and may cause a child to become even more defiant and rebellious than before (Centre for Civil Society, 2013).

Section 18 stipulates that private schools cannot be established or function without procuring a certificate of recognition which is only issued to schools which fulfil the prescribed norms and standards (MHRD, 2013). Section 19 subsequently defines these standards to which all schools – government or private – must adhere. It also directs schools to upgrade their infrastructure within three years from the date of commencement of the Act (Centre for Civil Society, 2013; MHRD, 2013).

Section 20 enables the federal government to amend the schedule on norms and standards. The formation and constitution of a 'school management committee' (SMC) is outlined in Section 21. Section 22 advocates the preparation of a school development plan (SDP) by the SMC. The SDP is comprehensive and includes all aspects of the school, e.g. protection of children's rights, infrastructure, teacher availability, classroom transaction, child assessments and inclusiveness, etc. (MHRD, 2012, 2013).

Sections 23 – 26 discuss the norms regarding teaching regulations. These include qualification and employment condition terms for school teachers. The National Council for teacher education NCTE is recognised as the authoritative body for teacher qualifications. These sections also detail the guidelines for teachers' duties and call for lower maintenance of pupil-teacher ratio in schools. Furthermore, school vacancies should not exceed ten percent of the total teacher strength in the school. Sections 27 and 28 outline certain restrictions on the teaching community – they discourage the deployment of teachers for non-academic purposes. However, their participation in decennial population census, disaster relief duties or duties relating to elections to the local authority, state legislatures and parliament are all permitted.

Organisation of private tuitions by teachers is forbidden, and they are required never to use their influence for commercial gain (Centre for Civil Society, MHRD, 2013).

Sections 29 and 30 of the RTE include rules relating to the curriculum as well as completion of primary education by children enrolled in schools. These sections further instruct that no child shall be required to pass the national examinations⁸ until the end of primary education as national examinations are known to induce stress and anxiety amongst children (MHRD 2012).

Sections 31 – 34 describe the protection of children’s rights. Section 31 necessitates an institutional body in the form of National and State Commissions responsible for the protection of children’s rights. These bodies shall also monitor children out of schools⁹ and aim to facilitate access and participation. They call for the establishment of a grievance redressal mechanism for the rights of the child under the proposed act. Sections 33 and 34 enable the formation of advisory councils to give expert advice for the implementation of the Act. While the former deals with the creation of the body at the centre, the latter deals with forming an agency at the state level (Centre for Civil Society, 2013, MHRD, 2013).

The final chapter comprises sections 35 – 38. Section 35 outlines guidelines to be issued by the central government as well as directions for local authorities on how to implement the Act effectively. This section also provides powers to appropriate governments for giving directions to local authorities. Section 36-38 address the prosecution of offences, provide powers to the appropriate governments to take action in good faith and offer protection against legal proceedings.

1.6 The growing private sector in education and the threat from RTE

India’s literacy rate rose from 52 percent to 65 percent, a 13 percent increase, from post the reform era of 1990 in 10 years (1990-2001) and then surged to 74 percent by 2011.

The accumulated growth rate of 22 percent from 1990 to 2011 was the maximum for any two-decade period since India’s independence (Shah and Miranda, 2012; D. N. Shah, 2013).

⁸ National examinations include board examinations held at the end of grade 10 and 12

⁹ Out of school children include who have never enrolled or have dropped out, children who are temporarily absent, children who are permanent migrants, who migrate seasonally with their parents.

The phenomenal growth in the education sector throughout the last two decades calls for investigation of budgetary allocation for understanding its prospects.

Pankaj and Dholakia (2009), have stated that the budgetary investments in the Indian education sector are less than 4% of the GDP (Jain and Dholakia, 2009). Elsewhere, they have stated that, given the high component of teachers' salaries, it is impossible to raise budgetary investments to 6% as recommended by UNESCO and hence, it is important to understand which phenomena could fuel the growth of education in India (UNESCO n.d.)

Figures tabulated from India's governmental database, District Information System for Education (DISE), and Kingdon (2017) show that enrolment in private schools has increased.

Table 3 – Rising enrolment in private schools

	Student enrolment in Government and private schools					
	Government schools			Private schools		
	2010-11	2015-16	% change	2010-11	2015-16	% change
Andhra Pradesh	6186492	5367402	-13%	4592255	4943739	8%
Assam	4082132	4140192	1%	998944	1013270	1%
Bihar	19495910	21548010	11%	404132	1812378	348%
Chhattisgarh	3808619	3281257	-14%	755632	1113912	47%
Gujarat	5901456	5816280	-1%	2017575	3031588	50%
Haryana	2093700	1663752	-21%	1304015	2006442	54%
Himachal Pradesh	745712	580395	-22%	284026	370371	30%
Jammu-Kashmir	1213246	1024643	-16%	786400	832133	6%
Jharkhand	5591346	4727894	-15%	928935	1508344	62%
Karnataka	4624287	4043609	-13%	2328793	3007783	29%
Kerala	1075886	859682	-20%	375084	1471373	292%
Madhya Pradesh	10634585	7979148	-25%	4623450	4720051	2%
Maharashtra	7418628	5937688	-20%	2433975	3803480	56%
Odisha	5659929	5053711	-11%	599886	992117	65%
Punjab	2165466	2072324	-4%	1642518	1760579	7%
Rajasthan	7132668	6264557	-12%	4736520	6073144	28%
Tamil Nadu	4262160	4170562	-2%	3250332	3196288	-2%
Uttar Pradesh	19688240	16602404	-16%	10280445	17622294	71%
Uttaranchal	936630	757137	-19%	617344	886874	44%
West Bengal	13484910	11193885	-17%	1349964	1662095	23%
India (20 states)	126202002	113084532	-10%	44310225	61828256	40%

Data source - (G. Kingdon, 2017) (DISE data 2010-2016)

Table 3 compares enrolment rates in government and private schools between 2010 and 2016. At the national level, enrolment in private schools rose by 40% in a six-year time frame whereas, in the same period, government schools reported a fall of 10%.

Some states like Bihar and Kerala have shown extraordinary growth (more than 100%) in five years, and other states (Uttar Pradesh, Odisha, Jharkhand, Maharashtra, Haryana and Gujarat) have shown a rise in enrolment of 50% or more.

A stark contrast is observed in government school enrolments; states like Madhya Pradesh, Himachal Pradesh, Haryana, Kerala and Maharashtra show falling enrolments to the tune of 25 to 20 percent. The rising figures in private schools indicate the crucial role played by the private sector in the Indian education ecosystem.

The story seems similar in Pakistan as well where literacy levels are said to be the lowest in the world. Evidence from the World Bank (2012) indicates that enrolment in low-cost private schools in the state of Punjab increased by 36 percent from 1998-1999 to 2004-2005.

Tooley (1998) outlines three primary areas – regulation, provision and financing – and further states that the private sector can do an efficient job in all the above areas. He argues that the state's role can be confined to the provision of a legal framework for contracts and the rule of law (Tooley, 1998). However, with the introduction of the RTE Act, the state in India seems to be engaged in all three spheres. It regulates public and private schools through the Act and is engaged in the provision too as there are purely state-owned schools providing education. The state also finances education as it provides grants to many recognised schools for the provision of teachers' salaries, infrastructure upkeep and other maintenance purposes.

Shah and Miranda (2012) argue, given the changing dynamics of India, that it is vital that the private sector participates in the production of social goods like health and education. It would be undoubtedly misguided to leave the production of such goods solely in the hands of the state.

1.7 Why consider the private sector for low-income families?

Several studies have attempted to raise the question of education for the poor in developing countries – is the private education sector capable of catering for children hailing from low-income families? (Kingdon, 2017; Heyneman and Stern, 2013; Day Ashley et al. 2014). Numerous reasons have been suggested for the rising demand for education amongst low-income families.

Prime amongst them is the declaration of free and compulsory education acts emerging across the different parts of the globe and the absolute shortage of education supply (Heyneman and Stern, 2013).

A study by Day Ashley et al. (2014) reports that there is substantial evidence of better teaching in low-cost private schools in comparison with state schools.

The study further states that there is moderate evidence of better learning outcomes, lower cost of education delivery, better quality of teaching, improved teacher attendance, school performance, smaller class size and discipline in low-cost private schools (Day Ashley et al. 2014).

The excess of demand from society has led to the rise in private education for low-income families even in a socialist country like China (Z. Xu, 2002). Highlighting private investments and the emergence of low-cost private schools, Shah and Miranda (2012) state:

“As parents began to earn more in the post-reform era, they began to invest in their children. As better employment opportunities arose, the value of education became more apparent to parents. This increased demand for education was met by a rapid expansion of budget private schools.” (Shah and Miranda 2012, p. 112)

Low-cost private schools, especially in rural areas and poor urban neighbourhoods, are an attractive option for families looking for better educational opportunities for their children. A World Bank report (2012) states that there is substantial evidence of increased enrolment in low-cost private schools due to lower fees and better access, implying that these schools offer an opportunity to reach students from economically-disadvantaged families with a potentially higher quality of education.

Various developing countries have embraced female-focused educational initiatives, and low-cost private schools represent a good avenue for improving girls' education, even in countries like Pakistan (World Bank, 2013) and Bangladesh (Raynor and Wesson, 2006) which have been historically opposed towards education for women. Therefore, gender equality is also a significant indicator and is among the many reasons for the spur in low-cost non-government schooling amongst low-income families (Heyneman and Stern, 2013).

Baird (2009) suggests that the quality of education provided by state-owned schools does not align with parents' expectations for their child's future. Stephen and Heyneman (2013) also support the notion that parents' decision to spend their income on private education could be closely related to the poor quality of public schools in developing countries.

Evidence suggests that private schools are not only more efficient in imparting learning but manage to do so at a fraction of the unit cost of government schools (Kingdon, 2007).

Private schools perform better even with much lower expenditure per pupil than government schools (Singh, 2013).

Rigorous comparative studies undertaken between government and private sector schools in India indicate the relative efficacy of the two options across rural and urban areas. Students enrolled in private schools perform much better on average in achievement tests.

Raw scores from student achievement tests show considerably higher achievement in private schools (Dixon, 2005). Kingdon (2007) examines data relating to learning achievement levels gathered by a national level organisation in India which indicate that private school students from grades 2 to 5 outperform government school students by 37.4 percent in reading and maths tests.

Teacher absenteeism is observed on a lesser scale in private schools as compared to government schools. Only 38 percent of teachers were found teaching in classrooms in government schools as compared to 70% in private schools when researchers attended unannounced (Dixon, 2005).

It is quite likely that due to the perceived better quality, gender equality, academic achievement, teacher accountability and geographical reach, parents from low-income families are encouraged to seek low-cost private solutions for their children. The next section outlines reasons as to why Delhi was chosen as the setting for field research.

1.8 Why work in Delhi?

Delhi, India's political capital, has long been considered a centre of reform. It is interesting to note the different set of regulations which govern the educational landscape of Delhi. The complex regulatory framework of Delhi includes three overarching regulations, the Delhi State Education Act and Rules (DSEAR), 1973, Delhi Right to Education Rules, 2010 along with the central Right to Education Act, 2011.

General intelligence indicates that with the enactment of a central law, the other two older acts would be repealed. However, it seems that this is not the case; educational entrepreneurs wishing to set up new schools are required to read the RTE legislation in conjunction with the other two acts for the fulfilment of legal requirements. It is both severe and complicated to navigate through a myriad of legislation while establishing a school and organising its everyday operations (Antony, 2014). Thus, Delhi's legal, regulatory environment prevailing in the education sector makes a compelling case.

Consider, a simple case of complexity in Delhi's regulatory environment. A notification¹⁰ from the Ministry of Human Resource Development MHRD recognises the fact that it is nearly impossible for private schools operating in land-scarce cities to have a playground within the existing school premises.

The DESAR 1973, on the other hand, obligates an established school to make arrangements for a playground if it hitherto lacks in this requirement. The two sets of regulations certainly seem to be complicated and confusing.

A review of documents reveals an elaborate system that educational entrepreneurs need to follow for setting up a school.

The first step for establishing a school in Delhi requires it to be registered under the 'Societies Registration Act of 1960'¹¹. For a school registration the following documents need to be submitted to the registrar of societies, Government of National Capital Region NCR, Delhi (Govt. of Delhi, 2014). Essential documents include the following:

- A Memorandum of Association (MOA) according to the prescribed MOA given in the Act 1860
- Essentiality certificate stating that it is the correct copy of the rules and regulations
- Details of the governing body
- Financial details of the body through a self-declaration form including bank accounts and sources of income and management of funds
- An affidavit consisting of a No Objection Certificate (NOC) from the legal owner of the building stating that he/she has no objection to the society office to function in that space

(Antony, 2014, p. 5), (Govt. of Delhi, 2014)

Moreover, the promoters need to send an intimation letter to the Directorate of Education detailing the number of children to be enrolled, the stage of education to be provided, the number of schools established in the proximity zone, information relating to the building's architecture and the financial resources.

¹⁰ See appendix 1 for playground notification from the government

¹¹ See appendix 2 for the MOA required for the formation of educational societies

Potential owners must produce a NOC from three schools from the preferred zone or the alternative zone, if there are any, for opening a school in said zone (Antony, 2014).

The DOE carries out an independent assessment to determine if there is a need for the private school in the stated zone and would issue a NOC if the assessment report turned out to be satisfactory. If the proposed school receives a go-ahead from the DOE, the second step is to apply for school recognition. The recognition process is quite complicated as the potential school owner is required to submit four different set of documents to the DOE.

These documents are listed in a circular brought out by the MHRD in 2011. Some of the critical set of documents are as follows:

- Certificate of Registration of Society under the Society Registration Act, 1860
- A land ownership certificate which entitles the owner of the land for carrying out the operations of the school
- A fire safety certificate approved by Delhi fire safety services
- Health certificate approved by the Director of Medical services ensuring that the sanitary requirements have been addressed
- Building safety certificate and a water test report sanctioned by the Delhi waterworks department
- Mock drill participation certification provided by the Delhi disaster management authority
- Income tax returns and audit of all financial documents
- An affidavit of the list of members of the society along with their addresses
- Certificate of Ownership of land or lease agreement for a rented building
- Enrolment status of all children
- Infrastructure details and sanitary conditions
- Declaration of barrier-free access
- Declaration of the area, building space, classroom size, number of classrooms
- List of teaching and learning material
- List of sports and play equipment
- List of library books/periodicals/newspapers
- Type of drinking water facility
- Type of sanitary conditions – list of the number of urinals/lavatories for boys and girls separately
- Particulars of teaching staff – qualifications and teaching experience
- A certificate stating that all information is, in 'accordance with' the data capture format of DISE

- Application to the District Education Officer (DEO) for the recognition certificate of the school
- Details admission of children as per Section 12(c) of the RTE Act, 2009, regarding the 25% reservation for the economically weaker sections (EWS) and disadvantaged groups

(MHRD 2011)

Other documents¹² include budget estimates, the declaration of final accounts, declaration that staff salaries are, prescribed as per the MHRD guidelines and the fee structure of the school. Delhi is thus a suitable option for the research due to the complexity of regulations in the area.

Apart from the complexity, three other vital criteria were also responsible for Delhi's selection as the research interest. The foremost, being able to identify a threat order issued by the government authorities for private school closures¹³.

A comprehensive list was, discovered through complex secondary search strategies which contained the details of 243 schools threatened to be, closed due to the failure of recognition or its renewal. The closure list certainly made the research interesting in two ways.

Firstly, there was enormous complexity involved in establishing and obtaining recognition for new schools and second, schools already established were required to complete a cumbersome bureaucratic process for obtaining renewals. Failure or slight delays in applying for recognition led to the school's closure. Secondly, Delhi was also chosen due to logistical ease and my awareness of the geographical terrain – I have considerable professional experience working in the region. Therefore, it was easier to plan routes for undertaking the arduous fieldwork in the summer months. Given the tight budgets and the lack of time to collect the data, Delhi was the best option in terms of resource optimisation.

Professional networks are crucial for any research and given my experience as a researcher; I had developed strong links which I presumed would enable me to undertake the research smoothly. These were helpful in several ways.

¹² See appendix 3 for the exhaustive list of documents required for registering a new school

¹³ See appendix 4 for the closure orders from the government of Delhi

Firstly, they helped me to contact sampled schools, enabling necessary approvals for testing and interview permissions.

Secondly, they assisted in tool development improvement issues, specifically in the areas of translation. The networks were used for professional printing of the tools which enhanced the quality of tools during the field work.

Delhi was thus a suitable setting due to various factors like legislation, school closures, familiarity with the geographical terrain and finally strong professional networks.

1.9 Thesis organisation

At the beginning of this chapter, I mentioned that human resources are an essential component for the development of any nation and the catalyst for raising the quality of human capital is education. A key measure to improve educational quality is the Right of Children to Free and Compulsory Education Act of 2009, considered to be the most sweeping and ambitious legislation in the history of India. Preliminary evidence indicates that educational expenditure as a percentage of GDP increased in the last ten years (Aiyar 2013). However, learning levels in government schools declined during the same period (ASER Centre, 2014). The RTE, according to the MHRD (2012, 2013) guarantees free and compulsory schooling to the nation's 233 million children in the age group of 6 to 14. It hopes to empower the population by strengthening its bargaining power in the political, economic and social spheres (Keaveney, 2014). The structure of the thesis is as follows.

Chapter one analysed the landmark stages in India's education sphere and outlined the significant events that led to the formation of the RTE act. The chapter also looks at the various sections of the RTE and discusses the norms associated with it. ASER (2013) reports that the RTE's implementation to some extent has led to increased accessibility, expanded school infrastructure and reduced class sizes. Although the nature of the events indeed seems to be positive, critics contend that following the introduction of the Act, student achievement levels in core subjects like reading and maths have been consistently poor and have deteriorated (Chavan, 2011). Others like Muralidharan, Shah have questioned the above RTE norms and regarded them as input-based norms, and a majority of these norms are not concerned with improving learning outcomes for students (Muralidharan 2013).

Chapter two reviews the literature around the key drivers, empirically indicated, to affect student learning and achievement. A detailed discussion of the various drivers as listed by the RTE schedule is highlighted, and research around school input studies undertaken in developing countries is considered. It further outlines the successful interventions, as well as the ones that failed to improve student learning achievement.

The review of the literature attempts to find the causes and correlates of student learning and performance on two fronts: the teacher and the institution.

The third chapter relates to methodology. It aims to align the context of educational research and explores different philosophical stances. An overview of ontology, epistemology and research paradigms enables understanding of more broad and minute aspects of the research, rather than merely the procedure. Chapter three also discusses the selection of research methods, adopted for gathering, tabulating and analysing the data, and outlines the rationale behind the choice of methodology.

It further presents the sampling methodology and elaborates on the test instrument selected for testing the children. The chapter concludes with a discussion of the ethical considerations and the validity and reliability of the research study.

Chapter four details the results. It combines quantitative and qualitative techniques to report the findings. Using test achievement scores obtained through diagnostic and IQ tests and semi-structured interviews with teachers and principals, the chapter seeks to answer the following research questions.

- Is there any relationship between student achievement and the RTE's emphasis on physical indicators?
- Do the RTE teacher indicators listed in the RTE act and schedule have any impact on learning outcomes?
- Does following certain core guidelines from the RTE rigidly have any impact on student test achievement?
- Does following the RTE's institutional academic indicators have an impact on student achievement?
- In correlation to the above questions, how do low-cost school owners view the RTE regulations?

To, answer the above questions, different regression models have been constructed to predict the relationship between the dependent variable, (test scores obtained from the sampled schools), and the covariates mentioned in the RTE's schedule. The chapter provides school vignettes, written after discussions with school heads and owners. The insights generated through the vignettes are also used, for substantiating the correlations identified through the quantitative techniques. The chapter enlists the findings around each of the questions and concludes by combining the insights found through the process of qualitative and quantitative enquiries.

Chapter five presents the overall findings and highlights specific insights, corroborated by the literature review undertaken in chapter two. Insights presented in the chapter could be used in designing policy measures and significant reform interventions. The chapter also introduces the implications of coerced school closures and the shortcomings of the current research and steps that could be undertaken for the co-existence of private and public schools in India. Limitations of the study and directions for future research are proposed.

The final chapter also discusses implications of the findings for threatened low-cost private schools and recommends the way forward for such research undertaken in developing parts of the globe.

The introductory chapter, initiated with a story, highlights the drive for researching Right to Education and acts as a catalyst to investigate the educational, regulatory regime of the RTE. The second section outlines the importance of education to raise the level of human capital and discusses the structure of the introductory chapter. The third section revisits the historical phases of the Indian education system and how state-based education dominated India for nearly seven decades since its independence from the colonial rulers. Two essential elements – education financing and non-state actors – were also discussed in the section, as they played a crucial role in shaping the current education system. To understand the laws, sections and subsections, a thorough review of the RTE was undertaken in the fourth section. Understanding the RTE helped to design the research instruments and enabled consideration of solutions for its gaps, presented in the concluding chapter. The fifth section looked at private sector provision for education and the role it plays in the area of regulation, provision and financing. The section highlighted the importance of investing in the private education sector, especially at elementary levels, currently threatened by the RTE. The sixth section lists the causes for selecting Delhi as the venue for research, and the final section lays out the questions to be explored in the research.

The next chapter highlights the available literature across the globe and focuses on institutional and individual factors that can potentially impact student learning outcomes.

Chapter Two: Review of the literature

2.1 Introduction

Economists, academics and other professionals across the globe to a certain extent agree that education is imperative, for sustaining economic growth and achieving a high standard of living (Lucas, 1998; Barro, 1991). Governments spend on average 4.7 percent of their GDP on education with Latin America and the Caribbean at the top with 5.7 percent, and South Asia ranked lowest with 3.81 percent (World Bank, 2017). Spending in such proportions has no doubt led to a rise in enrolment of children in developing countries (World Bank, 2018; Glewwe & Muralidharan, 2015). Two issues have repeatedly surfaced in research around lower and middle-income countries (LMCs). Firstly, poor quality of learning across elementary and secondary levels (Pritchett, 2013; Robinson, 2011; UNESCO, 2015) and secondly, children struggling to complete their primary education or even failing to enrol in schools (UNESCO, 2015). There is substantial evidence pointing to a trend of children across developing regions acquiring knowledge, skills and competencies below the threshold established by the relevant national curriculum (Glewwe and Muralidharan, 2015; ASER Centre, 2015; Abogan, 2013; Banerjee and Duflo, 2011; Glewwe and Kremer, 2006).

Given this backdrop, it is crucial to understand which of the indicators promoted by the Right to Education Act (RTE) can have a substantial impact on student learning and achievement. This chapter aims to examine the literature that informs the research questions as well as the overall research interest and will allow for comparisons with previous work undertaken in this area. The four research questions to be answered by this research and therefore of interest to the literature review are as follows:

- Is there any relationship between student achievement and the RTE's emphasis on physical indicators?
- Do the RTE teacher indicators listed in the RTE act and schedule have any impact on learning outcomes?
- Does following certain core guidelines from the RTE rigidly have any impact on student test achievement?
- Does following the RTE's institutional academic indicators have an impact on student achievement?
- In correlation to the above questions, how do low-cost school owners view the RTE regulations?

The field work in Delhi aims to collect the RTE indicators that are likely to have an impact on student learning and achievement.

The plan for the current chapter is divided into six sections. First, the chapter begins with three common drivers associated with low and middle and income countries (LMCs) discussed across studies to improve learning outcomes. The second section focuses on input-based indicators associated with the RTE which are of core relevance to answer the research questions. Research carried out in developing countries using production function analysis is discussed in the third section, aiming to understand the impact of input on schools' efficacy and the issues outlined in such studies.

The fourth section reviews a variety of studies from the global arena to assess the ones which have been successful as compared to those, which were less, or not successful at all. These studies include randomised controlled trials (RCTs) that aim to address student learning outcomes. Although it is hard to design specific studies that seek to address systemic issues in education, such studies are capable of providing insights into these.

The fifth and sixth sections study the evidence of causes and correlate of learning outcomes associated with teachers and educational institutions. With reference to teachers, characteristics include inputs such as educational qualifications, training, remuneration, experience and the nature of teachers' contracts. On the institutional front, factors include facilities and infrastructure, class sizes, school meals, teaching and learning materials and playgrounds. The chapter ends with a final table outlining the effect (positive, negative or indeterminate) of the input correlates on student outcomes.

2.2 Empirical Underpinnings

Various economic models have been discussed by several experts, outlining the importance of schooling, which plays a vital role in propelling the economic growth of nations see (Becker et al., 1990; Romer, 1994). Thinkers such as Jacob Mincer and Theodore Shultz contend that developing human capital is vital for 'individual productivity and incomes' which could propel a nation towards development (Hanushek and Luque, 2002, p. 1). Developing countries across the globe realise the importance of human capital due to its positive impact upon economic development and thus have begun to invest in education to accelerate growth following independence from colonial rule (Coombs, 1985; Tilak, 1988).

The drive to improve education in developing countries was first observed in the 1980s with further impetus provided by the World Declaration on 'Education for All'.

Recent goals posts like Millennium Development Goals (MDG's) and Sustainable Development Goals (SDG's) set up international consortiums like the UN, World Bank and other global foundations view education as an anchor to raise human capabilities.

The targeted approach has now become the norm, and several developing countries are making efforts to reach these milestones as set by the international consortia (Masino and Nin˜o-Zarazu´, 2015)

Growing evidence indicates that developing nations across the globe are now striving to provide quality education at the primary and secondary level for two crucial reasons. Firstly, evidence strongly implies that economic prosperity is hugely dependent on the quality of education (Hanushek & Kimko, 2000; Ozturk & Ilhan, 2001; Patrinos, 2016). Secondly, developing countries realise that although access to schooling has been increasing, poor quality remains a chronic issue. By the first reason, a good example is the use of test scores to predict economic development which is a better indicator than others such as enrolment or improvement in access (Hanushek & Woessmann, 2008; Jamison et al., 2007; Laurini & Andrade, 2012).

Masino and Nin˜o-Zarazu´ (2015) propose three drivers capable of improving the quality of education in developing countries and enhancing student outcomes:

- a. Enhancing supply-side capabilities of educational entities
- b. Behavioural experiments aimed towards the supply side as well as the demand side elements to trigger behaviour alterations for impacting educational services
- c. Participatory and management interventions

Each of the above drivers has been discussed in detail. They will be later revisited in the discussion section, as to what combination of strategies can prove to be effective in the case of low and middle and income countries.

a. Enhancing supply-side capabilities of educational entities

Supply-side interventions include investments that are undertaken to augment the existing physical infrastructure, make provisions for new infrastructure or improve teaching-learning materials (Barrera-Osorio & Linden, 2009; Glewwe et al., 2004; Vermeersch & Kremer, 2005, Banerjee et al. 2007; Muralidharan & Venkatesh, 2009). Such interventions also direct a significant portion of the government budget to enhance student learning (Paqueo & Lopez-Acevedo, 2003; Bjorkman, 2004; Barrera-Osorio, 2007).

“Supply-side interventions aim to raise student achievements by targeting infrastructure or organisational deficiencies through, improving physical infrastructure, providing teaching materials, and training and hiring extra teachers.

Financial resources provided by governments and/or aid-funded programmes can take the form of directed or generalised financial allocations to improve physical conditions of existing schools or involve the construction of new schools.”– (Masino and Nin˜o-Zarazu’ 2015, p.54)

Evidence on improving educational quality through supply-side interventions remains limited. In the subsequent sections, this thesis will review evidence on such interventions as they form a central component of the RTE, India’s most significant policy reform. The other two drivers have been briefly explored in this section.

b. Experiments aimed towards the supply side as well as the demand side elements that potentially trigger behaviour alterations to impact educational services

Behavioural economists are known to use ‘incentives’ to understand the way agents of education act on increasing or decreasing incentives (Rau & Contreras, 2009; Glewwe et al., 2010; Kingdon & Teal, 2007; Duflo et al., 2012). Agents of education include both providers and the entities directly involved in education, namely teachers, students and parents. Material benefits like remunerations rise, bonus incentives or morale raising strategies like training and development or career progression may be offered to teachers to view the changes in their teaching (Muralidharan & Venkatesh, 2009; Glewwe et al., 2009). School vouchers may be provided to parents and students under the preferential choices for education providers (Angrist et al. 2002, 2006).

Experiments on the supply side front of incentivising indicate that the impact of incentives is short-lived. In Chile, for instance, monetary incentives are linked to teacher presence and performance. Teachers who improved the academic performance of secondary school students during an annual year were provided with monetary incentives (Contreras, 2001; Hsieh & Urquiola, 2006). However, test gains could not be sustained for a more extended period as the teachers altered their behaviour for a short time when the incentives were provided and thus did not make any efforts to improve instructions that could have a long-lasting impact (Rau & Contreras, 2009)

Mere monetary and non-monetary incentives alone do not lead to positive achievements; these had to be tied with other complementary provisions like regular monitoring and enforcement. For instance, Duflo et al. (2012) observe that pay rise combined with monitoring teacher attendance leads to the improvement of test scores in schools. On the other hand, demand-side initiatives are effective in raising learning outcomes in sub-Saharan African countries with a few stipulations.

Demand-side interventions could include the provision of cash or vouchers to students and households to produce a change in how people use education services (Das et al., 2004; Baird et al., 2011).

Behavioural changes in such cases include improving attendance by motivating families to regularly send children to school, grade progressions or improving test scores. Demand-side interventions targeted towards females can impact on gender bias and normative discriminations (Niño-Zarazua, 2011) that usually exist in developing countries. Examples on the end of demand-side interventions in Kenya comprise a scholarship programme awarded to girls for improving academic progress at secondary levels. This intervention also produces positive spillover effects over boys (Kremer et al., 2009). Heckman and LaFontaine, (2010), view that socially and economically backward groups, including minorities based on religions, are also targeted as beneficiary groups of conditional cash transfers (CCT's) as they encounter high-risk factors (Heckman et al., 2010).

Nyugen (2008) finds that the efficacy of such policies is dependent on certain factors. For instance, in Madagascar, when parents were informed about the returns to education, it motivated parents to aim for better cognitive achievement in their children which was a cost-effective way to improve student test scores (Nguyen, 2008). Furthermore, demand-side experiments are also known to generate redistributive effects meaning that households which usually spend a specific number of resources on their children reallocated these to other purposes following the provision of cash grants (Masino and Niño-Zarazu', 2015). In this context, Baird (2011) finds that conditional cash transfers to households are more efficient and have a more enduring impact than unconditional cash transfers. Masino and Niño-Zarazu' (2015) indicate that resources provided with conditionalities are capable of altering individuals decisions as to what options become available in the future.

c. Participatory and management interventions for the community to improve educational needs

Under the participatory management intervention, Masino and Niño-Zarazu' (2015) outline two different strategies for changing educational outcomes, defined as 'bottom-up' and 'top-down'. The 'bottom-up' approach usually refers to policies that are introduced at the grass root level to raise the participation of community members in educational services. Such interventions are usually effective in breaking or changing customary social norms that impede the demand for education, particularly amongst vulnerable and needy groups (Jimenez & Sawada, 1998; Masino & Niño-Zarazu', 2015). On the other hand, 'top-down' programmes aim to enhance the deployment of resources by way of standardised reforms or practices (Jimenez & Sawada, 1998) (Masino & Niño-Zarazu', 2015).

State or federal governments usually initiate top-down programmes, providing resources, encouraging community participation and rationalising the flow of educational services (Galiani et al., 2008; Garcí'a Palomer & Paredes, 2010.)

Thus participatory interventions for the community can be viewed as an additional component to both supply and demand side elements as they engender social change (King & Ozler, 2005; Masino & Ninõ-Zarazu', 2015).

Prominent examples of the 'bottom-up' approach suggested in literature are the EDUCO and PROHECO schemes in El Salvador and Honduras which encourage community participation. They were capable of improving student test scores (Jimenez & Sawada, 1999). In Chile, a government programme placed students from low-income families in top performing schools. Results of such interventions tend to be mixed. While Argentinian reforms hardly reach marginalised sections, the Chilean programme reported better test scores for children from more impoverished families when placed in better performing schools (King & Ozler 2005; Galiani et al., 2008).

Masino and Ninõ-Zarazu' (2015) study no doubt have thrown lights on some of the critical drivers helps in raising student test scores. However, it could have been more helpful if they could outline which drivers are more powerful than others. Moreover, the study could assign some weights to each of the drivers and describe which drivers work better than others, which could potentially make the study robust.

2.3 Indicators associated with the RTE

The Right to Education in India, constituted in 2009 and implemented in 2010, created a myriad of accountability initiatives. These range from infrastructure obligations, class size specifications, increases in schools' expenditure, teacher training, textbooks and increasingly tightened regulations on private education (Abogan, 2013). The RTE also advocates the creation of school management committees and recommends the formation of national and state commissions (see sections 20, 31; MHRD, 2013). Academics and experts have criticised the RTE's emphasis on inputs; although the RTE has invested in schools, teachers, training, textbooks and other resources, it has been unsuccessful in improving the learning outcomes of children (Basu, 2013; Centre for Civil Society, 2015; Mukerji & Walton, 2012). It seems that the primary focus of the RTE is to raise access in schools by focusing on physical infrastructure. This section discusses the schedule of the act and the three critical components associated with it: infrastructure, guidelines for teachers and accountability mechanisms.

The RTE's schedule outlines various input components such as class sizes, floor space, toilets, teacher qualifications, capital-intensive building requirements such as kitchens, playgrounds, barrier-free access and an office that can double as the head teacher's room. The impact of the various input-based measures on student outcomes is discussed later in sections 2.7 and 2.8. These input-based measures are divided into teacher factors and school factors. Teacher factors include educational qualifications, subject competency, teacher training, remuneration, experience, nature of teacher contract and pupil-teacher ratios in the classroom. School factors include facilities and infrastructure, class sizes, school feeding programmes, libraries, textbooks, teaching-learning materials and playgrounds.

Table 4 - Schedule of the RTE Act

S.No.	Schedule Item	Norms and Standards	
		Admitted children	Number of Teachers
1.	No. of Teachers for first class to fifth class	Upto 60	Two
		Between 61-90	Three
		Between 91-120	Four
		Between 121 to 200	Five
		Above 150 children	Five + 1 Headteacher
		Above Two hundred children	Pupil-Teacher Ratio (excluding Headteacher) shall not exceed forty
2.	For sixth class to eighth class	At least one teacher per class so that there shall be at least one teacher each for	
		<ul style="list-style-type: none"> i. Science and Mathematics; ii. Social Studies iii. Languages 	
		At least one teacher for every thirty-five children	
		Where admission of children is above one hundred	
		<ul style="list-style-type: none"> I. A full-time head-teacher; II. Part-time instructor for <ul style="list-style-type: none"> • Art Education • Health and Physical Education • Work Education 	
3.	Building	All-weather building consisting of:	
		I. At least one classroom for every teacher and an office-cum-store-cum-Head teacher's room;	
		II. Barrier-free access	
		III. Separate toilets for boys and girls.	
		IV. Safe and adequate drinking water facility to all children'	
		V. A kitchen where mid-day- meal is cooked in the school;	
4.	Minimum number of working days/ instructional hours in an academic year	VI. Playground	
		I.	Two hundred working days for first class to fifth class
		II.	Two hundred and twenty working days for sixth class to eighth class
		III.	Eight hundred instructional hours per academic year for first class to fifth class
		IV.	One thousand instructional hours per academic year for the sixth class to eighth class

S.No.	Schedule Item	Norms and Standards
5.	Minimum number of working hours per week for the teacher	Forty-five teaching including preparation hours
6.	Library	There shall be a library in each school providing newspaper, magazines and books on all subjects, including story-books
7.	Play material, games and sports and teaching-learning equipment	Shall be provided to each class as required

Source - (MHRD 2009, 12)

The mandatory requirements of the act as listed in the schedule and its compliance with private and state schools are shown in table 4. Ironically, the schedule has no mention of learning standards or student outcomes, considered as a critical measure to judge the health of an educational system.

2.4 School input and student academic achievement studies in developing countries

Policy discussions around the world of late have focused on schooling inputs, and with the growing popularity of schooling in developing countries, there is a natural tendency to focus on them. Several aspects have improved or changed in the last couple of decades. Class sizes have reduced, teacher competency and qualifications have improved, the quality of teaching-learning materials has improved, and physical infrastructure in schools has become more conducive to learning. However, evidence indicating that there are significant changes in learning outcomes is mixed or in some cases very scant (Hanushek, 2003).

Education economists and academics have aimed to determine the impact of schooling on student outcomes since the publication of two significant reports – Coleman, 1966 in the US and Plowden, 1967 in the UK. Both report that schooling factors do not play a dominant role in raising academic performance or influencing the earning capacities of students when community background is taken into account. The Coleman report, commissioned by the US Office of Education, uses data from over 600,000 students and teachers. It suggests that academic achievement is closely linked with schools' social composition rather than their quality (Kivua, 2000).

One crucial concern outlined in various publications is that school and family environments differ considerably in developing and developed countries (Jamison et al., 1981; Harbison & Hanushek, 1992; Heyneman, 1984). Therefore, much caution needs to be taken in replicating findings in different contexts as the emulated policies are likely to encounter cost escalations, resulting in minimal or no impact on student achievement.

For instance, Lockheed and Komenan (1989) caution policymakers who intend to blindly replicate findings, suggesting an appropriate mix of academic inputs to enhance student achievement:

“Finding the appropriate mix of alternative...differs from country setting to country setting. To better inform local policymakers, within-country research capacity will need to be enhanced, and the appropriate mix of inputs identified through local research efforts” – (Lockheed & Komenan 1989, p. 111)

The peril of replicating theories is echoed by Heyneman and Loxley (1983), and they note that theories with school effectiveness are mindlessly emulated without understanding its long-term implications and thorough evaluations. Moreover, one significant impact could be the loss of resources, which could prove to be disastrous to those states which may not be sufficiently endowed with capital (Heyneman & Loxley 1983).

“A danger inherent in paradigms pioneered in one part of the world is that results might be assumed to be universal without undergoing the requisite testing. This is the case in the prediction of academic achievement. It is unfortunate that not all countries are self-sufficient in terms of development capital, including the capital necessary to improve learning and to conduct research on the improvement of learning.”

(Heyneman and Loxley 1983, p. 1183)

Academic performance of students across countries requires internationally comparable data on student achievement. In recent years, assessment interventions such as TIMSS (Third International Mathematics and Science Study), PIRLS (Progress in International Reading Literacy Study), projects administered by the International Association for the Evaluation of Educational Achievement (IAEEA) and the PISA (Programme for International Student Assessment) project managed by the OECD have become benchmarks for comparing student performances. However, such data is only available for developed countries, some middle-income countries but hardly any for developing and low-income countries. Data available from some of the developing countries indicates below average performance of the students in critical subjects as reading, mathematics and science (Glewwe & Kremer, 2006).

“Internationally comparable data are not available for very low-income countries, but the performance of students on achievement tests

administered within many of these countries suggests that academic achievement is often very low – (Glewwe & Kremer 2006, p. 958) ”

Data collection about the variables and the measurement of these variables is also an issue in developing parts of the world. Firstly, this is due to the assumption that variables are likely to change quickly or there would be minimal change in a short frame of time (Glewwe & Kremer, 2006). However, this assumption is likely to be a misconception as schools and educational institutions are likely to make quick changes in schooling facilities with the introduction of new policies and framework by the state or educational authorities. Due to errors in data collection, it is likely that educationists using sophisticated models may encounter an omitted variable bias, attributing the cause of academic achievement to a highly unlikely variable and incorrectly leaving out one or more critical factors. This bias occurs when models penalise the impact of the missing element by over/underestimating the effect of one or the other factors.

The use of retrospective data to understand the impact of school inputs and teacher inputs can also lead to distorted conclusions. For instance, Hanushek (1995) reports that there is scant evidence that indicates that educational inputs are capable of raising student outcomes in developing countries. Hanushek (1995) summarises his findings from 96 studies based on variables such as pupil-teacher ratio, educational qualification of teachers, teacher experience and salary, the cost incurred per pupil and physical facilities (Hanushek, 1995). Kremmer (1995), however, has an alternative interpretation and reports a positive influence of school inputs on student test score except teacher-pupil ratio. Commenting on retrospective studies, Glewwe and Kremer (2006) note that:

“Even the best retrospective studies suffer from serious estimation problems, the most serious being omitted variable bias with respect to school and teacher characteristics, unobserved child and household characteristics that are correlated with observed school and teacher variables, and measurement error in school and teacher data” (Glewwe and Kremer 2006, p. 995)

Limitations in retrospective studies encourage researchers to turn their attention towards natural experiments and randomised controlled trials. These methods assist in averting the estimation issues that surround retrospective studies. However, such studies still require a broader set of results before forming any concrete conclusions as to how schooling inputs may affect student outcomes.

2.5 Global education research using education production functions

Analysing the available literature on student attainment indicate that a majority of studies use some form of production function to determine the impact of the inputs. The standard form of equation observed in the literature is demonstrated below:

$$A = \beta_0 + \beta_1 I + \beta_2 H + \beta_3 S_f + \beta_4 IT + \varepsilon$$

The above production function permits to determine a relationship between the different elements associated with it. Where A, is the student achievement or the attainment by a pupil in the educational production process. β_0 is the intercept (also known as the constant), β_1 is the slope parameter or the slope coefficient) and ε represents the errors.

In the above model, student achievement is measured through some form of test scores and this research uses a diagnostic test score, which determines the student's proficiency in language, maths and environmental studies (EVS). Vector I captures the inputs or resources prevalent in a school, H captures the household and family characteristics, S_f captures the school or institutional factors and IT captures innate talent (Hanushek & Woessmann, 2017).

Although, a scientific and a rational method to determine the impact of inputs on the outputs, the use of production function in the educational context is not free from criticism. Some of the criticism outlined to the production function approach are discussed below:

Omitted variable bias - Hanushek and Woessmann (2017) believe that inputs usually taken into account in a production function are not always likely to be exogenous in a statistical sense. This means that a production function is expected to omit certain crucial variables. For instance, a critical component ignored in several international test the innate talent of the student. Measuring this through a proxy variable like an IQ test can further the complexity of an endogenous bias. The impact of endogeneity bias is reflected in longitudinal surveys which attempt to use the production function.

Consider the example using data from NLSY (National Longitudinal Survey) the USA, which employs education, experience and ability as variables to measure the impact on wages of 935 men in 1980 using the following function.

$$\log wage_i = \beta_0 + \beta_1 edu + \beta_2 exp_i + \beta_3 abil + \varepsilon$$

The coefficient for education showed an increase of 2.1% point when the proxy variable was omitted.

Table 5 – Impact of various determinants on wage

Log(wage)	Coefficient	Std. Err.	Coefficient	Std. Err.
Education	0.078	0.007	0.057	0.007
Experience	0.020	0.003	0.0020	0.003
IQ	—	—	0.006	0.001
Constant	5.503	0.112	5.198	0.122

(University College London, 2008)

Estimated returns to education change from 7.8% to 5.7% once the proxy variable IQ is introduced for ability. Results from large-scale research using production functions need to be interpreted with great caution, due to the substantial scope of endogeneity bias that can create distortions, while using the least squares estimates.

Inclusion of cultural aspects - This is another major criticism of production functions, mentioned in Alexander (2000). Hanushek and Woessmann (2017) suggest that

“unobserved heterogeneity at the country level may introduce new forms of omitted variable bias. For example, cultural factors such as “Asian values” may remain unobserved in the econometric model and correlate both with student outcomes and relevant inputs in the education production function” (Hanushek and Woessmann 2017, p. 153)

However, the cultural aspect to a great extent is covered through elements like family background, ethnic groups and the socio-economic status of the children in the schools that they are enrolled. Hanushek (2017), further advises checking for the robustness, which is comprised of the correlates of cultural factors as control variables (Hanushek & Woessmann 2017, p153).

Data limitations – Data collected from the field may not always be as accurate, and thus can lead to inaccurate measurement bias. Consider the two primary forms of errors that are likely to occur during the data collection process. First, students may not have an accurate memory of their family background or any other variable related to the socio-economic status. Second, data about teaching methods, especially the variables pertaining to classroom transactions are omitted (Todd & Wolpin, 2003). The former can be rectified through back-checks, a process in which a certain proportion of questionnaires and schedules are checked twice or thrice by different people to spot any data aberration. In the case of the latter, researchers can use classroom observations in conjunction with questionnaires administered to subjects in the study which form part of the statistical analysis. The collection of information from various sources including teacher, students and school environment provides a rich variety of data inputs, and the above limitation can be

mitigated by collating the various attributes of the subjects robustly. For instance, in the case of teachers, these attributes could include experience, educational qualifications, socio-economic background, age, subject proficiency and remuneration. For students, it could be socio-economic status, IQ, age, family composition, parental education and finally data collection on schooling amenities can include physical facilities such as building maintenance, availability of toilets, library, computer labs and playgrounds. Such rich data from various sources mitigates for skewed effects and enhances the contributing effects of the endogenous variables.

Utilisation of test scores – Educational quality is measured with the help of student achievement. Several historical studies including Heyneman and Loxley (1983) and Toma (1996) make use of them along with educational production functions.

Woessmann (2003) conducted the first economic study using micro data on student achievement, family background and school inputs that exist across different nations to estimate the impact of education production functions. Hanushek and Luque (2002) state that using test scores to determine student achievement is considered to be quite controversial. However, they defend it as well by contending that student test scores are the best proxies that are available to researchers and academicians in the absence of other indicators. It would be indeed difficult to collate data on income, the status of the individual in the society and criminal offences, to name a few examples. Moreover, one has to consider the practical hurdles in measuring such data (Hanushek & Woessmann, 2017).

Hanushek and Luque (2002) further state that 'educational quality' can be hard to define. The term quality can be best estimated by measuring the 'knowledge' and 'analytical skills' which are mainstays of the school system (Hanushek & Luque, 2002).

“Relying on standardised tests to provide measures of quality is controversial... Nevertheless, such measures appear to be the best available indicators of quality and do relate to outcomes that we care about.” – (Hanushek & Luque 2002, p. 3)

Arbitrary selection of variables Alexander (2000) criticises research on school efficacy using education production functions by stating that the endogenous variables used to build the equations are selected 'arbitrarily' and the equation constructs are mainly based on search engine results. Thus the function is a mere representation of what the educational researcher has chosen to write about or investigate (Alexander, 2001). One might disapprove of this conclusion as it is doubtful that prominent education economists like Hanushek, Woessmann, Muralidharan, Glewwe, Kingdon, Heyneman and Kremer would

disregard newer methods and models and instead select variables through arbitrary procedures. One way to raise the robustness of the findings is by using multi-level estimation techniques which allow for a self-section bias and control for family background and child's cognitive ability. This enriches the analytical findings and allows more flexibility and variation in the data.

Multicollinearity – Butler and McNertney (1991) indicate that estimates from coefficients cannot be relied upon if they are highly correlated. They explain that the measure function may lead to inconsistent estimates and describe this as an issue of multicollinearity. Multicollinearity occurs when endogenous variables are closely correlated with each other which means that it is unclear which variable is responsible for the variance in the dependent variable.

However, with new sophisticated software which detects the presence of multicollinearity through the inspection of the 'coefficients' and 'tolerance values', the problem can be resolved to a great extent (Butler & McNertney, 1991).

2.6 Where does the current study draw inspiration?

The current research draws inspiration from four studies in particular. These studies use a combination of various methods ranging from production techniques, panel data and experimentation. Using these different techniques, they study the causes and correlates of student learning outcomes and aim to establish causal relationships between inputs and outcomes. The work undertaken by Abogan (2013), Muralidharan (2013) and Mukerji and Dhruva Bhat (2017) is of particular relevance to this study.

Apart from the above, the thesis is inspired by Professor Pauline Dixon's doctoral thesis which aimed to study school inputs using production functions and regression models to enhance student learning in developing countries including India. However, Professor Dixon's thesis focuses on examining the regulatory policy in Indian schools and matching them with Austrian economic principles whereas the current thesis focuses on input-based indicators about the RTE (Right to Education Act).

2.6.1 Abogan (2013)

Student achievement is pivotal to Abogan's work which identifies the complicated relationship between inputs that can potentially lead to better learning outcomes. The work also attempts to 'evaluate the efficacy and logic of the RTE and looks into various indicators of the RTE including infrastructure deliverables, proceeds to educator and student attendance and aims to gauge their impact on outcomes. Abogan (2013) uses secondary data sets from the Annual Status of Education Report (ASER) which is an annual survey that

measures basic learning capacities of children in rural government schools. Utilising village level data collected over three years, Abogan studies variations across schools. There are, however, a few data limitations to Abogan’s study and hence, the results are interpreted with caution.

The study does not take into account socioeconomic differences, and thus, it is hard to determine if variation in learning outcomes was due to differences between the communities residing in the different district and states. In the absence of socio-economic indicators, it is likely that omission bias can set in and linear functions could be assumed for the sake of convenience rather than a priori reasons. Second, although the study acknowledges the contribution of the non-state sector in the improvement of learning levels, it is unable to determine a causal relationship as to what might be driving the outcomes.

The study uses language and maths test scores which act as proxy variables to determine student learning and achievement. Using regression analysis, the research identifies the effect of education variables on student outcomes. Language scores for grades I and II assess the ability to read letters, words or more, while maths tests evaluated the capabilities of children who could recognise numbers 1– 9 or more. Similarly, for grades III and IV, the study evaluated the student’s ability to read class 1 text and more in language and their capability to do subtraction or more in mathematics. The study finds at most 70% variation in learning outcomes, after considering the time state and district fixed effects. However, the variation does not take into account socio-economic factors including family income, school’s proximity to home, nutrition and development, which could also have an impact on student learning and achievement. Table 6 discusses the effects of various indicators when regressed with student test scores.

Table 6 - Impact of input based variables on learning outcomes

Variable	ASER-PAISA Result	Notes
Student attendance	++	Strong positive relationship with somewhat stronger effect on learning outcomes for higher Standards
Teacher attendance	No significant effect	
Infrastructure	No significant effect	
Midday meal	No significant effect	
Learning materials	+	Moderately positive relationship for most outcomes
Log of student-teacher ratio	No significant effect	

% students out of school	--	Strong negative impact on all outcomes, with much worse results for higher Standard math skills
% students in private school	+	Modest positive effect for lower standards, stronger for higher standards
Teacher education	++	Strong positive relationship for all outcomes, with more robust relationship for higher Standard outcomes
% scheduled caste in district	--	Strong negative impact on all outcomes, larger effects for higher standards
Teacher training and gender	No significant effect	

(Abogan, 2013)

Abogan's study indicates that student attendance has a significant positive impact on learning levels. For grades I – II, reading scores increase by 3.4% and by 3.1% in maths, when attendance rises by 10%. Similarly, grades III-IV see an ascent of 4% in reading scores and 4.4% in mathematics scores when attendance levels. Learning materials such as charts and non-text book material seem to have a positive effect on learning outcomes as well. Learning materials help children to acquire necessary skills while minimising boredom and thus, they are likely to have a positive impact.

Abogan's study also factored in the crucial indicators advocated by the RTE including; infrastructure, midday meals, and student-teacher ratios and these seem to have no significant impact on learning outcomes. A negative relationship was discovered between the students who were either out of school or had dropped education in the midway as these children would have no avenues to learn basic literacy and numeracy skills.

Teacher education and training were positively correlated with learning outcomes, and the effect was more likely in the higher grades as compared to the lower classes. The substantial impact on higher grades suggests that teachers require better skills and competencies to teach older children efficiently (Abogan, 2013). Further discussion of individual teacher factors impacting student outcomes is provided in subsequent sections.

Abogan (2013) discusses the impact of various educational indicators on student attendance, teacher attendance and head teacher attendance. The findings of the study are not presented here as they are out of scope in the context of the current research undertaken in this thesis.

2.6.2 Muralidharan (2013)

Muralidharan's research draws evidence from various sources and describes the impact of input at multiple levels (school, teacher, student) on student outcomes. The study, however, does not consider all the input variables as listed in the RTE schedule. Using experimental evidence and panel level data, the policy research finds that investment in inputs may not lead to improvement in education quality.

The research, organised into five sections, begins by outlining insights from various academic papers drawn from developing countries, based explicitly on large-scale data panels. In the second section, the research presents the facts relating to progress made by the Indian education system in terms of inputs and the dwindling levels of student outcomes. The third section reviews the evidence on educational inputs at the school, teacher and student level on learning outcomes and also looks at evidence influencing outcomes by reforming pedagogy and school level governance.

In the last two sections, the study details the priorities for policies keeping the future outlook in perspective and closes with challenges envisaged and proposed strategies to mitigate them. For the review of the literature, the thesis focuses on the second and third sections of the policy research.

The research throws light on positive achievements in the government schooling spectrum. It reports a decline in PTR, approximately by 8 % (from 47.4 to 39.8), doubling in infrastructure facilities like toilets (40% to 84%), electricity (20% to 45%) and the rise in mid-day meal programmes (MDM) by nearly four times 21% to 79% in a period of six years. While lauding the achievements made to improve the school quality, the study laments the fact that improvements in educational inputs have not translated into benefits in student achievements (Muralidharan, 2013; Kremer et al., 2005).

Muralidharan (2013) quotes the ASER report which finds that less than ½ of the children enrolled in the fifth grade can read a simple paragraph suitable for second-grade children and a little more than a quarter (27%), enrolled in the third grade are capable of solving a two-digit subtraction problem. Most children at these levels are usually expected to solve problems of these types (Muralidharan, 2013, p. 5). Quoting a study by 'Educational Initiatives'¹⁴, the research describes that student performance on test items 'requiring

¹⁴ Educational Initiatives is an Indian educational consultancy focused on undertaking large scale research assessments across India.

application of concepts is consistently lower than those representing rote learning' (Muralidharan 2013, p 6). Further, the study informs that the average scores across grade 4 in languages is less than half than that of their international counterparts.

Muralidharan (2013) quotes his work with Zieleniak and Yendrick (2013) using item response theory (IRT) and highlights that '*not only are learning levels low but so are the learning trajectories over time*' (Muralidharan, 2013, p. 6). The use of IRT allows for estimation of the '*probability of a typical student in a given grade getting a question correct over time as they progress through the grades*' (Muralidharan, 2013, p. 6). The research finds that less than 20% of the students were capable of answering a grade N-level question correctly while nearing the end of grade N. However, they were able to solve it accurately after grade N+1 (Muralidharan, 2013, p 6; Muralidharan & Zieleniak, 2013).

Not only are learning levels reduced at the elementary levels but they are also poor at secondary levels as well. Quoting PISA assessments, Muralidharan (2013) finds that India's two states which participated in the test were at the bottom of the league tables.

Ranked 72nd and 73rd from a total of 74 countries, the results highlight a significant gap in learning levels and India's fragile position educationally as compared to international entities (Maurice, 2011).

Muralidharan (2013) states that most correlational measurements of student learning with inputs based on investments seem to be happening at three levels: school, teacher and student.

At the school level, Muralidharan (2013) uses village-level panel data from more than 1000 villages and 19 Indian states and finds no correlation between 'village-level school infrastructure' and enrolment, teacher absence and student test scores. The paper outlines that the reasons for the minimal impact of infrastructure on learning outcomes are not obvious. However, it does indicate a few possible causes as to what might be hampering the impact. First, investments in infrastructure may appeal to teachers and students, although they may not affect the '*teaching and learning process*' which could be the leading cause of learning. Second, existing infrastructure in schools might not be used at all, and thus, no visible impact is likely to be produced. Finally, evaluation of investments in infrastructure for shorter periods may yield negligible returns to learning, and therefore they become a challenge to measure statistically. At the teacher level, Muralidharan reviews the inputs in terms of teacher remuneration, training and reducing pupil-teacher ratios (PTR). Using evidence from Kingdon and Teal (2010), the research reports a lack of significant positive relationship between teacher training and test scores.

Drawing further evidence from the same studies, Muralidharan (2013) indicates that there exists a negative relationship between teacher remuneration and student test scores.

The research presents a mixed review of PTR, with most studies finding no impact of PTR on student test scores. Results from an experimental evaluation by Banerjee, Cole, Duflo and Linden (2007), focused on providing remedial instruction to children outside the classroom with the assistance of a volunteer, find no impact on the test scores of the children who remained in the classrooms with lower size. However, children receiving remedial instruction outside the classroom did show improvement in test scores.

Further evidence from a study by Muralidharan and Sundararaman (2013) reports significant but modest gains from decreased PTR levels. Using panel data, the study finds that reducing the PTR by half would lead to an improvement of 0.25 standard deviation per annum. Production function estimates from Jacob, Kochar and Reddy (2008) also indicate significant minor effects of reduced pupil-teacher ratio on student achievement.

The research reports finding on inputs such as textbooks, uniform and mid-day meals, and studies do not find any significant positive relationship between the above input and student learning. Evidence from experimental studies by Das et al. (2004) indicates that spending a definitive budgetary proportion over two years on books, stationery and writing materials, has a positive impact on test scores. However, the effect was observed only in the first year and diminished in the second year.

In terms of investment in school meals, the research finds evidence from Jayaraman, Simroth and Vericourt (2010) who construct differential estimates with private schools as a counterfactual, and they report an increase in enrolment, however, no significant impact on test scores.

The paper, in the end, presents the verdict that is aiming to '*improving school quality*' in a '*business as usual way*' by solely raising investments in inputs may not lead to optimistic results (Muralidharan, 2013).

2.6.3 Dhruva Bhat (2017)

Bhat (2017) uses a difference-in-difference (DID) regression model to assess the effect of the RTE Act on learning outcomes at a country level by creating control and treatment groups. The control group is comprised of the set of covariates before the RTE while the latter encompasses the variables post the RTE. Using large-scale data sets from Pratham, the study utilises the test scores in language and maths for grades 1 to 7, as a proxy for determining learning outcomes. The data range for seven years from 2007-2014 and compare learning outcomes before and after the introduction of the RTE.

The geographical scope of the study includes Jammu and Kashmir (J&K), and the whole of India, before and after the enactment of the act. The inclusion of J&K state in the study is interesting as it was exempt from the RTE due to the adoption of article 370, providing it with autonomy over several matters and restricting the state's involvement to defence, foreign affairs and communications (Noorani, 2011).

Bhat (2017) uses three major controls in the DID equation to study the impact of RTE on student outcomes. The research controls for the gender of the student, checks for the student's enrolment with a private school and finally, ensures that the changes in the outcomes are not due to the rising incomes by controlling the state level GDP.

Bhat provides an important clarification for all the controls and states that due to the preference of male children in India, it is plausible that outcomes could be 'impacted by gender' (Bhat, 2017, p19). Secondly, controlling for the private school ensures that the performance of public schools is highlighted under the RTE.

The research reports that the introduction of the RTE in government schools had negative results in language across all grades, except grade one. These findings reflect a similar story for mathematics as well as the results were negatively impacted at a broad level across all classes. However, they were not statistically significant. The research states that children enrolled in private schools are likely to gain a 6.9 percentage point increase in reading and a 5 to 13 point increase in math skills following the introduction of the RTE.

The research ensures the robustness of the findings in two ways – by plotting the average scores of the treatment and control groups and observing a steep decline in student performance. However, to make the findings more robust, Bhat (2017) regresses the outcome variables against the covariates and plots the coefficients.

The research also finds that the school level characteristics improved under the RTE regime, as did the usage of blackboards, while teacher absence declined.

A significant limitation to the study is 'omitted variable bias', which means that Bhat's study (2017) does not identify or pinpoint the covariates responsible for declines in differences due to RTE schedule. The researcher does control for private schools, gender and the GDP of the state but the RTE itself is a complex mechanism which outlines several drivers in its schedule. For instance, the RTE schedule regulates hiring trained teachers, salary levels and infrastructure components such as playground, office-cum-store, library and teaching-learning materials. The research needs to consider the drivers of the RTE listed in the schedule and separate its effects to measure the real impact on learning outcomes in public schools pre and post the RTE. Furthermore, the study also does not consider student-level

characteristics such as the family background of the student, income levels and the IQ level of the students, which is likely to affect student outcomes. Other absent variables include pedagogical style, teaching quality and curriculum itself.

The current thesis takes into account the different RTE indicators which form a gap in the above study and tries to determine the differences in learning outcomes in the threatened private schools due to the imposition of RTE regulations. In the next sections, the thesis throws light on the different teacher level factors and institutional factors that have empirically shown to influence student performance.

2.7 Teacher Factors

One of the essential drivers for variation in student achievement is the quality of teachers (Mckinsey, 2007). Education systems gain strength from the quality of teachers, as effective teaching aims to improve student outcomes which in turn helps students to shape their future careers (Coe et al. 2014). Mckinsey's (2007) report, which investigates some of the high performing systems across the globe, focuses on improving student learning and finds three things in common amongst these systems. Firstly, high performing systems aim to maximise the quality of teachers by ensuring the right people for the right job. Secondly, these systems invested in time and resources to train the teachers to be better instructors, as they were aware that – to raise outcomes it was imperative to invest in improving instruction. Finally, they build well-integrated support systems that benefit students through excellent instruction (Mckinsey and Company 2007). Although it is clear that 'teachers' in any system do have an impact on student achievement, it is nevertheless important to determine which factors associated with teachers can lead to better learning outcomes. Therefore, the research focuses on the following factors based on secondary literature (Glewwe et al. 2012; Evans & Popova, 2015; Abogan, 2013; Nannyonjo, 2007; Muralidharan, 2013; Goyal & Pandey 2011).

- Educational qualifications and subject competency
- Teacher training (In-service and academic)
- Teacher remuneration
- Teacher experience
- Nature of teacher's contract
- Pupil teacher ratios

2.7.1 Educational qualifications and subject competency

Buddin and Zamarro (2009), using contemporaneous value-added models, find that teacher education has no effect on student achievement, and hence they recommend that using

'teacher education' as a way to increase student achievement should be viewed with caution. They report that teachers with advanced degrees are not likely to impact test scores positively or sometimes are also known to have an adverse effect on reading and mathematics scores.

Glewwe et al. meta-study (2012) analyse studies which focus on the various characteristics that have positive impacts on learning outcomes. The study finds the relationship between teachers' qualifications and student outcomes to be vague. Of the 13 studies analysed by Glewwe, ten were found to be statistically insignificant, two turned to be significantly positive, and one was significantly weak (Glewwe et al. 2012).

Hanushek (2015, 1997) analyses 151 studies on teacher education and finds only 9% of the studies statistically significant to student achievement. The other 86% of the studies are statistically insignificant, of which 53% were negative or indeterminate.

Coe et al. (2014) and Rockoff et al. (2011) find a negligible or small relationship between academic qualification, general competency of teacher and student achievement. They describe the relationship as 'disappointing' (Coe et al. 2014, p.18).

Studies by Sadler et al. (2013) report a positive but modest relationship between teachers' subject knowledge and student learning outcomes. Sadler et al. (2013) test teachers and students on subject competency in science. They find that more than 4/5th of teachers respond correctly to the questions as compared to a little more than a third of students (38%). However, their study also finds that teachers' ability to recognise misconceptions in science is 'hardly above chance' (Sadler et al., 2013). Similar trends are observed in a less recent study (Harbison & Hanushek, 1992) which compares teachers' subject competency in language (Portuguese) and mathematics with that of their students. They report that although teachers performed better in tests, their performances were not 'remarkably good'. The tests were designed with specific learning objectives of the fourth grade. 1/5th of the questions were not completed by the teachers. The usual expectation in such scenarios is that teachers', the extent of whose education is approximately eight years, would be capable of acing such tests with near perfect scores (Harbison & Hanushek, 1992). Evans and Popova (2015), in a metastudy, report that teachers' subject knowledge helps raise student achievement in that particular subject. Abogan (2013) also finds that as subject mastery improves, it paves the way for better teaching to a different category of students. Zuzovsky (2003) analyses the TIMSS-2003 data to study the relationship between teacher characteristics and student achievements. The study reports that teachers with an advanced degree in science or majoring in science have a positive influence on science test scores, although not significant. Reporting the findings, Zuzovsky states:

“Students taught by science teachers with a second degree or by teachers who had majored in at least one of five relevant subject areas .. had achievement levels that were slightly higher (about one fifth to one third of a group standard deviation) than those of students studying in groups taught by science teachers with a first degree or less” – (Zuzovsky 2003, p. 48)

In conclusion, it is difficult to ascertain if general teacher qualifications or degree can have a positive impact on student outcomes. However, the literature does indicate that depth of subject knowledge or specialised subject competence can help in scoring better outcomes for students.

2.7.2 Teacher training (In-service and academic)

Meichen et al. (2017) review the National Teacher Training Programme (NTTP) in China to understand the impact of national training programmes on student outcomes. The research, comprised of more than 3000 students and 84 teachers, finds that the training programme in maths had no effect on achievement and a negative impact on student outcomes. Meichen et al. (2017) further state that it is likely that teachers fail to ‘apply’ their training in a classroom setting and therefore, they may fail to impact upon student learning. The other causal reason could be the disruption of normal learning for students, as teachers attended the NTTP during term time. A major limitation could be the limited sample size. Secondly, the study was undertaken to determine changes during a specific period, and therefore it is plausible that the long-term effects of teachers’ knowledge could yield better effects on student outcomes (Meichen et al., 2017).

Similarly, Harbison and Hanushek (1992) analyse two different national programmes, namely, the ‘Logos’ and the ‘Curso de Qualificacao’ under the ‘Edurural’ project in Brazil. They find a statistically negative impact of teacher training on mathematics achievement in the second and fourth grade. Elaborating on the negative impact detected in Curso de Qualificacao programme, Harbison and Hanushek (1992) report that teachers participating in the programme would have been those with low levels of formal educational attainment or with poor skills.

Evans and Popova (2015) review six different studies and find that teacher training is capable of producing the largest effect on student outcomes. However, Evans and Popova quickly caution that schools and educational institutions aiming to provide ‘general guidance’ in the name of training may not lead to better student outcomes. A study by Muralidharan and Sundararaman (2010) provides an example to that effect, showing that when teachers

are equipped with general information and training to assist student learning, this does not impact student outcomes. However, training which focuses on classroom transactions and pedagogical strategies have a more profound effect on weaker students (Murnane & Ganimian, 2014). He, Linden and MacLeod (2008) show that when teachers are equipped with a bespoke lesson plan, provided with storybooks, teaching-learning materials and are given instructions on how to use them, they are useful in raising learning outcomes for children.

Nannyonjo (2007) aims to find the impact of teacher training on an extensive database of 3949 pupils after analysing test scores from the Uganda National Examination Board (UNEB) and National Assessment of Progress in Education (NAPE, 2003). On examining the evidence between teacher training and student performance in English and Mathematics, the study shows the following results:

Table 7 – Teacher score comparison

Subjects	Teachers who attended in-service training - (μ) scores	Teachers who did not participate in in-service training - (μ) scores
English scores	26.15	24.60
Maths scores	27.87	30.04

Table based on data from - (Nannyonjo 2007)

The results indicate that for English, teachers who receive training have students with higher test scores as compared to those who have not received training. However, for mathematics, the results are reversed; teachers who have not received any in-service training in the last three years have higher pupil mathematics scores compared to those who have received training. Nannyonjo (2007) further reports that positive test scores in English and negative scores in mathematics are significant. The study outlines that the effect of the in-service training for mathematics was adverse as it might have lacked focus on the improvement of pedagogical skills or would not have been linked to the new curriculum (Nannyonjo, 2007).

Abogan (2013), analysing the RTE indicators, finds that teacher training has a positive correlation with student learning outcomes, especially in higher standards than in lower standards. The findings suggest that teachers need to be better equipped to teach children.

It seems that it is difficult to determine the effect of in-service training on student learning and achievement, due to the lack of substantial evidence in this area. However, there is some evidence that the quality of teachers engaged in training programmes and the type of training intervention are likely to impact student outcomes positively.

2.7.3 Teacher incentives and salaries

Imberman (2015) presents evidence from India and Kenya on teacher incentives, and reports that the 'knowledge of teacher wages impacting student outcomes in developing countries is far more limited' (Imberman 2015, p. 7). Indian evidence includes a study by Muralidharan and Sundaraman (2011), who study the effect of pay incentives on student outcomes in the government schools of Andhra Pradesh.

In the first stage, the treatment group was provided with an incentive based on the mean achievement of students in language and mathematics. Following their intervention, schools, where teachers received incentives,¹⁵ saw an improvement in test scores by 0.27 standard deviation (SD) and 0.17 SD. Apart from that, students also perform well in other subjects including science and social studies, indicating a positive spillover effect of the experiment. In the second stage, Muralidharan and Sundaraman (2011) experimented with 'individual' and 'group incentives', which reveal that students scored better in language and maths in the schools which received individual incentives. However, the differences are not statistically significant (Imberman, 2015).

Glewwe and Kremer (2010), in their experiment in Kenya, award incentives to the schools that have the best average student scores and the highest average increases in student test scores. They report that financial awards encourage teachers to teach for the tests, resulting in a short-term improvement in learning rather than a long-term one. Another interesting finding from the study indicates that students' outcomes are better in more critical tests as compared to lower priority ones and also the gains in the tests fade after the end of the intervention.

Harbison and Hanushek (1992), while evaluating teacher salaries over three years in the second and fourth grade find a negligible but small effect on student achievement by raising remuneration. At grade four level they find that a 35 percent rise in the mean average salary is associated with a gain of 1.5 points in mathematics test scores. The results are not very different at the grade two level as well, although the effect of teacher remuneration is positive and statistically significant across the years. However, due to the small effects they conclude;

¹⁵ Teachers, were given a 3% rise to their annual wages, in case of improved student by administering internal and external tests

“Salaries themselves apparently ignore considerable variation in teacher quality.... increasing teachers' pay indiscriminately, by itself and without regard to their other characteristics, will not meaningfully enhance student achievement” (Harbison and Hanushek 1992, p.109).

Kingdon and Teal (2010) attempt to find the relationship between student outcomes and teacher salaries from private schools in India. They study teachers who join the unions and receive better pay as compared to teachers who are not union members.

Their study confirms that student achievement is strongly reduced when teachers receive higher pay after joining the unions.

Ree et al. (2015) report no changes in test outcomes of children in Indonesian schools when teacher salaries are doubled permanently from the existing scales. They report a rise in satisfaction levels, but income raises fail to yield positive effects on student achievement (Mbiti, 2016; Ree et al., 2015). Similarly, in Gambia, Pugatch and Schroeder (2014) report that when teachers' income is raised by 30-40% in rural areas, there is no improvement in average test scores. However, their research indicates that salary raises did result in increases in the performance of high-attaining students.

The current evidence to some extent does indicate that higher wages and incentives are unlikely to impact student outcomes positively. It is also unclear whether changes to wages or incentive structure is capable of producing long-term and sustained effects on student learning. In conclusion, teacher remuneration is a problematic element capable of improving the quality of learning but using it to increase test scores should be considered with caution.

2.7.4 Teachers experience

Teacher experience is also one of the crucial traits that need to be examined for its impact on student outcomes. Analysing 151 studies, Hanushek (2015) finds that nearly 1/3rd of the studies (29%) indicate a positive correlation between teacher experience and student achievement, while 71% of the studies are statistically insignificant and altogether negative.

Leclercq (2005) also finds a positive association between experience and student outcomes, but the findings are advised to be taken with caution as the effect is non-linear. Furthermore, elaborating the non-linear impact, Leclercq observes that positive and significant coefficients are only observed in the first few years of the teacher's experience and the effect seems to dissipate with time.

Govinda and Varghese (1993) also found that teachers, with an experience range of 5–10 years were capable of positively influence student learning, whereas those with more than

10 or 15 years were less effective in conducting classroom transaction unless they received training. Referring to their findings, they believe that:

“With age, the teachers continue to maintain the same style and pedagogical practices. In the absence of in-service training programmes to upgrade their pedagogical skills, they become less effective”– (Govinda and Varghese 1993, p. 255).

Nannyonjo (2007), while determining the association between student achievement and teacher experience, finds that test scores in mathematics and English plateau after five years and begin to decline after ten years. For instance, his study in Uganda shows that mean test scores in mathematics are 29.34 for teachers with 6-10 years of experience and 26.71 for teachers with more than ten years of experience.

Table 8 - Teaching Experience, Mean English and Mathematics Scores

Teacher’s experience	% of students (English teacher) N=3570	Mean English Score	% of students (Maths) N=3574	Mean Maths Score
<1 year	9.9	21.14	10.8	25.36
1-5 years	38.8	26.94	38.6	27.74
6-10 years	27.2	26.46	31.3	29.34
More than 10 years	29.2	21.98	19.3	26.71

Test scores in mathematics and English are found to be different at 5% significant level. Findings by Nannyonjo (2007) are consistent with those of Govinda and Varghese (1993) and Leclercq (2005). Outlining the decline in student achievement with experience, Nannyonjo (2007) states that:

“It is possible that teachers get tired of teaching or do not get new skills as changes take place in education..... The results of this study call into question the widely held view that employing more experienced teachers improves pupil performance. It may also call for a more clear understanding of what contributes to continued teacher effectiveness, or what leads to reduced teacher effectiveness over time” – (Nannyonjo 2007, p. 46).

An interesting insight relevant to the developing world can be found in slightly less recent research, undertaken by Schiefelbein and Simmons (1981), which could be relevant in today’s context. The research examines 19 studies of which nearly 63% produce insignificant results when teacher experience is regressed on student achievement.

However, most studies from Asia and Africa are found to be significant, leading to indicate that the length of teaching experience is probably associated with cultural traditions. Their research demonstrates that good supervisors tend to share their positive teaching experiences with their subordinates. They hypothesise that the experience of rural teachers is more likely to have an impact on student achievement as rural teachers are more frequently in contact with their supervisors compared to their urban peers.

This could still be applicable in the Indian context where close to 1.3 million schools are still located in the rural area, where experienced teachers could influence children's learning (DISE, 2016).

From the works reviewed above, it can be concluded with some certainty that teachers within the experience range of 5-10 years are likely to impact student outcomes positively. However, teaching experience must be supported with appropriate in-service teacher training to maintain the positive impact.

2.7.5 Nature of teachers contract

Various parts of the developing are under increasing pressure to improve the quality of learning in schools. However, given constrained educational budgets and limited financial bandwidth, governments are embracing creative ways to find solutions to problems surrounding teaching. One such way is by deploying contract teachers, who have been increasingly used in Africa, South Asia and Latin America to solve the problem. Contract teachers, often hired at a fraction of the cost, as compared to the civil teachers with the aim of achieving equity and efficiency.

Kingdon et al. (2013) review 15 studies which use a combination of techniques to determine the effect of contract teachers on learning outcomes. The meta-study concludes that contract teachers are in general more effective in improving student outcomes than regular teachers (Kingdon et al., 2013). However, the authors of the study are quick to caution that the findings are entirely context-specific.

Goyal and Pandey (2011) find that contract teachers usually exert more effort compared to permanent teachers and high efforts by contract teachers are found to be positively associated with student outcomes. Furthermore, contract teachers are found to be cost-effective, with an average attendance of 75% as compared to 60% for those with permanent tenure. Moreover, as reported by Kremer et al. (2005), a 10% increase in teacher absence results in a 1.8% increase in students' absence and a reduction of 0.02 SDs in test scores.

Banerjee et al. (2007) show improvement in test scores by hiring young women without any requisite teacher qualification or high salary. The RCT programme claims to have improved the average test scores of all children in treatment schools by 0.14 standard deviation in the first year and 0.28 in the second year, relative to comparison schools. The young women hired in the treatment schools were not qualified as per the RTE norms, nor were they paid salaries as prescribed by the RTE (Banerjee et al., 2005).

In a different, contrasting study, Vegas and De Laat (2003) report negative findings from Togo. They find that teachers with permanent and regular contracts outperform teachers with temporary contracts and outline that the better performance of permanent teachers is plausible due to their higher level of experience as compared to contract teachers. A UNESCO (2015) report, on the contrary, finds no difference in overall learning outcomes when students are taught by a regular teacher or a contract teacher. A majority of studies do indicate that contract teachers can efficiently raise learning outcomes for children. However, such research must be interpreted with caution due to region specificity.

2.7.6 Pupil-teacher ratios

Pupil-teacher ratios (PTR) are known to play a crucial role in the way that children learn in the classroom, which in turn can impact outcomes (Koc & Celik, 2010; Chetty et al., 2011; Hanushek, 2003; Kremer & Holla; 2009). Koc and Celik (2010) study the correlation between PTR and student achievement in Turkey and find a negative correlation, indicating that higher class sizes may represent a barrier to raising learning outcomes.

In advanced, industrialised nations such as the United States, Chetty et al. (2011) find that reducing class sizes is likely to improve labour market outcomes. Research in Nigeria by Ajani and Akinyele (2014) identifies a significant positive relationship between PTR and student achievement in maths in the elementary grades. They reveal that teachers are capable of providing more attention if there are fewer children in the classroom. Moreover, due to lower class sizes, teachers can focus on weaker students and provide them with more academic inputs to improve their outcomes. Even at the secondary levels, smaller class sizes are instrumental in reducing the attainment gap in reading and science (Ajani & Akinyele, 2014; Bayo; 2005).

On the other hand, Hanushek (2003), while analysing the distributed effect of PTR, finds an equal number of studies that have a significant, positive and negative impact on student outcomes, based on 376 production function estimates.

Table 9 – Effects of key resources based on 376 production function estimates

Resources	Number of estimates	Statistically significant %		Statistically insignificant %
		Positive	Negative	
Classroom Resources				
Teacher pupil ratio	276	14	14	72
Teacher education	170	9	5	86
Teacher experience	206	29	5	66

Commenting on the above findings Hanushek 2003, stated:

“The standard hypothesis driving policy initiatives is that each of these resources (teacher ratios....should have a positive effect on student performance. In terms of real classroom resources...14% of the estimates investigating teacher-pupil ratios find positive and statistically significant effects on student performance. These relatively small numbers of statistically significant positive results are balanced by another set finding statistically significant negative results reaching 14% in the case of teacher-pupil ratios – (Hanushek 2003, p. F75, F76)

Kremer and Holla (2009) find no definitive evidence from the developing world that supports the notion. Reporting on the basis of the RCT studies undertaken in Kenya and India, they suggest that reducing the PTR in classrooms often has little or no impact on student achievement. Evidence on PTR was found to be little or to have a mixed impact on student test scores, even in developed parts of the world (Angrist & Lavy, 1999; Hoxby, 2000).

Glewwe et al.’s (2012) meta-study on educational inputs and their impact on learning reports that five studies reveal a significantly positive impact of PTR on the test while on the other hand, an equal number are found to have a significantly negative impact on student achievement. Experiments from Kenya by Duflo, Dupas and Kremer (2012) show that reducing class sizes and employing more teachers has no impact on student achievement (Mbiti, 2016; Duflo et al., 2012).

Overall, the impact of PTR on student achievement is nebulous and indeterminate.

Conclusion — Learnings on teacher characteristics and their impact on student achievement. Teachers undoubtedly play an integral role in educational systems and are an essential input determinant that can impact learning outcomes.

The following conclusions are drawn from the preceding literature review on the various factors associated with teachers.

- Education qualifications and subject competency – Through the available literature, it is difficult to ascertain if general teacher qualifications are of any help in improving student outcomes. However, subject specialisation to improve teachers' skills and competencies does help to improve efficiency in the classroom, thereby leading to better student achievement.
- In-service training – Teacher training programmes do not seem to impact student learning outcomes. However, some studies do indicate that in-service training assists in raising learning outcomes, provided that the quality of teachers participating in the training is better.
- Teacher remuneration – Most studies indicate a negative relationship between teacher remuneration and student test outcomes.
- Teacher experience – The evidence on teacher experience is quite mixed. The available literature indicates that teachers with an experience range of 5-10 years can impact student learning outcomes positively. However, beyond ten years, efficiency begins to decline significantly and is hardly likely to have any impact on student learning outcomes.
- Nature of teacher contract – Existing literature on teachers' contract is quite limited, and most literature does indicate a positive co-relation between temporary or contract teachers and their ability to raise learning outcomes. Current, supporting studies are quite region specific, and hence, they need to be interpreted with caution when applied to a broader context or at a policy level.
- Pupil-teacher ratio – The impact of PTR does seem to be positive on student learning outcomes, but further research is required in this area to support any concrete opinion.

Summary tables 10 –14 represent the synopsis of the study and the evidence found across these studies. The tables also provide a conclusive decision on the various indicators based on the evidence presented.

Table 10 – Summary table for teacher qualifications & subject competency on student outcomes

Teacher Indicator	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact		
Educational qualifications and subject competency	Buddin and Zamarro (2009)		Teachers with advanced degrees are unlikely to impact the test scores positively, or sometimes, they are also known to have adverse effects on reading and mathematics		Difficult to ascertain, if general teacher training has any impact on student learning outcome. Specialised and subject teacher training seems to have some positive impact on student achievement.
	Coe, et al. (2014)			Negligible and insignificant relationship between academic qualification and student achievement	
	Sadler et al. (2013)	Modest, positive relationship between teachers specialised subject knowledge and student learning outcomes			
	Evans and Popova (2015)	Positive impact due to teacher's subject knowledge on a specific subject			
	Zuzovsky (2003)	Teachers with advanced degree in mathematics and science are capable of influencing test scores positively			

Table 11 – Summary table for the impact of teacher training on student learning outcomes

Teacher Indicator	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Teacher training (In-service and academic)	Meichen, et al. 2017		Teacher training programme in math did not affect achievement, and the study reported a negative impact on student outcomes		Generalised teacher training may not be beneficial to improve student learning, specialised teacher training and the type of training intervention may assist in raising learning outcomes.
	Harbison and Hanushek (1992)		Negative impact on mathematics achievement, when, the national programme Logos' and the 'Curso de Qualificacao' were evaluated		
	Evans and Popova (2015), Muralidharan & Sundararaman (2010)	Positive impact of specialised subject training on student outcomes, general teacher training may not have a strong impact on student outcomes			
	Nannyonjo 2007	Teacher training in languages improved student outcomes in language	Teacher training in mathematics had, an adverse effect on mathematics test scores		
	Abogan 2013	Teacher training impacts score positively, especially at elementary levels			

Table 12 – Summary table for impact of teacher salaries on student learning outcomes

Teacher Indicator	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Teacher incentives and salaries	Muralidharan and Sundraraman (2011)			Teacher incentives had a positive impact on student outcomes, when, teachers were given individual incentives, as compared to group incentives	Current evidence on financial incentives is negative and shows no or negative impact on student test outcomes
	Glewwe and Kremer (2010),	Financial rewards to teachers assisted in improving scores in the short term, rather than in the longer run.			
	Kingdon and Teal (2010)		Negative impact, on student achievement, when teachers were paid higher compared to their regular incomes		
	Ree, et al. (2015)		No change in student outcomes, when teacher salaries were, doubled		
	Gambia, Pugatch and Schroeder (2014)		No improvement in the average test scores, in the rural areas of Gambia, when teacher salaries were, raised		

Table 13 - Summary table for impact of teacher experience on student learning outcomes

Teacher Indicator	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Teacher Experience	Hanushek, (2015) – analysed 151 studies as a part of metanalysis	Nearly 1/3 rd of the studies indicated a positive impact of teacher experience on student outcomes		More than 70 percent of the studies were found to have no impact or insignificant results of teacher experience on student outcomes	Teachers with an experience range of 5-10 years are capable of influencing student outcomes positively. However, any experience beyond ten years needs to be supplemented by teacher training to influence student achievement.
	Leclercq (2005)	Positive effect of teacher experience on student outcomes but. the effect fades away after a certain period of time			
	Nannyonjo (2007)	Positive impact on student test scores for teachers with 5-10 years of experience, however, the achievement starts declining, for teachers with more than ten years of experience			
	Govinda and Varghese (1993)	Positive impact of teacher's experience on student outcomes but, teachers with more than ten years of experience need to be skilled and trained to sustain learning outcomes			

Table 14 – Summary table of teacher contract on student learning outcomes

Teacher Indicator	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Nature of teacher contract	Kingdon et al. (2013)	Contract teachers are more effective in improving student outcomes than regular teachers.			Temporary teacher contract does seem to positively influence student learning outcomes. However, the findings need to be interpreted with caution, as they could be region specific.
	UNESCO (2015)		No impact on student outcomes, when taught by regular or contract teachers		
	Goyal and Pandey (2011)	Contract teachers usually exert more efforts compared to regular teachers and thus contract teachers are found to be more effective in raising student learning outcomes			
	Vegas and De Laat (2003)		Contract teachers are incapable of producing positive effects on student outcomes. Regular teachers are capable of performing better, due to more extended experience		
	Banerjee et al. (2007)	RCT's find that employing teachers, without any formal qualifications, temporarily improved average test scores in schools			

2.8 School Physical Characteristics

Despite the dearth of research concerning the impact of school characteristics or inputs, specifically, associated with the RTE, a significant body of literature does summarise the impact of general infrastructure in schools on learning outcomes. Studies of particular interest, which primarily focused on facility aspects and looked at the state of learning facilities in developing countries include; Abogan (2013), Adroque and Orlicki (2013), Adukia (2016), Cameiro (2015), Chakraborty and Jayaraman (2016), Coe et al. (2006), Glewwe et al. (2012), Howie and Pate (2012), Mukerji and Walton (2012), Murillo and Roman (2011), Muralidharan (2013), Kamijo et al.(2011), Kazianga et al. (2012), Tradeau and Shephard (2008) and Walker (2011),.

This section discusses the following input-based components relating to school characteristics. These characteristics include school buildings and facilities (electricity provision, toilets, desks, tables, chairs, and computers), the inclusion of learning spaces (libraries and laboratories), teaching-learning materials and school meal programmes.

2.8.1 School facilities and infrastructure

The schedule (Table 4) from the RTE act indicates that to some extent the government regulations prioritise the physical environment over the learning inside the classroom. The schedule makes it evident that there should be at least one classroom for every teacher, a multi-purpose office and storeroom for the head teacher, safe and adequate drinking water for all children, separate toilets for boys and girls, a playground and a boundary wall or fencing. It also stipulates the minimum working hours for teachers in government and private schools. The schedule also instructs schools to have libraries and play materials including games and sports equipment.

Commenting on such a framework reports that it “considers schools as “factories” that produce “learning” using various school and teacher characteristics as “inputs” (Glewwe et al. 2012, p 5). Further, Glewwe has noted that such a framework uses the production function approach, which argues that cognitive skills are an outcome of several different factors (Glewwe et al. 2012). The impact of school infrastructure and pedagogical materials on student achievement is quite mixed, so any conclusion derived should be treated with caution.

Carneiro et al. (2015), in their research in Senegal, found that schools that invested significantly in material and infrastructural improvements saw only minor gains in student achievement, compared to ones which invested in raising the capability and capacity of teachers and school leaders through training interventions (Carneiro, et al. 2015)

On the other hand, Muralidharan et al., using panel data, from Indian states found no correlation between an improvement in village-level school infrastructure and enrolment. The study also reported no relationship between village-level school infrastructure and student test scores (Muralidharan, 2013).

Abogan (2013) uses regression estimates to conclude that improved infrastructure provision, as recommended in the RTE Act is unlikely to produce positive results on short-term education outcomes. He reports no significant effect on student outcomes and suggests that it would be too early to expect any impact of the RTE's investment on infrastructure (Abogan, 2013).

Table 15- Input variables analysed relative to learning outcomes

Variable	ASER-Paisa dataset	Commentary
Infrastructure	No significant effect	
Midday meals	No significant effect	
Learning materials	++	Moderately positive outcomes

(Abogan 2013, 11)

Another critical factor is toilet provision. Adukia (2017) explores the relationship between school sanitation infrastructure and student educational outcomes, using a difference-in-difference empirical strategy. The study used a national level government database for identifying schools with and without sanitation infrastructure. Adukia (2017) finds that the presence and construction of gender-specific toilets and sanitation facilities raise enrolment in schools, especially that of pubescent girls. However, constructing new toilets in schools does not affect the test scores of students (Adukia, 2017).

Mukerji and Walton (2012) conclude that although limited evidence is available in this area, the existing literature indicates that students enrolled in schools endowed with better infrastructure do not seem to have better learning outcomes (Mukerji & Walton, 2012). A Brazilian project analysed by Harbison and Hanushek (1992) by various infrastructure facilities including sanitary facilities, offices, classroom space, electricity, water, desks and chairs found that the presence of facilities can potentially raise student test scores by four basis points.

Of all the studies, the most comprehensive is that of Glewwe et al. (2012) who attempt to review the literature over 20 years. The meta-review examines 79 studies and further classifies 43 papers as high-quality studies due to their rigour. The 43 studies either use RCTs (randomised controlled trials), DD (difference-in-difference) or RDD (regression discontinuity design) for estimating variables.

The remaining 36 papers rely on OLS (ordinary least squares) methodology (Glewwe et al., 2012). The table below provides a summary of the findings:

Table 16 - Summary table reflecting the impact of infrastructure

Variable	Overall studies examined - (79)		High-quality studies - (43)	
	Studies on school infrastructure	Status	Studies on school infrastructure	Status
Desks/Tables/Chairs	11	Almost all positive	4	All positive
Computers/Games	8	Mostly positive	6	Ambiguous
Electricity	6	Mostly positive	3	No significant effect
Blackboard	6	Mostly positive	3	Ambiguous
Roof/Wall floor	4	Mostly positive	4	Mostly positive

Studies using sophisticated designs such as RCT, DD and RDD find that schools with better quality desk, tables and chairs, roof, wall and floor show improved student learning. Rigorous reviews indicate that the impact of resources like computers, games and blackboards on student outcomes is vague (Glewwe et al., 2012).

Willms and Somers (2001) also report that the size of a library is capable of influencing test scores. They measure size in two categories: less than or more than one thousand copies. They conclude that libraries with a collection of 1000 books or more are capable of increasing test scores by 12 points in reading and mathematics. Murillo and Roman (2011), in their study conducted across 15 Latin American countries, find a significant positive relationship between the number of books and student academic performance in most of the countries.

Lonsdale (2003) reviews several studies conducted over 12 years and finds that school libraries have a positive impact on student test scores. Some of the key findings of the review are listed below:

- Library facilities with adequate staff and resources can lead to better student achievement, regardless of a student's socio-economic background
- The quality of book collection and usage of the library have a significant effect on student test scores

- Collaborative relationship between teachers and librarians has a positive influence on student achievement
- Libraries are capable of inducing self-esteem, confidence, independence and sense of responsibility in students with regards to their learning and thus allow them to learn better which positively influences their achievement

To conclude, firstly, it is difficult to determine the impact of school infrastructure on learning outcomes. Secondly, it is clear that maintenance and usage of infrastructure are critical to derive maximum benefit out of existing infrastructure. Finally, investments in infrastructure yield return over an extended period as compared to other interventions.

2.8.2 School meal programme

School feeding programme is another component of the RTE schedule that mandates the provision of a kitchen for feeding pupils in the school. A vast body of research indicates that school feeding programmes can lead to two main advantages. First, they motivate children to be present in the school thus impacting enrolment and attendance (Jomaa, McDonnell & Probart 2011; Kaur & Bansal 2016; Chakraborty & Jayaraman 2016). Second, children from the most impoverished families receive food for no cost, thus helping them to alleviate hunger, leading to improved health and better cognitive outcomes (Chakraborty & Jayaraman 2016; Adroque & Orlicki 2013; Kazianga et al., 2012).

Chakraborty and Jayaraman (2016) find that provision of midday meals raises learning achievement, albeit at a decreasing rate. Using OLS estimates, they find that schools providing mid-day meals up to five years have 18% higher reading test scores and 9% increased maths test scores, compared to those which offer mid-day meals for less than a year. The rise in test scores is statistically significant for both the subjects (Chakraborty & Jayaraman, 2016; Jayaraman, Simroth & Veriocrurt 2010).

Others including McEwan (2013), Adroque and Orlicki (2013), Tan et al. (1999) and Kazianga et al. (2012) also found a positive impact of school feeding programmes on test scores. McEwan (2013) discovered insignificant but positive language test scores amongst grade four children in Chile. Adroque and Orlicki (2013) observed statistically insignificant positive test scores in language, and significant positive test scores in mathematics, amongst grade three children In the Philippines, school feeding programmes were found to significantly impact test scores in maths by (0.25 σ_X) and (0.16 σ_X) in language (Tan et al. 1999).

Glewwe et al. (2012) conducted a meta-review of 79 studies, observing the impact of school feeding on student outcome. They produce 13 distinct estimates of which seven are negative, four are significantly negative, and six are positive and statistically significant.

On reviewing 79 studies, of which 43 were of a higher standard, Glewwe recognises that *“the evidence does not provide strong support ... as a means to raise student learning”* (Glewwe et al. 2012, p25).

In conclusion, school feeding programmes do seem to produce positive effects on learning outcomes to some extent. However, more evidence is required to understand the impact of substitution effects on student achievement due to the provision of free school meals.

2.8.3 Textbooks and teaching-learning materials (TLM)

The RTE’s schedule does not quite clearly outline the norm for textbooks and other teaching-learning material, and the mandate seems to be quite vague and muddled. The schedule instructs schools to provide textbooks and teaching-learning materials ‘as required by every classroom’ (OPEPA, 2016)

Research in Sub-Saharan Africa by Michaelowa (2001) across five nations mainly speaking the French language – Burkina Faso, Cameroon, Côte d’Ivoire, Madagascar and Senegal–, finds a positive impact on French and mathematics in standardised tests due to the availability of textbooks (Yu, 2007; Michaelowa, 2001). Yu (2007) clarifies that the provision of textbooks in schools and educational institutions may not be sufficient. His research further suggests that textbooks and teaching-learning materials should be utilised and efficiently deployed, which can subsequently raise engagement levels and lead to learning outcomes. Sabharwal, Evans and Marshak (2014), in research conducted in Sierra Leone, show that when textbooks are provided freely, they lay unused and produce minimal or no impact on student learning in the given context (Sabarwal, Evans & Marshak, 2014).

A less recent study from Govinda and Varghese (1993) find a considerable difference in the test scores of children in mathematics and Hindi in schools where all students possess textbooks, those where most children have textbooks and classes where children have no textbooks. They further report that teaching aids assist in improving mean achievement scores. However, their conclusions are similar to Yu, (2007) and Sabharwal, Evans and Marshak, (2014). They recommend that teaching aids need to be utilised efficiently to raise test scores; mere provision of textbooks and learning materials may not be sufficient.

A recent report by the World Bank (2018) reviews several studies across the globe and finds that raising the material provided in schools may not improve learning interactions in the classroom.

Experiments from Kenya show that textbooks have no impact on learning outcomes as the students are unable to understand the language in the textbooks. Similarly, in Colombia, technology aids fail to produce any impact on learning achievement as they merged poorly with the curriculum (Barrera-Osorio et al., 2009; Glewwe et al., 2009; Ganimian & Murnane, 2016). The World Bank (2018) report reiterates the historical findings:

“It seems obvious that resources have to be used to have an impact, but many interventions that provide inputs fail exactly because insufficient thought is given to how resources will be used. Infrastructure and other inputs are essential, but they work only when they serve the relationship between teaching and learning” – (World Bank, 2018, p. 148)

Overall it is clear from the above literature reviewed that if textbooks and other TLM in schools are capable of improving learning outcomes. However, there seems to be some positive effect when, textbooks and other resources, are efficiently used by teachers. Investments in resources that lie idle in classrooms introduced merely as a part of a legislative regime are highly unlikely to yield any results in terms of academic achievements.

2.8.4 Presence of playgrounds for physical activities

The RTE Act demands that every school have a playground and teaching-learning materials for games to be made available to students. The logic behind this is to ensure that educational institutions undertake sports and physical exercises. Schools are always under pressure to improve academic achievement, and this has forced schools to devote less time and resources towards activities that enhance physical health. Some research in this context does indicate that undertaking physical activity in schools can lead to better cognitive development and academic achievement (Howie & Pate 2012; Active Living Research, 2015) and lower physical activity may lead to deteriorated learning outcomes (Roberts et al., 2010). Carlson et al. (2008) show that female students who devote an hour to five hours on physical education per week performed better in mathematics and language, as compared to those who spent less than ½ an hour on P.E.

Kamijo et al. (2011) use an RCT to show that children aged 7-9 years who participated in a physical activity programme performed better in activities related to working memory as well as cognitive tasks.

Trudeau and Shephard (2008) also report strong correlations between academic achievement and participation in sports and extracurricular activities (Lewis, 2004; Trudeau & Shephard, 2008). Using quasi-experimental data, they find the following relationship:

“Data from quasi-experimental studies find support in mechanistic experiments on cognitive function, pointing to a positive relationship between physical activity and intellectual performance.” – (Trudeau and Shephard 2008, p.1)

On the other hand, Coe et al. (2006) report no improvement in standardised test scores in sixth-grade pupils after a semester of arduous physical activity. Similarly, Dwyer et al. (1983), in an experimental study, find no effect on student outcomes due to physical activity. Sallis et al. (1999) report no improvement in academic performance when comparing an active group of students to a less active group. Even in the case of Kamijo et al. (2011) where the control group was found to be better in cognitive tasks, several participants opted out of the cognitive tasks, and therefore, it is recommended to interpret this research with caution.

Evidence, from several cross-section research publications and RCTs do indicate that ‘fit and healthy’ children demonstrate better academic achievement. However, proof that strenuous physical activity and involvement in sports benefits children’s academic activities is still lacking. Thus the relation between non-academic activities such as sports and games needs to be further explored before drawing any concrete conclusion.

A summary indicating how different input factors can impact achievement is shown in tables 17 – 20.

Table 17 – Presence of a library and its impact on student learning outcomes

Input indicators	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Library	Murillo and Roman (2011)	Positive relationship between the number of books and student academic performance in research undertaken, in 15 Latin American countries			Size of the library, quality of collection can influence student achievement. Mere presence of a library in a school may not be sufficient to raise student outcomes.
	Willms and Somers (2001)	Size of a library in a school is capable of influencing the student outcomes			
	Lonsdale (2003)	Found positive impact between libraries and student test scores, however, lists the factors associated with libraries capable of influencing academic outcomes: <ul style="list-style-type: none"> • Quality of book collection • Collaborative relationship between library staff, teachers and students • Capability of libraries to induce self-esteem, confidence, independence and sense of responsibility in students with regards to their learning 			

Table 18 - Provision of mid-day meals and impact on student achievement

Input indicators	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Mid-day meals	Chakraborty and Jayaraman (2016)	Finds that schools providing mid-day meals up to five years, have 18% higher reading test scores, and 9% increased maths test scores, as compared to those schools which were providing mid-day meals for less than a year			School meals programme does seem to produce positive effects on learning outcomes to some extent.
	Adroque and Orlicki (2013)	Observed, positive relationship between school meals and mathematics test scores		Observed, positive relationship, between school meals and language scores	
	Glewwe and Muralidharan (2015)	School feeding programme found to positively impact test scores in maths by (0.25 σ_X) and (0.16 σ_X) in language			

Table 19 - Availability of resources and its effect on learning outcomes

Input indicators	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Textbooks and teaching-learning materials	Michaelowa (2001) Yu 2007	Positive impact on French and mathematics in standardised tests due to the availability of textbooks			Difficult to ascertain the impact of textbooks and teaching-learning material on student outcomes.
	Sabharwal, Evans and Marshak (2014)		Minimal or no impact on student learning, when textbooks were provided but remained unused in schools		
	Govinda and Varghese (1993)	Children with textbooks were found to have better scores in Hindi and Mathematics. Teaching aids further reported that teaching aids helped in improving the mean achievement scores			
	World Bank, (2018)		Reviewed studies from the developing world, found raising the material provision like textbooks and TLM in the schools may not improve learning interactions in the classroom		
	Barrera-Osorio et al., (2009); Glewwe et al., n (2009); Ganimian and Murnane, (2016)		Experiments from Kenya showed textbooks had no impact on learning outcomes. In Colombia, technology aids failed to produce any impact on learning achievement		

Table 20 – Impact of playground for physical activities on student learning outcomes

Input indicators	Study Author/Author's	Statistically significant		Statistically not significant	Conclusion on indicator
		+ve Impact	-ve Impact or no impact		
Playgrounds for physical activities	Howie and Pate (2012); Active living research (2015)	Physical activity in schools leads to better cognitive development and academic achievement			Research indicates that fit and healthy children do tend to perform better academically. However, the potential of physical activities in schools, and its impact on student outcomes, remains indeterminate.
	Carlson et al., (2008)	Female students, who spent an hour to five hours on physical education (P.E), performed better in mathematics and language			
	Kamijo et al., (2011)	Using RCT showed that children between 7 to 9 years, who participated in a physical activity programme performed better in activities related to working memory as well as cognitive tasks			
	Coe et al. (2006)		Found no improvement in standardised test scores, in sixth-grade pupils after a semester of arduous physical activity		
	Sallis et al., (1999)		No improvement in scholastic or academic performance, when an active group of students was compared to a lesser active group		

2.9 Conclusion

Sections 2.7 and 2.8 specifically focused on the different teacher, and school inputs that are likely to affect student achievement – either positively, negatively, or if the effect of the input is indeterminate. Other factors such as a student’s family background or socioeconomic status, are also capable of influencing student outcomes. However, they are out of the scope and purview of the research.

The summary tables (10 – 20) present the final results drawn from the literature review on the various inputs discussed. The table consists of five columns; the first column lists the name of the input. The second column denotes the author/authors of the study. The third column reports if the study has a statistically negative or positive impact on student outcome, while the fourth column indicates whether or not the study is statistically significant. The final column describes the conclusion of the studies examined during the literature survey.

In the case of teacher inputs, the indicators found to be positively associated with student achievement are teachers’ experience and the nature of teachers’ contract. However, the literature also reveals that the length of teachers’ experience is critical in influencing student outcomes. The effect of experience is limited to a certain length, after which in-service training is required to retain the positive influence of teachers’ experience on student learning outcomes. The verdict on remuneration, teacher qualifications and subject competency remain indeterminate. Generalised teacher training is found to have no impact on student learning. However, specialised training in subjects like mathematics and science can assist in raising scores for respective subjects.

In the case of material inputs, school meal programmes seem to have a positive effect on student achievement as they act as a lucrative incentive for children to attend school, alleviating hunger, improving physical and mental stamina and ultimately leading to better learning outcomes. It is difficult to ascertain the impact of textbooks and teaching-learning material on student achievement, but some studies show positive effects, leading to an improvement in test scores whenever they are used efficiently by teachers. In the case of schools’ physical infrastructure, it is tough to determine the impact of every individual input associated with the school due to two reasons. Firstly, the effect of infrastructure depends on its use and maintenance. For instance, in the case of libraries, the size of the library and its usage matters; merely stipulating a library in schools may not yield fruitful results for student achievement. Secondly, investments in infrastructure generate positive outcomes over an extended period; the prolonged duration combined with accounting complexities involves depreciation which makes it challenging to estimate achievement effects caused by infrastructure.

Most teacher and school inputs are, introduced in the schooling systems with an aim to improve student achievement. The RTE as a regulatory measure focuses on several of these inputs, however, misses a crucial link, i.e. the development of academic and cognitive abilities. Brinkmann (2012), notes that individual sections of the Act do mention learning processes. However, it does not form the core criteria of the Act, nor does it become an integral component while securing recognition for a new school. Furthermore, she states that act guarantees: “a right to schooling rather than a right to education. If followed in its entirety, it will produce a schooled population, but not necessarily an educated citizenry” (Brinkman 2012, p. 104).

Conclusions drawn from the above literature survey for the various inputs will be used to inform the research questions drawn at the beginning of the chapter:

- Is there any relationship between student achievement and the RTE’s emphasis on physical indicators?
- Do the RTE teacher indicators listed in the RTE act and schedule have any impact on learning outcomes?
- Does following certain core guidelines from the RTE rigidly have any impact on student test achievement?
- Does following the RTE’s institutional academic indicators have an impact on student achievement?
- In correlation to the above questions, how do low-cost school owners view the RTE regulations?

Chapter Three: Methodology

3.1 Introduction

This chapter focuses on exploring the context of educational research. It is imperative to analyse distinct philosophical standpoints relating to social science research methods proposed by various thinkers. Through this overview, I intend to examine the process of my research which is constructing my knowledge and social reality, providing a firm, theoretical foundation for my research. Understandably, ontological assumptions give rise to epistemological assumptions; these, in turn, motivate methodological considerations, enabling the creation of research instruments required for data collection (Irene, 2014)

Philosophical standpoints allow us to understand research methods as more than a mere technical exercise. They assist us in understanding the world, as well as clarifying the purposes of this understanding (Cohen et al., 2007)

The first three sections of the chapter explain the different paradigms associated with the research, tracing tenets, critical thinkers and their influence. In the subsequent three sections, I elaborate on the sampling methodology, instrument design and field operations of my research. The final sections focus on ethical considerations and the validity and reliability aspects of the study undertaken in Delhi.

3.2 Research paradigms and philosophical stance

Before beginning the research, understanding the research paradigm is of paramount importance. According to Scotland (2012), 'paradigm' encompasses the following: 'ontology, epistemology, methodology, and, methods (Scotland, 2012, p9). Each of these terminologies is explained below.

Researchers need to understand the mechanics of how reality is constructed. 'Ontology' is the study of the existence of a phenomenon (Crotty, 1998; Scotland, 2012). The etymology of the term is derived from the Greek present participle ὄντων/ on/ which means 'to exist' (Irene, 2014). Ontology further can be split into two basic positions – objectivism and 'constructionism' (Bryman, 2004).

'Epistemology' refers to the foundation of existing or acquired knowledge. The knowledge could be concrete, factual or could be more porous or subjective, obtained through experience and insight (Cohen et al., 2006; Irene, 2014). Origins of this term share the same roots as ontology, specifically the Greek verb 'episteme' meaning to understand a concept and grasp it through experiencing phenomena or processes (Irene, 2014). Furthermore, Irene (2014) outlines that epistemology views the quest of knowledge in two dimensions.

First, that which considers knowledge to be 'objective and tangible', termed as 'positivism' (Irene, 2014). Secondly, any knowledge which advocates understanding the subjective world of human experience is termed as 'constructivism' (Cohen, Manion & Morrison, 2007)

Crotty (1998) defines methodology as a 'plan of action' or the rationale behind the selection of a plan to use a particular method. The process of answering questions about 'why, what, where and how' the data will be collected termed as 'methodology' (Scotland, 2012; Guba & Lincoln, 1994; Crotty, 1998). The importance of paradigms in research is crucial as every research method can be linked with epistemology and an ontological position. The differences in ontological and epistemological stances often lead researchers to employ different research methods. However, the aim may be identical (Grix, 2004; Scotland, 2012)

The current research follows a 'pragmatist' approach, focusing on the solutions to problems which allows the flexibility to choose the method suited to attain the research objectives. Moreover, it provides the flexibility to use multiple ways to address a problem (Creswell, 2003; Rossman & Wilson, 1985). Tashakkori and Teddlie (1998) recommend that this approach justify the use of mixed methods as it lays the foundation to use 'pluralistic approaches' to resolve a problem (Creswell, 2003).

3.3 Epistemology

Stuart and Little (2007) describe epistemology as the study of the 'components, sources, limits and the justification of knowledge'. Epistemology, according to the Sandford dictionary (2009) is defined as the process of 'creating and disseminating' knowledge in particular areas of enquiry

Carter and Little (2007) describe three components capable of influencing an epistemological stance. These include interactivity, the data gathering process and finally the communication and dissemination of obtained knowledge. Interactivity determines the relationship between the researcher and the participants which can be viewed in two ways. First, the objective view in which a researcher employs scientific tools for the collection of data in a way that avoids bias, refraining from obtaining any knowledge likely to impact the study and assessing the subjects through an independent approach. The second view is the subjective view which allows the researcher to create knowledge in coherence with his/her subjects. Interaction is essentially the mode of communication between the researcher and the subjects, allowing for a multi-dimensional view of the research.

Second, an epistemological stance indeed determines how the data is collected, validated, cleaned and analysed (Angen, 2000). The objective position allows researchers to collect responses through questionnaires and to triangulate and interpret them in a predefined

fashion, suiting the requirements of the research. The subjective view allows the researcher to understand the reaction and experiences of his/her subjects by linking with the process (Carter & Little, 2007).

Lastly, an epistemological stance also determines how a researcher shares findings with the outside world (Mantzoukas, 2004). For instance, from a subjectivist viewpoint, a researcher becomes part of the story, allowing for successes and failures encountered during the research process (Carter & Little, 2007). However, from an objective standpoint, the results are summarised and discussed without the interference of emotions or experiences encountered during the data gathering process.

In the current study, responses were sought from participants and subjects through a semi-structured questionnaire. Data was gathered from various sources, but the researcher remained an independent observer without interfering so that the subjects could report their beliefs and attitudes without bias. Collection of data from multiple sources allowed for triangulation. Data gathered from the field through the semi-structured questionnaires¹⁶ were analysed with sophisticated regression models, and the findings are presented most accurately. The narrative data is presented in the form of vignettes, maintaining the anonymity of subjects participating in the study.

3.4 Influence of the pragmatist paradigm on the current research

The 'pragmatist' paradigm influences the current research as it provides flexibility to integrate the subjective and objective view in research. It aims to provide a bridge with the binary divide between positivist and 'interpretivist' traditions. The recognition of the dual approach makes it relatively unique to the social sciences. According to Cresswell (2003), pragmatism does not restrict itself to any particular philosophical stance and thus allows researchers to draw the appropriate assumptions, either from the qualitative or quantitative domain. The approach further allows a 'freedom of choice' (Cresswell, 2003 p12) and thus researchers are at liberty to adopt methods, processes and techniques that satisfy their objectives. Moreover, it permits to look at several approaches, across the different stages of the research from data gathering to analysis.

Using a pragmatic approach allows for analysis of both quantitative and qualitative data, advocating the selection of whichever approach is optimum for resolving a problem.

¹⁶ See appendix 5, 6 7 and 8 for student, principal and teacher questionnaires.

Applying the pragmatist view to the current research which aims to understand the impact of a four-year educational law in India, this paradigm provides the flexibility to choose from quantitative or qualitative methods owing to the complexity of the study.

Using pragmatism to follow the quantitative line of enquiry assisted in understanding the causal links that are necessary for prediction and control as indicated by Cohen, (2007). The proposed piece of research aims to observe the impact of compliance on educational regulation which seeks to improve student learning outcomes by implementing various drivers across schools. Private schools failing to comply with the Act are threatened or closed down citing clauses of non-compliance which in turn is forcing children out of school. The quantitative method of enquiry observed the impact on learning outcomes in private schools of drivers of the RTE Act (infrastructure, student-teacher ratio, student enrolment, school management committees, accountability mechanisms and inspections). It also enabled a deeper understanding of social phenomena (household status) and psychological phenomena incentives to teachers and students, curricula, assessments and pedagogical approach.

However, given the rigour of the framework, I understand the limits of the approach because human affairs, including teaching and learning, are inevitably complicated. Equally, quantitative methods have a major limitation in that their application is restricted to phenomena that are stable and uniform across time, space and context. This may not be consistently true of the human world of teaching and learning (Gage, 2014). The pragmatist paradigm, as discussed earlier, focuses on methods and problems rather than associating with a philosophical stance, unlike other paradigms.

To, overcome the limitations of the quantitative approach, pragmatism incorporates the qualitative mode of enquiry which is characterised by a concern for the individual. Qualitative methods enable understanding of the subjective world of human experience (Cohen et al., 2007) and the pragmatist stance adds rigour to the subject of investigation as the aim is to understand the perspective of the subject of inquiry.

Using the pragmatist paradigm in the current research allowed me the flexibility to gather the data not only through structured instruments but also through experiences, observations, discussions and one-to-one interviews with school heads and owners. For instance, school owners revealed their experience in dealing with the threat of closure and how it could impact the lives of students and teachers associated with the school. This could not have been captured through quantitative methods.

3.5 Mixed methods – the use of quantitative and qualitative techniques

3.5.1 Empirical influence and Strategy

The mixed methodology employed in this current research was discussed at length during the 1980s and 90s. Subsequently, these varying research designs came to be known as ‘contrastive approaches’ in research methodology circles. There was a tension between the humanistic, subject-centered approach aiming to capture participants’ subjective experiences and the hard, statistical approach of quantitative analysis (Talja, 1999).

A similar situation is confronted in the current research as the understanding the RTE Act and its implication on student learning, and school closures require an in-depth study of its quantitative drivers. However, to gain a thorough understanding of subjects and their current social situations, experiences, perspectives and histories, a qualitative approach is equally necessary. The thesis, hence, followed a mixed method strategy, employing both qualitative and quantitative techniques.

According to Creswell and Clark (2011), a mixed method strategy allows combining the quantitative and qualitative line of enquiry. The former includes techniques like surveys and use of a semi-structured questionnaire to gather numerical data, while the latter includes one-to-one in-depth interviews and focus group discussions to gain an understanding of the research question in focus.

Johnson et al. (2007) define mixed methods as:

“Mixed methods research is a systematic integration of quantitative and qualitative methods in a single study for purposes of obtaining a fuller picture and deeper understanding of a phenomenon. Mixed methods can be integrated in such a way that qualitative and quantitative methods retain their original structures and procedures (pure form mixed method” – (Johnson et al., 2007, p. 119)

Combining the methods provided a clearer understanding of the research issue in hand. Cresswell (2012) advocates for mixed methods in research, explaining that the mixed methods approach requires an understanding of both quantitative and qualitative domains. Incorporating mixed methods in the research design requires extensive thinking to merge, integrate and link the data (Cresswell 2012).

3.5.2 Mixed method designs

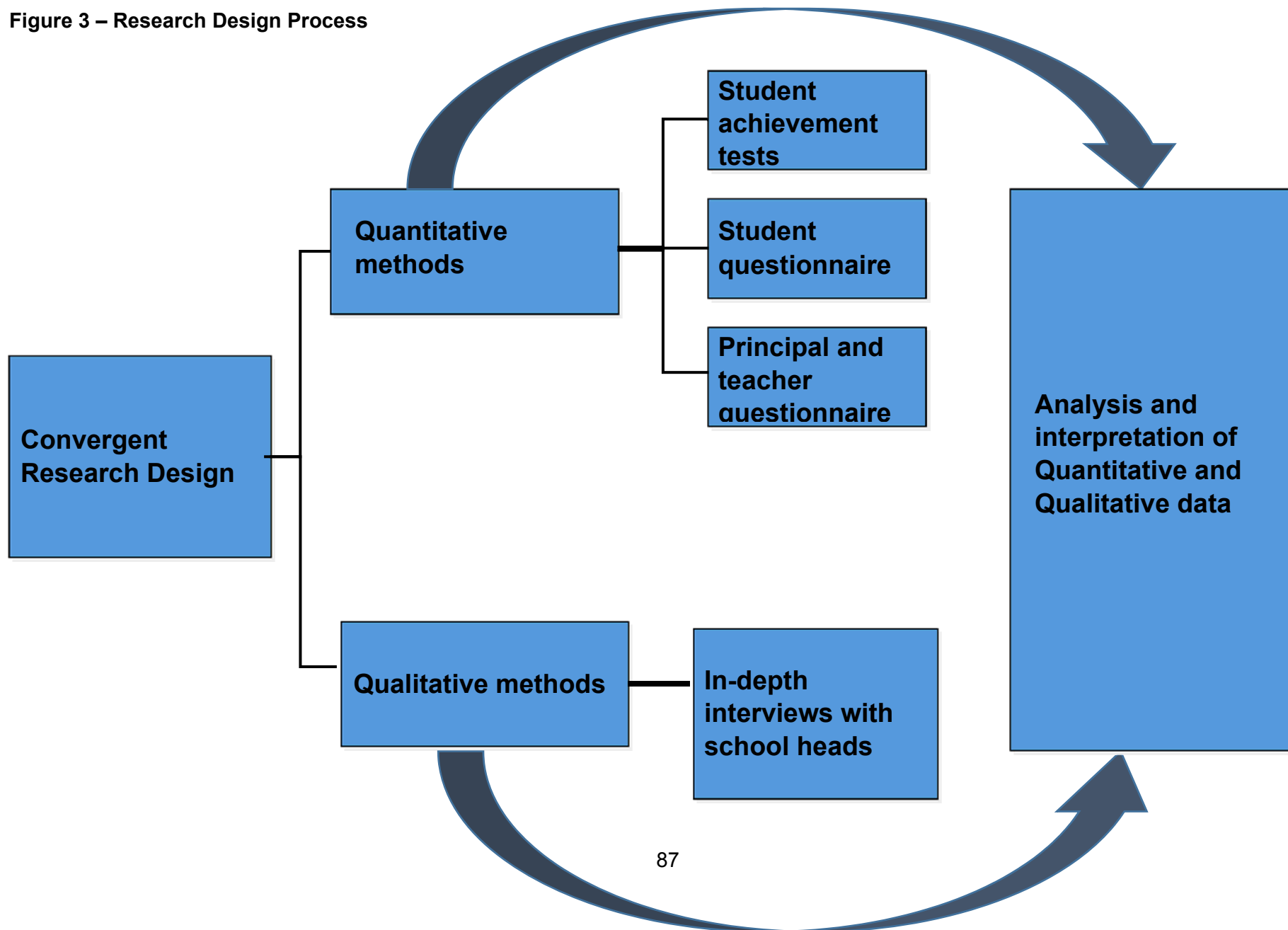
Mixed methods, can be achieved by four basic research designs. These include the convergent parallel, the explanatory sequential, the embedded and the transformative design. Each of these designs has been explained sequentially below.

In a convergent mixed methods designs, the qualitative, as well as the quantitative data, is collected simultaneously, and the objective of this design is to provide a comprehensive understanding of the research problem outcomes by merging the data from both sources (Creswell, 2012). In an explanatory sequential method, quantitative data is collected in the beginning and analysed, and in the next stage, the qualitative data is collected to inform the quantitative data (Ivankova et al., 2006). However, in the case of an exploratory sequential design, qualitative data takes priority over quantitative data, and qualitative data informs the quantitative data (Onwuegbuzie et al., 2010). The embedded design is similar to the parallel design whereby the quantitative and qualitative data is collected simultaneously, but one form of data plays a 'supportive role to the other form of data' (Cresswell, 2012, p. 544).

Using mixed methods has some advantages as the researcher can garner information from the quantitative and qualitative fields. According to Creswell (2012), quantitative data assists in identifying patterns and helps to derive generalizable insights, thwarting biased or skewed interpretations. On the other hand, qualitative information enables a researcher to acquire a better understanding of the setting in which humans operate. When methods are combined, and data are merged, they give a better understanding of the research problem at hand. However, using mixed methods can be cumbersome, time-consuming and expensive. Moreover, the researcher has to plan for collecting the data while maintaining the quality and rigour of both methods (Wisdom et al., 2011; Creswell, 2012).

Thus the use of dual methods enables a broader range of inference, interpretation, explanation and prediction of the data gathered. Figure 3 on the next page describes the research design adopted for collecting the data. The subsequent section describes the different strategies adopted for analysing the data obtained through the positivist and interpretivist approaches.

Figure 3 – Research Design Process



3.6 Quantitative techniques

3.6.1 Survey method

Using the survey study methodology prescribed by Wolf (1993), I study the relationship between the variables that already exist in the RTE and its impact on student achievement. The research also follows the UNESCO (2005) guide for causal modelling, which attempts to find the tenability of causal relationships (UNESCO, 2005). It is also critical to understand the differences in the terminologies – ‘association’ and ‘causation’. Using the definitions given by UNESCO (2005), an association states that there exists a relationship between any two given variables, while, causation implies that a variation in one variable is due to the cause of another (UNESCO, 2005, p. 10).

As described in the beginning, the survey method allows for exploration of associative relationships; the current research goes further to draw the causal relationships that might exist between the different variables included in the study. Using sophisticated statistical techniques (discussed at length below), the research attempts to draw further insights into these causal relationships. Furthermore, Wolf (1993), commenting on the nature of the relationship between variables, suggests that ‘if two variables are associated’ (p. 14), it is likely that a plausible causal relationship amongst the variables exists. However, he cautions, that researchers should refrain from firmly concluding that the ‘causal relationship already exists or has been established between the variables (Wolf, 1993, p. 14)

The current research deals with several variables associated with physical inputs – teaching and teacher-related factors and curriculum-related factors. Variables related to physical inputs include the components listed in the schedule of the RTE Act comprising pupil-teacher ratio, the presence of a playground and library, teaching-learning materials, kitchen for mid-day meals, barrier-free access and boundary wall or fencing in the school. Similarly, teaching and teacher-related factors include their experience, salary, educational qualifications, in-service training received and the nature of their contract.

To find the strength of the association between variables and to determine if there is any plausible causation due to covariates associated with the RTE Act, this research used multiple regression modelling. The regression model allowed to determine the overall fit, i.e. (indicating the variance) and the relative contribution of each the indicator to the total variance explained. The next section discusses in detail the objective of using the regression models and the considerations and limitations of using such models in a large scale study.

3.6.2 Regression modelling for quantitative analysis

Regression modelling as a statistical technique has been used to determine the relationship between several covariates and a single dependent variable. The current study which deals with understanding the influences on student outcomes is likely to have more than one predictor as it occurs in an educational set up with several elements associated with it.

According to Field (2009), regression models enable the prediction of a variable through a combination of variables multiplied with their respective coefficients plus a residual term. Jeon (2015) outlines several objectives that can be achieved through regression models. Firstly, they assist in defining the influence of covariates on a dependent variable. Secondly, they facilitate understanding of the extent to which changes occur in the dependent variable due to the independent variables in consideration. Finally, they enable estimation of the value of dependent variables due to the variation in the independent variables. Jeon 2015 summarises thus:

“When the goal is to understand (including predicting and explaining) the causal influence on a population outcome, regression analysis can be a powerful tool.”

(Jeon 2015, p. 1634)

3.6.3 Characteristics and considerations in multiple regression modelling

Multiple regression models allow for experimentation with different independent variables that were likely to have an impact on the dependent variable, such as test scores. For instance, a regression model can be constructed using three or more variables. Most models used in the current study considered more than three variables to understand the desired influence of the covariates. A typical model with three covariates would take the following form:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon.$$

Where β_0 is the constant and β_1 is the slope parameter (also known as the slope coefficient) for X_1 , and so forth, and ε represents the errors. In using a statistical test like the above, there is an initial assumption that there exists a linear relationship between each independent variable and the dependent variable, as well as the "composite" of the independent variables and the dependent variable.

Jeon (2015) advises that researchers should carefully consider a large number of equations when resorting to regression models, where the possibilities could be $2n$.

However, he cautions that while selecting the most appropriate equation for the determining the impact, 'meaningfulness should be the main objective rather than raising or gaining an incremental value of statistical significance' (Jeon, 2015, p. 1635).

Osborne and Waters (2002) outline four crucial assumptions which include linearity between the covariates and the dependent variable, normality of distribution, assumption of homoscedasticity and independence of error terms. All the premises in the current research have been addressed through partial regression plots, identifying outliers and normal QQ plots before drawing causal conclusions. Regression equations were also checked for multicollinearity as recommended by Jeon (2015) to estimate the effect of covariates on dependent variables. Variables were removed or replaced whenever the models identified multicollinearity between the variables.

Finally, the sample size was large enough to generalise the reports and estimate effect sizes; it is usually difficult to draw generalisable insights based on small samples.

The use of survey methods and regression modelling assisted in understanding the relationship between the variables and helped in identifying the causal relationships wherever they existed. The next section deals with the methods used to collect, tabulate and analyse the qualitative data

3.7 Qualitative approaches

3.7.1 Grounded theory design and its integration

The current research uses a grounded theory design to report the qualitative data generated. According to Creswell (2012), using grounded theory approaches allows a researcher to 'generate a theory that explains, at a broad conceptual level, a process, an action, or an interaction about a substantive topic' (Creswell 2012, p. 423). Grounded theory, established by Glaser and Strauss (1967), allows researchers to collect data systematically, classify them in different topics or categories and then link these topics to explain a theory.

In the current study, the objective was to study the patterns, process and practices that emerge amongst school leaders after the introduction of the RTE Act. The critical element of the approach allows the formulation of a new theory through collection and analysis of the interview data relating to a phenomenon. The central aspect was the school closures being faced by the low fee private schools in Delhi due to the Act and the strategies employed by school owners to prevent their schools from being closed.

Creswell (2012) describes three critical designs in 'grounded theory' research.

These include systematic design proposed by Hood (2007) and Corbin and Strauss (2008), the emerging design propagated by Larson (1997) and finally the constructivist design advocated by Charmaz (2000, 2006).

In the systematic design process, the researcher attempts to find out the influence of an event using strategies like open coding, axial coding and selective coding (Creswell, 2012). In an emerging design propagated by Larson (2012), the attempt is to examine the collected data through fewer categories and then compare them with emerging categories to form a theory around the phenomenon.

3.7.2 Use of Grounded theory's constructivist design

Grounded theory merged with constructivist design helped to gain genuine reflections and experiences from school heads located in different areas of Delhi. Information gathered during the research when blended with quantitative data, provided powerful and useful insights capable of assisting people facing the threat of school closure.

Taking a cue from (Creswell, 2012) and using the constructivist design allowed the researcher to gather the '*views, values, beliefs, feelings, assumptions, and ideologies of individuals*'. Similarly, constructivist design advocated by Charmaz (2000, 2006) tied up with the positivist (i.e., more quantitative) and the interpretivist stance. Gathering data on these attributes was crucial to draw the link between the causal relationships emerging from the quantitative data. The merit of using the constructivist design assisted in generating insights, on issues like the – understanding and applicability of the RTE act, the mechanisms followed by schools to obtain recognition and the hurdles faced by them.

Moreover, using a constructivist design allowed to present findings in a more explanatory and discursive fashion. Hence, this placed more importance on individuals especially the school principals and allowed the probing of events like 'school establishment', 'RTE awareness and norms', 'teaching and input mechanism' 'school closure and law enforcement' to be examined in detail.

The design allowed the flexibility to relate to school owners' 'experiences, conditions and consequences' (Chamaz, 1994, pgs. 283-284).

Grounded theory requires the classification of data into properly coded headings and further classification into subcategories (Strauss, 1987, p27). During the fieldwork, data was collected from in-depth interview with principals. Notes and verbatim collected during the fieldwork were then tabulated for headings. The main coding categories and sub-categories that emerged from the in-depth interviews have been listed in table 22:

Table 21 - Coding qualitative fieldwork

Code heading	Subcategories
School inception and establishment	Struggle for quality education, first generation learners, provide education to poor, uplift financially backward areas
RTE Act awareness and recognition	Government permission, administrative and legal issues, non-compliance, certification, no academic benefit and temporary recognition
RTE regulation norms	RTE schedule, capital investments, complicated rules and laws, bribery, corruption, harassment by officials, graft, building certificate, fire and safety certificate, schedule norms and powerful and well-connected
Teacher and teaching input mechanism	Teacher training, teacher employment, parent-teacher association, Library and TLM provision and teacher tenure
Consequences of law enforcement	Students coerced to join labour stream, teachers unemployed, capacity failure of govt. schools and children drop-out

3.7.3 Sources of evidence

Yin (2009) describes several sources of data. The essential sources indicated include documentation, archival records, interviews, direct observations, participant observation and physical artefacts (p. 101). Each of these sources has advantages and disadvantages, and this research uses three of the above. Table 21 shows the type of source utilised in this research.

Table 22 - Sources of Evidence

Source of Evidence	Type
Documentation	RTE Education Act, Court order by the Government of Delhi for schools closure (online document), Newspaper articles and magazine articles.
Interviews	Semi-structured interviews ¹⁷ carried out with, school owners who faced the threat of closure.

¹⁷ See appendix 5, 6 7 and 8 for student, principal and teacher questionnaires.

Observations	Observations were undertaken in the premises of threatened low-cost private schools: playground, head teacher's office, and the areas in the local vicinity.
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Documentary evidence ¹⁸ issued by government agencies and courts was studied before approaching the schools threatened with closure. The Delhi Right to Education Act and the Central Education Act were examined to understand the legal framework better before discussions with school owners.

Government documents also indicated the spread of schools across Delhi districts. Other documents used include publications from NISA¹⁹ Government websites including the Ministry of Human resources and development (MHRD) were also accessed to collect documents required for analysis.

Interviews were held with school owners from the different districts of Delhi with the help of an in-depth personal interview guideline²⁰ to gather facts, opinions and views on the RTE Act and their mechanism to cope with it. Semi-structured interviews were held with teachers enquiring about the status of their job, their income range, educational qualification, total years of teaching experience, subjects taught by them and the methods they used during classroom transaction. The information obtained from the field was adequately documented on the same day in an MS Word file format. School owners refused to speak on a recorder due to concerns around misquotation – regulatory authorities could instigate harsh actions against them if they spoke out of turn. Handwritten notes taken during field surveys are available for inspection.

Observations are an integral part of the evidence for the study. These were undertaken inside school premises with school owners or principals. During the interviews, the school principals readily agreed to conduct a guided school tour.

¹⁸ See appendix 4 for closure notifications

¹⁹ NISA – National Independent School Alliance is an independent body aiming to promote equality, equity and social justice by uniting the budget fee private schools in India through a common platform.

²⁰ See appendix 9 for in-depth interviews

3.8 Data Triangulation

The advantage of using mixed methods is that it facilitates the triangulation of data; many of the quantitative findings emerging from the research were supported and verified by the qualitative findings. The quantitative methodology allowed for more insights into the impact of the RTE Act's drivers on student learning and background factors like teacher qualifications, teacher salary, student family background, the association of law and student achievement. Meanwhile, the qualitative element gave an in-depth understanding of how low-cost private schools avoid closure resulting from the RTE Act and how they plan to prevent forced shutdown in the future.

Employing both qualitative and quantitative data has its advantages and disadvantages. Quantitative research is guided by a hypothesis, allowing the collection and analysis of data from various subjects.

However, the drawback of using this technique is that it limits the research through set questions and predetermined answer categories (Field, 2009). Qualitative techniques, on the other hand, allow the generation of information in great detail through techniques like interviewing and focus groups.

However, these are time-consuming, and a qualitative approach is most suitable in cases where the sample size is small and when monetary and physical resources are readily available (Creswell, 2007).

Keeping in mind advantages and disadvantages, this research carried out semi-structured interviews with school principals, aiming to explore their views on the RTE Act and gather their experiences in dealing with school closure notifications. The semi-structured interviews aimed to avoid bias by ensuring that the researcher's preconceptions were not expressed. The aim was to discover the truth from the different participants using diverse techniques, extracting the data with minimum errors and maximum accuracy. The broader objective was to report the findings neutrally and formulate a concrete policy recommendation to save the low-cost private schools from closures due to the impact of the Act.

The descriptive statistics helped in analysing test scores and interpreting background data obtained from the subjects, including teachers, students and school principals. These were gathered through semi-structured questionnaires. The diagnostic test instruments, capable of measuring skills and competencies of children in grade 5 and an IQ test, capable of measuring the general cognitive ability of the students, supported the quantitative data.

Information was collected through the various quantitative tools including background data on the school's physical facilities and amenities.

The practices followed by teachers in the classroom were matched with test student scores to obtain an accurate picture of student performance enrolled across the different set of schools.

To capture the 'interpretative repertoire' of the subjects involved in the research, qualitative research was employed. The research study is interwoven with multiple levels of social structure - school principals, students and teachers. It was necessary to have an understanding of underlying patterns as well as the mass events that confront them. The study used in-depth interviews ²¹as a method of inquiry for data collection. This qualitative technique generated opinions, facts, views, details and stories. The grounded theory approach provided a strong platform to produce new theories and insights. It allowed a systematic way to collect the qualitative data and assisted in presenting the series of 'events, actions and interactions' occurring in the private schools due to the RTE Act.

Triangulation is one of the most advantageous characteristics of conducting mixed methods research (Creswell, 2002). Cohen and Manion (2000) state that triangulation is an 'attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint (Cohen and Manion 2000, p 112). Triangulation of data thus assisted in conducting the mixed method smoothly. The use of triangulation, therefore allowed to examine the complexity of human behaviour by allowing it to study through multiple standpoints

3.9 Introduction to Sampling

Sampling in educational research surveys is undertaken to know more about a part of the population rather than the whole. The insights derived from samples often assist in the development of generalisations relating to the whole population. These generalisations are usually in the form of estimations about the characteristics of the population, or they may show the strength of relationships between the characteristics of the population.

Two main methods of sampling strategies are described by Cohen (2007) and Schofield (1996), bifurcating the sampling process into probability sampling (random sampling) and non-probability sampling (purposive sampling). The fundamental difference between the sampling techniques is that in probability sampling, the selection of a unit of a larger problem is confirmed, but a unit selection from a broader population is unknown (Cohen et al., 2007,

²¹ See appendix 9 for in-depth interviews guideline

p110). Probability sampling can be further divided into systematic sampling, stratified sampling, cluster sampling, stage sampling and multi-phase sampling. Other techniques such as convenience sampling, quota sampling, purposive sampling, dimensional sampling and snowball sampling are categorised under non-probability sampling (Cohen et al. 2005). The figure below provides a clear understanding of the different kinds of sampling and their techniques.

Figure 4 – Sampling techniques

Probability Sampling	Non Probability sampling
<ul style="list-style-type: none"> • Simple random sampling • Systematic sampling • Stratified random sampling • Cluster sampling • Stage sampling 	<ul style="list-style-type: none"> • Convenience sampling • Quota sampling • Purposive sampling • Dimensional sampling • Snowball sampling

PPS (probability proportional to size) sampling technique was utilised to draw the sampled units from the population. Two issues were confronted before the selection of the sample – sample size to be drawn from the population and whether or not the selected sample would yield results that could be generalised for the whole population.

3.9.1 Sample population

The desired target population or the population for which the results were ideally required included the students studying in grade 5 from 243 low-cost private schools. The target population was obtained through a meticulous internet search carried out with sophisticated research²² techniques. A government document obtained through the research listed 243 unrecognised low-cost private schools of Delhi threatened for closure under the RTE Act.

²² Use of sophisticated research techniques comprised using Boolean Operators which make use of simple words (AND, OR, NOT or AND NOT) used as conjunctions to combine keywords in a search, resulting in more focused and productive results (<https://library.alliant.edu/screens/boolean.pdf>). Phrase searching was also used in obtaining the lists. Phrases searching was also used extensively and phrases like “low cost private school closure”, “low fee private school closure”, “notice for closure of unrecognised schools’, “list of unrecognised schools in Delhi for closure” were also used for obtaining the closure list. (http://www.stthom.edu/public/getfile.asp?file_content_id=3580)

The document cited the lack of structural stability certificates as the prime reason for closure. Because of this, the schools had been rejected by the department of education.

3.9.2 Constructing the sampling framework

The original target sample size was 1000 students, and the number of schools to be tested across all the districts of Delhi was 25 (assuming an average of 35 to 40 students per class from 15 low-cost private schools, and 50 students per class from 10 government schools).

From the 243 low-cost private schools, a pre-survey²³ was carried out in 96 schools across all the districts, for drawing preliminary information to construct a sampling framework. The pre-survey²⁴ provided information on the number of children enrolled in the school (especially in Grade 4 & 5), type of school (playschool/primary/secondary), the willingness of the schools to participate in the test, nearest government schools and any other relevant information about the school. Once the sampling framework was constructed, some schools were excluded due to the sorting process. These schools included the ones where grade five was not prevalent; the special schools and schools with extremely low enrolment. Out of the 96 schools which were pre-surveyed, close to 40% did not have grade five^{#25}, and hence they were excluded from the sampling framework. 21% of the schools in the sampling framework could not be surveyed as they were either inaccessible[#], had temporary principal's[#], refused testing[#], or they were schools for children with special educational needs. Close to 13% of the schools had very few children enrolled in grade five, and thus they were also excluded from the sampling framework. Only 26% of the schools adequately met the requirements to be selected in the sampling framework refer (appendix 10). Two likely reasons that emerge, for the pre-survey schools that did not have grade 5.

One that many of the low-cost private schools acted as feeder schools to the recognised schools, as well as to the other government schools prevailing in the community pockets.

²³ All the 243 schools could not be covered due to the paucity of resources, time and manpower required for covering such a huge population base.

²⁴ See appendix 10 for the results obtained from the 96 schools.

^{#25} Test instruments used in the research were calibrated for grade five hence, schools without grade five were automatically excluded. Inaccessible schools included those which had been closed down, or no school was found at the designated address during the visit by the representative. Schools with temporary principals could not allow the research, as they had limited authority to provide assent. Some schools refused testing as they were unsure of the consequences of their participation in the study, although anonymity assurances and a study brief was provided to allay their fears.

Two schools comprising of grade five are required to issue a TC (Transfer Certificate) to children upon completion of class 5. However, for issuing, a transfer certificate, it is mandatory that the department of education recognised the schools.

Schools that met the following requirements in the sampling frame were selected for the PPS sampling technique:

- a. Those that included grade five classes
- b. Those that had an adequate number of students in grade 5 (the lower threshold was lowered to 15-20 students per school. The pre-survey process did not find a sufficient number of schools with 30 – 40 students)

Based on the pre-surveys, the main sampling framework was comprised of 25 schools selected from the 96 schools. These schools were willing to participate in the tests and provided an adequate sample size for data collection purposes.

3.9.3 PPS Sampling technique for selection schools

Probability Proportional to Size (PPS) technique of sampling was used to select the schools from the sampling framework. This method is a unique as the sampling unit chosen in the study is proportional to some known variable (e.g. in a population survey, the population size of the sampling unit – in this case, the sampling unit is the school. PPS method of sampling was selected, because of two reasons. Firstly, the sampling units of the population were quite varied and secondly to ensure that every element in the target population has an equal chance of being included

In situations where the populations of sampling units vary in size and the sampling units are selected with equal probability, the likelihood of elements from a sampling unit with a large population being selected for the survey is less than the possibility of items from a sampling unit with a small population being selected. The PPS method of sampling is thus used to reduce standard error and bias in statistical sampling procedures.

The following steps were followed to select the schools from the sampling framework²⁶ using PPS:

- Compiling the list of schools with an average predetermined classroom size, ideally also known as the Measure of Size (MOS).

²⁶ Refer to appendix 11 for the 25 complete list of schools that were chosen for PPS technique and the selected ones

- The MOS (average classroom size) was decreasingly ordered, enabling the replacement schools to be close in characteristics to the sampled schools
- A cumulative MOS was calculated as shown in column F
- The sampling interval was calculated by dividing the total population by the number of clusters to be sampled to get the Sampling Interval (SI). In the case of this research: (Total cumulative MOS / No. of schools to be sampled)
- A random number between 1 and the SI was chosen. This is Random Start (RS). The first cluster contains this cumulative population: (Column C). [Excel command =rand () *SI]
- Adequate replacement schools were chosen for each sampled school; this was done to avoid sample size losses.

The first sampled school was, selected by choosing a random number in the range between 0 and the sampling interval. The school whose cumulative MOS contains the random number was the sampled school. The second school in the sample was, chosen by adding the sampling interval to the first random number. Subsequently, the following series: RS; RS + SI; RS + 2SI; ..RS+(d-1)*SI was calculated to select the schools as per the PPS method to achieve the required size for the field work.

The PPS method was, chosen to achieve the maximum precision for adequate and representative sampling, as the population in the case of the study was large. The sampling mechanism paid sufficient attention to the resources available and ensured that its implementation was straightforward. Finally, the design was selected to yield statistically authentic results keeping in mind the administrative and operational constraints. The list of finally selected schools is provided in Appendix 11.

3.10 Test instrument design – Introduction

Instrument design is the most integral part of any research study. In the case of this research, ‘instrument’ has been used for the different test papers used for assessing the skills and competencies of children enrolled in low-cost private schools and government schools.

The accuracy, validity and reliability of the data depend on the tools developed for the research. It is essential to have an accurate, standardised process for preparing the tools of the study. This section of the thesis describes the features of the instruments that make up its design, format and nature of the question as well the scoring process utilised for the field work.

The section also focuses on the test developments, competency framework, translation and validation of the tests and the final blueprint for the subject's language, maths and science.

3.10.1 Structure of the testing tools

Two test papers were used during fieldwork for the research. Paper one, a comprehensive diagnostic test²⁷, assessed the subject's skills in language, mathematics and environmental sciences. The test followed a written format; the students were required to read the question paper and write answers in the paper itself. The tests and its items have been used by India's leading educational firms and NGOs to measure the learning levels of children across different states. A pilot test was also undertaken to check the validity and reliability of the instrument and details are discussed in the subsequent section.

Paper two, Raven's IQ test²⁸ was administered to measure the IQ (intelligence quotient) of the children participating in the study. The idea behind conducting both tests was to understand if there was any correlation between the IQ of the children and their performance in the subject-based tests.

3.10.2 Test structure

The comprehensive diagnostic test²⁹ comprised 50 questions, 17 from both the subject's language and science and 16 in mathematics. The questions varied between multiple choice and free response items. Open response questions included items which required students to give a numerical response, write a word or a short sentence, interpret text or diagrams and complete a sketch. A clear rubric was created for assessing the free response items objectively. Children were familiar with multiple choice questions in tests due to several large-scale assessment studies undertaken by various agencies such as the World Bank, Educational Initiatives, Pratham and the Azim Premji Foundation.

Table 23 – Test instrument structure

Grade	Subject	Paper Code	Questions				Duration (mins)
5	Comprehensive Test	C05	Language	Maths	Science	Total	105
			17	16	17	50	
5	Raven's Test	R05	60				60

27 See appendix 11 for specimen diagnostic test

28 See appendix 12 for specimen Raven's IQ test of matrices

29 See appendix 11 for specimen diagnostic test

The comprehensive tests were designed to assess the competency levels of children in grade 5. Each item (test question) linked to a particular competency reflected in the National Curriculum Framework (NCF) brought by the National Council for Education Research and Training (NCERT).

The test items varied in difficulty, aiming to achieve a competency balance – it was intended that they would not be too difficult for less able children or too simple for high-ability children. Questions that replicated the format in which they appeared in the school subject textbooks of language, maths and environmental sciences were termed as ‘straightforward’. A ‘non-straightforward’ item, appearing in the test, was designed to report children’s capabilities. The purpose of a ‘non-straightforward’ item was to ascertain whether children were able to perform only textbook-type problems or whether they could apply essential skills to solve more complicated issues.

3.10.3 Test response recording

The comprehensive test paper was supplemented with a scoring card³⁰ which was comprised of a detailed rubric (with scores/codes) indicating the procedure to record student responses from the test instrument. Test papers scored this way reduced evaluator bias and were on par with international assessment tests like PISA, TIMSS and NAS in India.

The evaluators who engaged in the field survey were trained before the tests for capturing the responses of students participating in the tests.

The codes were entered in a separate sheet called the ‘top-sheet’³¹. For coding the multiple response questions in the test instrument, the response option chosen by the student was recorded on the top-sheet whereas items requiring free responses were scored using a detailed scoring rubric (see appendix) provided for the evaluators. While evaluating the answer sheets, if the student had crossed, circled or marked a specific response in any way that option was treated as their choice. The scoring cards also had universal codes assigned for a specific type of responses which were common across all sections of the test.

Table 24 shows the codes for capturing the frequently appearing responses in the test papers.

³⁰ See appendix 14 for sample score cards

³¹ See appendix 15 for sample top sheets

Table 24 – Classification of codes

Nature of the test item	Classified code
Test items not attempted by students	88
Test items with invalid answers (e.g. question copied, more than one option chosen, crossed out answers, illegible answers)	86

3.10.4 Sample test items and recording rubrics illustrations

This section includes examples from the language, mathematics and science test papers. The test was multiple choice so the scoring rubric captured the possible responses that students would provide during the test.

Figure 5 – Free response Language question and rubric


Reading Comprehension question	Scoring Rubric	Code
<p>Listen to the story and answer questions in complete sentences.</p>  <p>Once there was a little girl called Sarala. She was having tea with her mummy in the kitchen. Suddenly there was a knock at the door. Sarala opened the door. There was a big tiger with stripes on its body. The tiger said, "Excuse me, but I'm very hungry. Can I have tea with you?" Sarala's mother said, "Of course, come in," so the tiger came into the kitchen and sat on the chair. He ate all the food on the table and drank all the tea they had.</p> <p>16. Where was Sarala having tea?</p>	Correct answer in a complete sentence mentioning 'kitchen' (Eg.. "Sarala was having tea in the kitchen")	01
	Other variations of the correct answer (Eg. "Sarala was having tea with her mummy in the kitchen").	02
	Correct answer in a word or phrase (Eg. In the kitchen)	11
	'Ghar Mein'	21
	Any other answer	85

Figure 6 – Free response Maths question and rubric






Question assessing the knowledge of time	Scoring Rubric	Code
<p>What time is this clock showing?</p>  <p>Ans: _____</p>	6 /six /6 o'clock /6a.m / 6p.m	01
	12.30 (any other related form)	81
	Any other wrong answer	85
	6 /six /6 o'clock /6a.m / 6p.m	01
	12.30 (any other related form)	81

Figure 5 & 6 illustrate examples from the language and math sections. For instance, as shown in Figure 5, students were required to answer a question after reading a short comprehension paragraph. Similarly, in mathematics, the students were asked to determine the time based on Figure 6.

Student responses were captured in the test paper, and the scoring rubric indicated the most likely responses to the questions provided. Test evaluators were required to read the response on the test paper and capture the correct code on a ‘top sheet’ provided to them.

Figure 7 – Multiple choices - Science question and rubric

Which of these is likely to be the foot print of a dog?			
 <p>A</p>	 <p>B</p>	 <p>C</p>	 <p>D</p>
Scoring Rubric			Answer code
Enter the option marked (enter option A, B, C, D in English)			<Option Letter>

Multiple choice questions such as the above required a different scoring rubric. The top sheet captured the option letter marked by the student. The coding process thus helped in maintaining consistency while evaluating the test papers.

3.11 Test development process

The test development was comprised of two broad stages.

Stage 1 - Necessary background information for designing the test competency framework³² was researched using textbook analysis and syllabi, allowing for the development of the test items by surveying pre-existing tests assessing student learning.

Stage 2 - At stage two, test instruments were fine-tuned through the process of pre-testing or pilot testing, carried out in the northern district of Haryana, India.

³² See appendix 15, 16 and 17 for the competency frameworks in Language, Maths and EVS

The pilot testing gave further insights as to whether the test items were too difficult or too simple for children and whether the test items could discriminate between the top and bottom quartiles.

3.11.1 Test competency framework

The test competency framework³³ is the heart of the testing instrument and was designed following analysis of the following documents:

- Studying the competencies and skills listed in the curriculum textbooks
- Skills and competencies identified, based on international best practices including tests like TIMSS and formats used in other tests across India.
- Researching and understanding the minimum levels of learning

The starting point for developing the competency framework was to refer to textbooks published by the State of Delhi as they were indicative of the kind of content a student would be expected to know by the end of class 4 and 5. Test papers and content from those used in Third International Mathematics and Science Survey (TIMSS) and ASER (Annual Survey of Education Report) were also reviewed to understand the construction of a competency framework. A significant influence for designing the structure was the 'Municipal School Benchmarking' test undertaken by Educational Initiatives, India. Finally, skills and competencies were outlined after reviewing the minimum levels of learning.

3.11.2 Translation and Validation

The comprehensive paper was first designed in English. After a pre-survey across the schools, it was decided that the test needed to be translated into Hindi as this was the medium of instruction across several schools. Based on the original English test blueprint, all the sections of the comprehensive test paper were translated into Hindi. The researcher translated the tests into Hindi with assistance from language experts to ensure validity and appropriateness of questions reflected across the Hindi versions. The researcher's expertise in the Hindi Language, as well as expert input, ensured that the question meanings remained unchanged and the difficulty level of the questions was intact. The translation process also took into account cultural adaptations and appropriate dialect for a classroom context.

³³ See appendix 15, 16 and 17 for the competency frameworks in Language, Maths and EVS

The robust process followed for translation ensured that the test papers were child-friendly, embraced colloquial terms used in classrooms and were comparable across English and Hindi language.

3.12 Pilot tests ³⁴ and changes to test instrument

Once in their final form, the instruments were pilot-tested in two rural private schools in Mewat District, located in the state of Haryana in India. The pilot testing was carried out to accomplish the following objectives:

- To fine-tune instruments for the final fieldwork conducted in July 2016
- To anticipate the problems and issues that might arise during actual field test administration

In total, 53 children across grade four and five were tested across two schools. The pilot test paper was calibrated to suit both classes and had 45 questions. It took the children about 90 minutes to complete the test. The entire process of pre and post-test administration was kept similar to the field test to ensure standardised test administration and the integrity of the tests.

Test scores were evaluated using binary coding procedures, and scoring and analysis was carried out using MS Excel.

The following changes were made to the final instrument after the pilot testing with the help of preliminary analysis on the student test scores:

Preliminary analysis observed that there were too many easy questions in the mathematics section about the same skill (number sequencing). Nearly 80% of the students from grade 5 received similar scores on those questions, and the questions repeatedly tested the same competency. Hence, it was decided to eliminate a few questions corresponding to number sequencing skills. The excluded questions on 'number sequencing' were then replaced with questions on 'place value' skills in the final test paper.

Secondly, it was observed that the mathematics section required more conceptual questions in nature to distinguish between the ablest and least able children. Thus items which needed linguistic abilities were removed from the mathematics section.

³⁴ Pilot test papers were similar to the final testing instruments used in the field study, each of the question had a skill or competency associated with it

Figure 8 – Question requiring more linguistic ability

5 In the list below, tick (✓) the number that is greater than 5 but less than 8.

4

7

9

2

For instance, the question in the pilot test (Figure 8) was eliminated as it required better linguistic capabilities and was replaced by a question which needed conceptual clarity (Figure 9) rather than linguistic ability.

Figure 9 – Question requiring mathematical competency

19 Fill in the appropriate number in the box:

$$3 + 3 + 3 + 3 = 3 \times \square$$

The pilot tests also captured the time taken by the students to complete the paper. It was observed that students were able to respond to the questions comfortably within the given time frame. The duration of the tests after the pilot was reduced to 105 minutes from 135 minutes. The next section discusses the details of test administration, logistics and data management procedures.

3.13 Field Work - Test Administration, Logistics and Data Entry

The thesis incorporated all the elements of a large-scale project. These included a different set of activities upon which the project executions were heavily dependent.

The success of the project was dependent on the cohesive function of all the elements to achieve the desired results. The following activities were undertaken for the execution of the fieldwork smoothly.

- Designing a robust logistical plan
- School data collection and test booklet printing
- Test volunteers
- Test administration
- Quality control
- Data entry error rectification and validation

The research fieldwork was undertaken with the utmost rigour, and all attempts were made to mitigate the issues enabling its timely and successful completion. The fieldwork was undertaken in India in July and August 2016.

The actual test administration in the schools was undertaken in the second and third weeks of July. The subsequent section provides a detailed description of the various activities carried out for the smooth implementation of the field work.

3.13.1 Designing a robust logistical plan

During the pre-survey, the testing dates were obtained from each school. Most of the schools consented in the second week of July. Due to the short window of time provided by the schools for testing, it was decided to use voluntary test administrators who could conduct the tests most impartially.

A detailed logistical plan was drawn for the smooth execution of tests in the schools. The logistical plan was quite helpful to the research in the following ways:

- It allowed preparations to be carried out in advance; these included the number of test papers to be printed, the stationery to be supplied and the class enrolments of the respective schools.
- It assisted in dealing with unprecedented circumstances. For instance, some schools requested a change in dates as soon as the team arrived at the schools. Since the team was aware of the logistical plan, changes such as exchanging dates could be made possible in consultation with other schools.

The logistical plan thus facilitated a smooth execution of the research study on the ground.

3.13.2 School data collections and test booklet printing

Enrolment and data collection from most of the schools were carried out during pre-survey. All the sampled schools were approached in May, a few months before the actual testing, and their enrolments were noted from school registers. The data collected from schools were entered into an Excel spreadsheet to facilitate the sampling exercise. The data collection also helped in estimating the test booklets to be printed. After the printing, the test instruments were securely stored. Final copies are provided in the appendix 7 and 8.

3.13.3 Test volunteers

Actual testing in the sampled low-cost private schools of Delhi was undertaken with a team³⁵ of test volunteers. Test volunteers were selected for the research after a rigorous interview and personal discussion. The idea of recruiting volunteers enabled timely completion of the

³⁵ For the field study execution the team comprised of a logistics co-ordinator and twelve test volunteers were chosen. A detailed list of their names and roles have been provided in appendix 12.

study as the schools had advised adhering to the agreed dates. All selected test volunteers were provided with two-day training on standardised test administration. This was relevant in terms of ethics and technical reasons.

It was crucial that all the test volunteers implemented the test uniformly without any variation which could have reduced the accuracy of results. The detailed training and coding manual are provided in the appendix.

3.13.4 Test administration

The diagnostic and Raven's IQ tests were conducted from 11th – 21st of July 2016. Two volunteers and tests visited each school and held the tests over two consecutive days. On the first day, the comprehensive test was administered to the students, with Raven's IQ test administered on the second day. On the day of testing, the volunteers met the school principal and explained the purpose of their visit. They initiated the test after creating a relaxed atmosphere in the classrooms.

The volunteers monitored the classrooms during testing and ensured that students taking the tests did not confer. They discouraged teachers from assisting children in case of prompts and ensured that all test books were returned following completion. The test papers also included a student questionnaire which students completed after they had finished the tests. All the test papers were organised in chronological order with the help of a student code which was similar across the comprehensive and the Raven's tests. Five schools from the final sample excluded themselves as they were concerned that the research might be a government-funded programme to check the quality of their education provision.

3.13.5 Quality control

The test volunteers returned to the evaluation centre after the completion of the test each day. Responses provided by the students in the test papers were coded in the 'top sheets'. For coding the test papers, test volunteers had a detailed scoring sheet which assisted them in the process of coding. All the test papers were evaluated on the same day. Coding the test papers assisted in eliminating evaluator bias while marking the responses. The researcher maintained high levels of quality control – several checks and parameters were put in place to ensure that the fieldwork took place smoothly as planned.

Test administrations were monitored across the schools during the testing period to ensure that they were uniformly administered across schools. Feedback was provided to test volunteers in case any discrepancy was observed in the course of test administration.

To, gain in-depth insights, all personal interviews with school leaders and administrators were carried out by the researcher. This ensured consistency in the manner in which interviews were conducted. This allowed the probing and generating of new information from participants in case of standard responses received during personal interviews.

The researcher participated in the coding process and also guided the test volunteers whenever they needed clarifications. Spot-checks were undertaken on the top sheet entries made by the test volunteers. These were also cross-examined in case of any major error in the coding process. Following completion of the testing programme, all the test papers and top sheets were separated. Each was assigned a unique student ID so that they could be identified in case of any discrepancy arising during the data entry stage. Figure 9 and 10 show the unique ID provided to the students on the test paper and the top sheet.

Figure 9 – Student code on top-sheet

Measuring Student Achievement in public and low cost private schools					
S. Code - 02706					
TOP SHEET					
PLEASE ENTER USING BLUE BALL-POINT PENS ONLY NOT PENCILS OR INK PENS					
Name -					
Boy -	<input checked="" type="checkbox"/>	Girl -	<input type="checkbox"/>		
School Code -	027	State Code -	001		
Paper Code -	005	District Code -	008		
Evaluator Code -	011				
LANGUAGE		MATHS		EVS	
Q.NO.	Answer Code	Q.NO.	Answer Code	Q.NO.	Answer Code

Figure 10 – Student code on the test booklet

MEASURING STUDENT ACHIEVEMENT					
S. Code - 02706					
Name नाम/ छात्र का नाम					
(Boy) / लड़का	<input type="checkbox"/>	(Girl) / लड़की	<input type="checkbox"/>	Date/ दिनांक -	18/7/16
School Code	027	State Code	001		
Paper Code	005	District Code	008		
Evaluator Code	004	Duration: 105 Minutes.			

3.13.6 Data entry, error rectification and validations

All the questionnaires were arranged school-wise before the data entry process. Data entry was undertaken using SPSS with the help of top sheets. Backchecks were conducted in all the questionnaires to ensure an error-free data entry. The most commonly identified issues during the manual data entry process include:

Double entry – As the volume of test papers was huge, it was observed that a double entry took place on a few occasions. This means attributing similar answer codes to questions that are in proximity to each other. Duplicate codes were identified and removed from the data sheets.

Missing entries – There were some questions for which the entries were found to be missing during the back checks. The missing entries were rectified, and the correct codes were attributed to the questions.

Erroneous entries – All incorrect entries to the respective test items were checked and immediately rectified in case of discrepancies. Datasheets were thoroughly checked with top sheets at first level and in case of any ambiguity of test papers, students were identified, and incorrect entries were corrected immediately.

Robust data checking ensured that errors were minimised as much as possible and that data was captured and entered correctly in the set formats for analysis.

3.14 Validity and Reliability

Golafshani (2003) underlines the importance of validity and reliability in quantitative research, stating that ‘quantitative research’ usually deploys the positivist paradigm to generalise hypothesis and attempt to find causal relationships between variables (Denzin & Lincoln, 1998). Furthermore, Golafshani (2003) emphasises the ‘measurable nature’ of quantitative research, stating that the process of measurement can be all ‘about numbers, objective hard data’ and thus can classify the process or the end outcomes ‘into measurable or common categories’ (Golafshani 2003, p 598). For measuring the variables, researchers usually design instruments capable of capturing the traits in a phenomenon. For instance, Smallbone & Quinton (2004) believe that one of the critical aspects of social research is the necessity to quantify human behaviour which is mainly measured through instruments. Hence, it is of crucial that the designed instruments are valid and reliable, as the success of the research relies on the capability of the instrument to measure, what it is intended to measure. Golafshani (2003) summarises:

“A quantitative researcher may prepare a list of behaviour to be checked or rated by an observer using a predetermined schedule or numbers (scales) as an instrument in his/her method of research. Thus, a quantitative researcher needs to construct an instrument to be administered in a standardised manner according to predetermined procedures. However, the question is if the measuring instrument measures what it is supposed to measure. ...The significance of this test is to ensure replicability or repeatability of the result”.

(Golafshani 2003, p. 598)

3.14.1 Validity

Validity is equally essential to qualitative and quantitative research. However, aiming for absolute validity is unreasonable – it is highly unlikely due to biases and standard errors that occur in research (Cohen et al., 2000). Validity, however, is a crucial aspect that needs to be considered, especially when any testing is involved as a method of measurement (Cohen et al., 2000).

Cohen (2007) enlists eighteen different types of validity:

- content validity
- criterion-related validity
- construct validity
- internal validity
- external validity
- concurrent validity
- face validity
- jury validity
- predictive validity
- consequential validity
- systemic validity
- catalytic validity
- ecological validity
- cultural validity
- descriptive validity
- interpretive validity
- theoretical validity
- evaluative validity

Content Validity

Content validity is reflected in a testing instrument when it represents the subject matter content from the syllabus which is being measured (Ross, 2005). An instrument is said to meet content validity when it is capable of accurately representing the domain or area that it intends to test (Cohen, 2007). Content validity in the current research was ensured through the bespoke diagnostic test instrument that aimed to measure the specific set of components as reflected in the syllabus and language textbooks of grade four.

Table 25 provides a brief example of the subject matter obtained from textbooks and the corresponding questions appearing in the test paper.

Table 25 - Subject matter skill measured in the language section of the diagnostic test

S. No	Competency tested	Written	Question numbers in the test
1	Identifies names of objects, birds and animals not seen in daily life and words denoting actions	3	13,14,15
2	Reads and writes moderately difficult words that have 4–5 letters with vowels and conjunct letters	3	1,2,3
3	Uses words appropriate to the context based on their meanings, opposites and gender endings	3	4,5,6,
4	Reads, understands, writes and constructs three simple and short sentences that have less than five words in a sentence	2	7,8
5	Student understands simple, short stories of 10-12 sentences when told and comprehends beyond the stated facts	2	16,17
6	Student reads short text of 5-6 sentences that describe daily activity, routine context, simple description, simple story independently and comprehends stated facts	4	9,10,11,12
Total		17	

Construct validity

Drost (2011) describes 'construct validity' as how well an idea or concept was constructed into a functioning reality. Construct validity intends to examine if inferences drawn from the research are meaningful. According to Cohen et al. (2000), "Construct validity must demonstrate that the categories that the researchers are using are meaningful to the participants themselves (p110).

Ross (2005) believes that construct validity aims to measure a psychological quality assumed to exist in the subjects which in turn would explain some aspect of their behaviour; it is usually measured using testing instruments.

Messick (1989) believes that 'construct validity' is closely associated with the efficacy of testing instruments capable of gauging the learner's knowledge on the relevant topics of interest. The tests should be appropriately administered, keeping in mind inference of results while integrating the evidence gathered from various sources. Inferences drawn from test results should be meaningful and trustworthy to ensure that 'construct validity' is appropriately embedded in the research process (Messick, 1989).

Predictive validity

Predictive validity occurs when the instrument used for assessing the performance of students is capable of predicting the outcome in the future.

In the case of the research, it is predicted that students who excel in the diagnostic test would equally score better in the school's language, maths and environmental exams. It is expected that this would be the case for the assessment of both factual understanding and high order skills such as synthesis and analysis of information.

Internal and external validity

Cohen et al. (2000) advocate testing the internal and external validity of the research. Internal validity is achieved when the collected data support the issues under investigation. Internal validity can be secured through methods including triangulation, active field engagement, peer debriefing and member checking.

For triangulating the data, semi-structured questionnaires gathered the objective information on the participants associated with the study including teachers, parents and students. A better understanding from an interpretivist point of view was obtained through in-depth

interview guidelines devised for school leaders. Information gathered from the various sources were matched by triangulating the data to generate quality insights.

Peer debriefing was undertaken while designing the instruments. Various suggestions from linguistic experts in terms of the wording of options and items were incorporated into the instrument following the pilot testing. Discussions were undertaken with academic colleagues at Newcastle University and leading Indian practitioners of data gathering and analytical procedures for large-scale studies.

Three months were invested in the field research in India, visiting the schools, collecting the data, entering the data and ensuring that there were no errors in data through a back-check method. This aimed to check 15% of the test papers that were administered to participants.

According to Drost (2011), external validity in a study allows the researcher to check the general validity of the study towards a larger population. External validity of a study or relationship implies generalising to other persons, settings, and times (Drost, 2011, p120). Bogdan and Biklen (1992) extend this further, and according to them, it is not only essential that research findings be generalisable to the broader population but also that they apply to people in similar situations and settings.

To, ensure the conditions of external validity, a detailed list of unrecognised private schools threatened with closure was obtained from a government website, and this served as the master list for sampling. Schools were chosen through probability proportional to size sampling, a rigorous method that ensured that every unit of the population had an equal chance of being selected. The final chosen schools from different districts of Delhi ensured adequate representation. Descriptive data from these areas show that family background and socioeconomic status were consistent with each other.

3.14.2 Reliability

According to Ross (2005), reliability in a study occurs when the instruments or tools used are capable of producing consistent results. It is crucial that tests used for the research subjects should be capable of producing similar results when administered on an independent set of samples or groups externally to the research. However, Ross (2005) states that “Reliability is a necessary but not sufficient condition for validity” (p41). This means that low reliability is likely to indicate a restricted degree of validity while high reliability does not guarantee a greater degree of validity. Kirn and Miller (1986) state three different types of reliability;

a) Measurement through the instrument, remains the same when repeatedly administered to similar populations

b) Measurement, through the instrument remains stable over a period

c) Measurements yield similar results, when administered, in a particular time frame

Cohen (2000) also believes that the three different reliability measures as stable, equivalence and internal. Stability is achieved when the research outcomes remain the same over a specific period when administered on populations with similar characteristics.

Quantitative research involves several complex calculations to ensure that there is no significant difference between subjects participating in the study. Equivalence reliability was not targeted in the current research as this type is usually associated with research involving pre and post-test measures or treatment and control groups.

Lastly, internal consistency (the reliability of the instrument) was determined through the SPSS software and the KR20 through Cronbach. The derived value (0.86) indicated high levels of internal test reliability.

3.15 Ethics

3.15.1 Ethical issues around testing assessment

Various ethical issues are involved in testing and evaluation of children as they play a vital role in the lives of the children from a very early age. From the elementary stages to the high school, college and higher education assessments are undertaken to decide on graduation, retention, admissions, scholarships and placements. Review of the literature reports several issues related to assessments with regards to ethics in developing and developed parts of the globe (Camara, 1997). Some of them are discussed below:

- Doiron and Asselin (2015) question how research treats children during the entire process. Reporting variance observed in the position of children in international studies; they find that their involvement (whether that be as passive subjects or active participants providing feedback) potentially affects their lives and careers. They ask “Do researchers provide children with the opportunity to give informed consent or at least assent?” (Doiron and Asselin 2015, p4).
- Protecting the rights and welfare of the participants involved in the research without concealing any information from them is highly critical. BERA’s code of conduct advises to seek consent before involving participants formally in the study and researchers are required to present the concerns candidly and let the subjects know how the findings will be put to use.
- Recent economic prosperity and globalisation have led to rising incomes, resulting in the emulation of western countries by developing nations. The phenomenon has

raised expectations that the English language will be at the forefront of all sorts of associations. Sensitivity towards local language and culture is of first importance (Doiron and Asselin, 2015).

- Educational institutions participating in research interventions such as large-scale testing programmes have been known to misuse data.
- Instrument design for research interventions should keep in mind cultural sensitivity and should have plans for addressing any issues. In the majority of developing countries, English is usually the second or even third language, and this can cause problems when translated into languages like Hindi, Arabic or Swahili (Doiron and Asselin, 2015).
- Cases of cheating operations across the US and UK have been reported widely. Penalties for cheating and plagiarism issued by Ofqual have risen by 25% in 2018 (BBC, 2018).
- Schools and teachers have been reported to prepare students for testing, rather than focusing on 'learning by understanding' which can gradually raise the scores.
- Negative consequences of testing and assessments also lead to ethical issues associated with it. These include discouragement and institutionalisation of failure, encouraging rote and mechanised learning and lesser focus on the development of cognitive abilities that prepare students for life and prolonged student tracing, even after they graduate from schools and colleges (Camara, 1997).

3.15.2 How were the ethical concerns addressed?

Not all the above ethical issues bore equal weight but some were directly relevant to the current study. Therefore, appropriate measures were taken to ensure that they were addressed satisfactorily according to the code of conduct set out by the University's ethics committee.

First, some issues related to consent and participation. All the private schools participating in the study were contacted before initiating the study. School heads and relevant authorities were debriefed about the nature and aim of the research in a one-to-one meeting and through a participant information sheet provided in a written format. The meeting outlined the exact involvement of the school and pupils and the invitation to parents to participate in the study. Consent forms were designed for school heads participating in the research to indicate that they understood the involvement expected from the school and pupils and to allow the research to go ahead.

Having, obtained permission to conduct the study in the school, teachers from standard five were met and asked to provide a list of students who intended to participate in the research.

Consent for children's participation in the study came through the definite choice of the principal to participate in the research.

Over and above, teachers were asked to emphasise the voluntary nature of participation in the study and to inform the students that they had the option to end their involvement at any time if they felt uncomfortable with the testing process. All the students who participated in the research received a pencil and a rubber as a token of appreciation for their efforts.

To, mitigate issues arising from cultural sensitivity, all the question papers were designed in bilingual formats (English and Hindi). Schools were free to choose the medium of testing which felt appropriate, keeping in mind the students' comfort and fluency. Even while translating the test instruments, assistance was sought from language experts to ensure validity, appropriateness, minimum levels of complexity and culture-specific words used in the northern state of Delhi.

Secondly, data were collected through questionnaires, testing instruments and in-depth interview schedules. Students were identified with a unique student ID, thus remaining anonymous. Data was retained using the UK's data deposit service, and field laptops and computers were secured using stringent passwords to protect data in the case of any untoward incident.

Thirdly, an independent team of trained test volunteers were sent out to schools who monitored the testing process. The test volunteers forbade teachers from helping the students and also ensured that there were no cases of cheating amongst the students during the tests.

Fourthly, there was little opportunity for teachers to prepare students through any sort of technique such as rote learning. All the schools were informed that the diagnostic test was designed to test the understanding of the students with minimal weighting on fact-based questions which favour rote and memorisation. Students were informed that it was a low-stakes test to minimise issues such as the stigma of failure, penalisation in case of weak performance or any sort of association with grades affecting their future.

3.16 Conclusion

The research aims to gather evidence through mixed methods. The current chapter describes the ontology, epistemology and lays out the detailed strategy for using mixed methods to analyse data collected through the field research. Elaborating upon the use of mixed methods, I have further outlined the used of data triangulation which combines data through both quantitative and qualitative techniques to produce meaningful insights.

Instrument design, its field administration and its fine-tuning after the pilot testing have been discussed in detail to showcase the rigour of the tools used in the study.

Conditions about validity, reliability and ethics have been outlined, and the necessary steps to satisfy the requirements are discussed in detail.

The next chapter describes the findings and insights generated from in-depth interviews with the participants. Chapter five discusses the implications of the findings and the final chapter concludes.

Chapter Four: Analysis and results

4.1 Introduction

Using a mix methods strategy to analyse the data gathered in field research, I combine quantitative and qualitative approaches to study the impact of the RTE Act indicators. The descriptive statistics include measures of central tendencies – mean, median and mode – to gain necessary information and build demographics of the. The research primarily uses linear and logistic regression models to draw a clear perspective on the relationship between student achievement and the different input indicators including physical indicators in schools, teachers, RTE Act tenets and curriculum. The quantitative findings are supported by qualitative insights wherever appropriate.

The purpose of this study is to explore the impact of the RTE input indicators on student achievement. Using diagnostic test scores and IQ test scores gathered from private schools during my field research, I intend to seek insights into the following questions.

- Is there any relationship between student achievement and the RTE Act's emphasis on physical indicators?
- Do the RTE Act's teacher indicators have any impact on student learning outcomes?
- Does following certain core guidelines of the RTE Act rigidly have any impact on student test achievement?
- Does following the RTE Act's institutional academic indicators have an impact on student achievement?
- In correlation with the above questions, how do low-cost school owners view the RTE Act's regulations?

The thesis used three different questionnaires to gather quantitative data. These include; student questionnaire, teacher questionnaire and school questionnaire. In the case of student questionnaires, there were two sets of questionnaires; the first one collected information on 13 variables, including information related to student's homework, the availability of teaching and learning material and tuitions attended by them. The second set of questionnaires collected the data on the surrogate socioeconomic indicators, details about family size, parental education as well as their occupation. The teacher questionnaire was comprised of three parts. The first gathered information about general background, job status, experience levels, educational qualifications, pay grades and subjects taught by them.

The second part focused on variables about homework-related activities and the last dealt with variables associated with teachers' attitudes towards students during classroom transactions.

Qualitative data in the study was generated through in-depth interviews with school principals. An in-depth interview guideline, capable of producing different themes was designed. The tool focused on obtaining information related to the Right to Education Act, the norms listed under the schedule of the RTE Act and schools' strategies to adhere to the RTE Act norms. Verbatim from the school principals or owners could not be voice recorded for analysis as the participants did not permit it. Hence, the researcher relied on detailed handwritten notes that were prepared during the interview and then they were transferred to a word document on the very same day. This was done to prevent any loss of information that could have occurred due to memory lapse from the point of collecting the data to recording it. After transferring the detailed notes to a single document, using a constructivist design, the researcher coded the notes into headings and further classified them into subcategories. For instance, wherever phrases such as - 'struggle for quality education', 'first generation learners', 'provide education to poor', 'uplift financially backward areas' occurred they were classified under the main heading School inception and establishment. Table 22 provides the various code heading and subcategories that were generated from the qualitative interview notes.

Code headings and the sub-categories generated from the document formed the basis of school monographs presented later in the analysis chapter. Verbatim quotations from the interviews have been provided and combined with analytical insights wherever required.

The roadmap of the chapter is designed around four different sections. The first begins by presenting descriptive statistics relating to both the diagnostic test and Raven's IQ test – test score distribution patterns, differences in scores between the districts and the extent to which infrastructure decreed by the RTE Act was available across the schools. A regression model determines the impact of the different covariates on the diagnostic and IQ test. Further, an ANOVA test was undertaken to determine if there were any mean differences between the scores of the private schools which complied with some or many requirements of the RTE.

The second section reports the demographic and pedagogical practices by teachers and determines the various teacher covariates capable of influencing test scores. Core indicators from the RTE Act are discussed in the third section. Using a binomial logistic model, I report the impact of the RTE Act's core indicators on test scores in the third section. The final section is comprised of school monographs, presenting an elaborate record of conversations

with school owners and heads. It aims to provide insights into approaches adopted by schools to deal with the Act's regulations. Qualitative and quantitative insights are bound together in several instances.

Findings about infrastructure, teacher parameters and the RTE Act's guidelines are obtained from linear and multiple regression, intertwined with data from interviews with school owners and heads.

4.2 General descriptive findings

4.2.1 Overall stakeholder participation

The field study was comprised of a diagnostic test and Raven's IQ test. 305 students participated in the diagnostic test, and 293 students participated in Raven's IQ test of matrices. Participation in Raven's test was reduced as one of the schools cancelled the second day of testing, and some students at other schools were absent that day too. 39 teachers and 12 principals agreed to take part in the research interview process. Table 26 presents a snapshot summary of the participants in the research.

Table 26 – Snapshot summary of the research

Item	Private school participation
Comprehensive Diagnostic test student participation	305
Raven's IQ test student participation	293
Student questionnaire with SEC variables	202
Teacher participation	36
Principal participation	12

The next section looks at test score differences between the private schools and identifies the variance between the scores across the different subjects.

4.2.2 Test scores differences within private schools

305 students from low-cost private schools took the diagnostic test. A few other students were absent from participating schools, so 12 fewer students took Raven's IQ test. Mean test scores across the subjects were reported to be ($\mu = 32.90$) with a standard deviation of ($\sigma_x = 5.42$) and variance of ($\sigma^2 = 29.45$). A high standard deviation explains the widespread of scores.

Table 27 - Test score distribution

	N	Mean	Std. Dev.	Variance
Language Scores	305	13.15	2.35	5.51
Maths Scores	305	10.87	2.19	4.83
Evs Scores	305	8.86	2.35	5.52
Total test score	305	32.90	5.42	29.45
Total IQ score	293	29.23	11.81	139.53

A valuable insight that can be drawn from the test results is that the performance of the children seems to fall as they progress through the test. The highest mean score was observed in language ($\mu = 13.15$) and the lowest was in EVS ($\mu = 8.86$), indicating a sharp drop in mean scores by 4.29 points (Table 27). There could be two possible explanations for the decline in test scores. First, fatigue might have set in amongst students, and they may have attempted to complete the test papers in a hurry so there is a likelihood that they could have chosen incorrect answer options in the multiple-choice diagnostic test.

The other reason could be that students were aware that the assessment was a low stakes test³⁶ and hence may not have attempted all the questions until the end. Variance for the private schools indicated a lower spread between the scores ($\sigma^2_l = 5.51$, $\sigma^2_m = 4.83$, $\sigma^2_{evs} = 5.52$) (ref. table 27).

The highest mean for the diagnostic test amongst the participating schools was ($\mu = 36.93$) with a low standard deviation ($\sigma_x = 3.174$) indicating that the scores were not much spread from the mean. On the other hand, the lowest mean scores were, reported at ($\mu = 29.77$) with a standard deviation ($\sigma_x = 4.22$) reflecting a broader disparity in scores from the mean. The highest total test scores across the participating schools was 44 and the lowest was 10 (ref table 28).

Table 28 – School wise descriptive statistics for diagnostic test

Name of the school	N	Mean	Median	Min.	Max.	Range	Std. Dev.	Variance
School A	66	31.76	32	23	40	24	4.14	17.17
School B	51	31.88	33	10	44	34	6.85	46.91
School C	16	32.38	33	23	39	16	4.56	20.78

³⁶ Students in India usually take high stakes testing seriously due to the important consequences associated with it. A high score or successfully clearing the test can lead to important benefits such as a high school diploma, a scholarship or a licence to practise a profession

Name of the school	N	Mean	Median	Min.	Max.	Range	Std. Dev.	Variance
School D	18	33.72	34	25	42	17	4.72	22.33
School E	12	33.17	32	28	40	12	4.26	18.15
School F	14	36.93	38	29	41	12	3.174	10.071
School G	11	36.09	36	28	44	16	4.549	20.691
School H	57	31.65	32	18	41	23	5.79	33.63
School I	13	29.77	29	22	37	15	4.22	17.85
School J	47	35.85	34	20	43	23	4.76	22.69
Total	305	32.90	34	10	44	34	5.42	29.45

Mean test scores on for Raven's IQ were, reported at ($\mu = 29.23$) lower than the diagnostic test scores. Furthermore, compared to the diagnostic test, the standard deviation ($\sigma_x = 11.81$) and the variance ($\sigma^2 = 139.58$) were also quite high, indicating a wide variation in scores from the mean. Comparing, between schools, the highest mean score for Raven's test was reported a ($\mu = 37.71$), and the lowest mean stood at ($\mu = 10.08$). Interestingly, the standard deviations were almost similar at both the schools, where the highest and the lowest mean scores were reported, indicating that there was not much disparity in the I.Q. test scores (ref table 29).

Table 29 – School wise descriptive statistics for IQ test

School	N	Mean	Median	Min.	Max.	Range	Std. Dev.	Variance
School A	65	29.31	32	3	46	43	10.80	116.59
School B	46	27.09	29.5	0	45	45	11.92	142.08
School C	14	37.71	38.5	29	49	20	6.49	42.22
School D	18	27.33	26	12	48	36	11.32	128.24
School E	12	34.67	36	23	46	23	6.47	41.88
School F	14	21.57	20.5	8	38	30	10.28	105.64
School G	11	27.18	24	10	46	36	12.07	145.76
School H	55	27.93	31.0	7	45	38	10.52	110.69
School I	12	10.08	10.5	1	24	23	6.85	46.99
School J	46	37.35	40.05	11	51	40	9.823	96.49
Total	293	29.23	32	0	51	51	11.81	139.53

School wise descriptive statistics have been discussed in the appendix³⁷. The diagnostic and IQ tests were found to be normally³⁸ distributed

4.2.3 Correlation between test scores

Pearson's product-moment correlation suggests a moderately significant positive correlation between total test scores and IQ test scores ($r = .392$), $p < .01$. A strong correlation is indicated between overall diagnostic test scores and student performance in the subject's language ($r = .823$) $p < .01$, maths ($r = .780$) $p < .01$ and EVS ($r = .832$) $p < .01$.

Students who performed better in maths test were likely to perform better in the IQ test ($r = .389$) $p < .01$. However, the same was not true for the other two subjects – language ($r = .0260$) $p < .01$ and EVS ($r = 0.273$) $p < .01$, due to the weak correlation reported by the tests (ref table 30). It is important to note that high IQ scores are not necessarily a cause for high achievement – it is merely correlated.

Better performance in a diagnostic test can be attributed to intelligence. Several other demographic factors including family background, parental education and profession are also likely to impact test scores³⁹. The next section looks at district levels participation and gender distribution, focusing on the variation occurring amongst them.

Table 30 – Pearson Correlation between test scores

	Evs Scores	Lng. scores	Maths scores	IQ scores
Total test score	.814 ^{**}	.783 ^{**}	.762 ^{**}	.392 ^{**}
Total IQ score	.273 ^{**}	.260 ^{**}	.389 ^{**}	
Maths scores	.450 ^{**}	.376 ^{**}		
Language scores	.458 ^{**}			
	293	293	293	293

^{**}Correlation is significant at the 0.01 level (2-tailed).

³⁷ See appendix 18, 19 and 20.

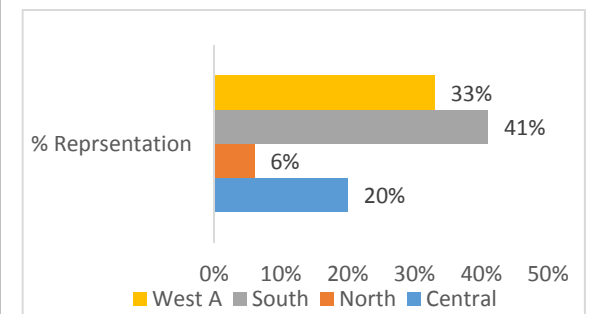
³⁸ A perfectly bell-shaped curve indicates that scores are normally distributed amongst the students. A normal curve reflects any discrepancy in the test scores in case it leans to the left or right. A positively skewed distribution would mean that several test participants have scored on a higher spectrum than the mean test score. An indirect indication suggests that the test items were too easy for the student participants. Alternatively, a negative distribution would indicate a low scoring pattern amongst the students which in turn could mean that the test items were too difficult. Thus, it is essential to have a normal distribution of scores for the students appearing in the test. The normal distribution graphs have been provided in the appendix 21, 22, and 23.

³⁹ See appendix 25 for details

4.2.4 Difference in test scores of private schools across Delhi districts

Student representation was analysed by the proportion of students represented from each district participating in the study. Data from the four districts, reveals that most districts had a representation of 20% or more except the North. The maximum representation of students was from the Southern district (41%) followed by the Western and Central districts. The Northern district included only 6% of the total student representation (ref fig. 11).

Figure 11- District participation figures



Variation in performance of students across different districts

A one-way MANOVA test was undertaken to determine the variation in student performance between the various participating districts. The test assisted in identifying the vector of the means, among the groups, of the independent variables. Assumptions related to the test have been discussed in Appendix 24. The analysis tests for the significant differences between the groups and the newly formed composite variable.

The dependent variables included the 'total diagnostic test scores', and the 'total IQ test scores and the independent variables comprised of the different districts of Delhi.

Table 31 provides the multivariate tests, the primary outcome of the MANOVA analysis. These include; Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root for determining the statistical significance between groups (Laerd Statistics, 2015). However, the most commonly recommended test is Wilks' Lambda, and hence, this research uses it to determine the statistical significance, and it is, determined by the p-value in the "Sig" column. The test was found to be statistically significant if $p < .05$ and it is evident from the table below that p is statistically significant, implying that there is less than a 5 in 10,000 chance of the vector means being different, provided the given null hypothesis be true. Thus it can be concluded that there exists a statistically significant difference in the test scores between the participating districts on the combined dependent variables, (i.e. test scores) $F(6, 576) = 6.75, p < .0005$; Wilks' $\Lambda = .87$; partial $\eta^2 = .07$ (ref table 31).

Table 31 – MANOVA analysis across districts

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.95	2867.255b	2.00	288.00	.000	.95
	Wilks' Lambda	.05	2867.255b	2.00	288.00	.000	.95
	Hotelling's Trace	19.91	2867.255b	2.00	288.00	.000	.95
	Roy's Largest Root	19.91	2867.255b	2.00	288.00	.000	.95
Final Districts	Pillai's Trace	.13	6.56	6.00	578.00	.000	.06
	Wilks' Lambda	.87	6.756b	6.00	576.00	.000	.07
	Hotelling's Trace	.15	6.95	6.00	574.00	.000	.07
	Roy's Largest Root	.14	13.659c	3.00	289.00	.000	.12

4.2.5 Gender distribution across districts

Gender distribution by districts revealed that there was an equal representation of boys and girls from the central district. The western district also came close to an equitable distribution. However, the proportion of boys were found to be slightly more as compared to girls. Boys constituted

2/3rd of the sample from the southern district compared to girls (37%). The Northern district had the highest disparity with almost 78% of the sample being boys.

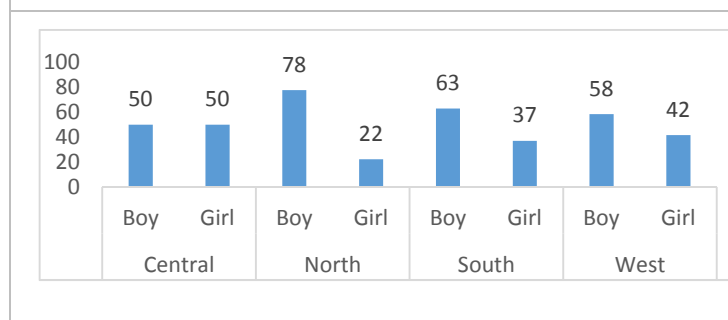
Gender disparity is a huge issue in Indian society where boys are much preferred over girls, and parental focus is on male children as the 'male child' is considered to be the breadwinner and social security avenue for parents. It is heartening to see the push in the central and western districts where gender distribution is almost equal. This reflects changing trends and beliefs in Indian society (ref fig 12).

The next section focuses on the first research question which aims to identify the relationship between the physical infrastructural indicators mentioned in the RTE Act and its impact on the learning outcomes of students enrolled in low-cost private schools.

4.3 Descriptive findings on RTE Act infrastructure indicators in private schools

Having understood the differences in test scores across schools and districts, I report the different physical facilities available in low-cost private schools from the participating districts. Necessary facilities such as a concrete building, electricity, safe drinking water and

Figure 12 - Gender distribution across the districts



blackboard facility were found in 100% of the schools. More than 90% of the schools claimed to have office-cum-store and separate toilets for boys and girls (Ref. table 32).

Close to three-quarters of the schools (73.1%) reported a separate classroom for every teacher and most schools secured their periphery with a boundary wall (94.8%). However, school designs did not prioritise access for the disabled; ‘barrier-free accesses’ as specified in the RTE Act to assist children were reported only in 19.7% of low-cost private schools. School feeding programmes (midday meals) are quite popular in government schools to encourage poor parents to send their children to school, thus boosting attendance. However, only 4% of low-cost private schools reported that they had a school feeding programme which is most likely due to three reasons (ref table 32). First, the cost of providing meals was quite high, and the only source of revenue that the schools had was from the fees that they received from parents.

Therefore, providing food would be a significant overhead in their expenditure. Second, the logistics involved in such an operation are vast and complex. Sourcing the raw materials, employing people for food preparation, delivering high-quality food and finally maintaining sanitation and hygiene are difficult to manage. Thirdly, most children have their breakfast at home and bring their lunch to school, so private schools felt no obligation to provide food to children who were enrolled in the schools.

More than ½ of low-cost private schools had libraries (55.1%), and 65.6% mentioned that they had computer labs. Schools with libraries reported books in the range of 150 – 2000. Computers were reported to be functional in all the schools where computer labs were reported.

Adequate TLM that supplement pedagogy like the presence of AV resources (72.5%), and charts or maps (78.4%) were reported in more than 70% of schools (ref table 32).

Table 32 – Infrastructure availability as per the RTE Act schedule

Item	Low-cost private*
Office cum stores	93.7
Separate toilets for boys and girls	94.8
Boundary walls	94.8
Barrier-free access	73.1
Availability of a library	55.1
Availability of a computer lab	65.6
Availability of charts maps to facilitate learning	78.4
Provision of MDM (mid-day-meal)	4.4
Barrier-free access	19.8

4.3.1 Is there any relationship between student achievement and the RTE Act's emphasis on physical indicators?

Using, a multiple linear regression model, I determine the variation in the dependent variable caused due to the independent variables.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon$$

The independent variables include:

x_1 - total IQ test score, x_2 - mid-day meals served in school, x_3 - barrier-free access to school x_4 - Separate toilets for boys and girls x_5 – school has a library x_6 – separate classroom for every teacher, x_7 – availability of AV resources. Where β_0 is the constant and β_1 is the sample slope parameter for x_1 , and so on for other constants, ϵ represents the error term.

Some variables mentioned in the RTE Act are excluded from analysis as they were commonly present indicators across all the schools. For instance, provision of clean and potable water, electricity and blackboard were available in all the schools that were interviewed. Assumptions related to the multiple regression including independence of residuals, heteroscedasticity, multicollinearity and test score normality have been checked, and detailed notes are provided in the appendix.

Table 33 shows the multiple correlation value coefficient (R= 0.483) suggesting a moderate positive linear association between diagnostic test scores and the various infrastructural amenities. R² explains a 23% variance on the diagnostic test scores with an adjusted R² of 21.4, indicating that the regression model was a modest fit, which means that 77% of the variance was caused due to other factors in play (Mujis, 2004). The overall regression equation model is statistically significant to determine the variation, (P[F(7)>12.388]<0.001) (ref table 33 and 34).

Table 33 – Regression summary on diagnostic test scores

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.483a	0.233	0.214	4.664	1.774

Table 34 – ANOVA table for significance for diagnostic test scores

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1886.38	7	269.48	12.388	.000b
Residual	6199.97	285	21.75		
Total	8086.35	292			

Table 35 – Regression model coefficient summary on diagnostic test scores

	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	23.093	3.694		6.251	.000	15.821	30.365		
Total IQ score	.189	.024	.425	7.912	.000**	.142	.236	.934	1.070
Mid-day meals served in school	4.097	1.554	.155	2.637	.009**	1.039	7.155	.783	1.277
Barrier free access to school	-1.183	.893	-.090	-1.324	.186	-2.941	.575	.586	1.706
Separate toilets for boys and girls	-.151	1.604	-.006	-.094	.925	-3.308	3.006	.634	1.577
School has a library	3.455	.882	.328	3.918	.000**	1.720	5.191	.385	2.599
One classroom for every teacher	-4.419	.945	-.373	-4.675	.000**	-6.280	-2.558	.422	2.370
Availability of AV resources	-.555	.810	-.047	-.686	.493	-2.149	1.038	.571	1.752

Findings from the analysis

The model indicates that IQ tests have a positive impact on scores. The slope coefficient for IQ score is 0.189 where ($p < .05$) represents the change in the diagnostic test scores for one unit of change in Raven's IQ test. The findings show that students scoring highly on Raven's IQ test scores have a high probability of scoring better on the diagnostic tests (ref table 35).

School feeding programmes are likely to have a positive impact on student test scores. The slope of the coefficient is 4.097, where ($p < .05$) indicates a significant positive correlation between test scores and school feeding. Although few private schools provide meals to the children, it seems that in those that do, learning outcomes are positively influenced (ref table 35).

Test scores are positively impacted due to the presence of a library in the school. The slope of the coefficient 3.455 and $p < 0.5$ indicates that low-cost private schools which have libraries and make use of it are bound to improve learning outcomes. The findings are statistically significant, ($p < .05$) (ref table 35).

One classroom for every teacher as mandated by the RTE Act is likely to impact test scores negatively. The slope of the coefficient is -4.419, $p < 0.05$, indicating a significant negative correlation. The exact reasons for this are not known. However, it is quite likely that a single teacher might not be competent enough to teach all the subjects.

Children at primary levels have varying levels of competencies and allocating a single teacher per classroom for teaching different subjects such as language, maths and EVS is unlikely to yield positive test scores across different subjects (ref table 35). However, the limited sample size of teachers participating in the study should be kept in mind before arriving at any concrete conclusion. The discussion chapter highlights the limitations of the current research study.

Other infrastructure factors such as barrier-free access, separate toilets for boys and girls and the availability of AV resources were also found to have a negative impact on test scores. However, the findings were not statistically significant, as $p > .05$ across these variables.

Summary

Of the six RTE Act variables, only two variables (provision of meals to children and library) were found to have a significant impact on student test score. Other infrastructure indicators including barrier-free access, provision of 'gender separate' toilets, availability of audio-video resources, were found to be statistically insignificant, suggesting that meal provision and library presence are of greater significance as compared to other indicators.

However, it should be noted that overall, the number of schools in the sample which provide food to children is quite low and results should be interpreted in light of this fact.

The next section focuses on the detailed findings related to teacher variables and attempts to study their impact on student outcomes.

4.4 Descriptive findings from teacher data

The first question focused on the extent to which infrastructure factors affect student learning. The second research question looks at different teacher attributes listed in the RTE Act and its schedule that are likely to influence students' test scores.

Three teachers were chosen from each school and data about them was gathered through a semi-structured questionnaire. However, for analysis, data from one teacher was corroborated and aligned with student data to understand the associative relationships. Teachers were chosen from the elementary levels, and it is highly likely that teachers involved in the study from the respective schools taught any one of the subjects (Language, Maths, EVS) or possibly all of them. The findings should be interpreted with caution due to the limited sample size of teachers participating in the study.

Before addressing the research question, I report the descriptive statistics associated with teacher demographics, pedagogical practices and PTR ratios from private schools participating in the study.

Teacher demographics include aspects such as job status, remuneration range, educational qualifications, teaching experience and the subjects taught. Pedagogical practices refer to teachers' general attitude towards meeting learning objectives.

Demographic findings from teacher data indicate that nearly 3/5th of teachers (58.7%) have a permanent position. Qualitative interviews revealed that one potential reason for low-cost private schools to hire teachers temporarily could be to test their capabilities during the probation period, following which the school is under no obligation to retain those who underperform. The contract system ensures efficiency so that schools are capable of retaining the best teachers.

Salary scales seem to have several layers in low-cost private schools, more than 2/5th of the teachers (43.6%) reported drawing monthly salaries between ₹2500 – ₹3999 INR (£27 – £44). 10.7% of the teachers mentioned that their monthly salaries ranged between ₹4000 – ₹5999 INR (£44 – £67). Nearly a fourth of the teachers (26.9%) reported monthly earnings between 6000– 9999 INR (£68 – £112). 20% of the teachers said that their monthly earnings were between ₹10000 – ₹20000 INR (ref table 36).

Under the RTE Act's legislation, the central government has mandated that unrecognised low-cost private schools must raise pay levels for teachers. However, this is challenging as low-cost private schools operate on enormous fixed costs, including rents, maintenance bills and investments in capital expenditures. On the other hand, revenue margins are usually thin and dependent on school enrolments, and educational institutions are not allowed to make a profit on their investments. Due to such tight stipulations, low-cost private schools are unable to increase remuneration for their staff as ordered by the government.

Close to 1/5th of the teachers (21.6%) reported that they had neither a graduate or postgraduate degree. 63% reportedly had a graduate degree, and 15% held postgraduate degrees.

Nearly a third mentioned having 1-3 years' experience, more than 1/2 (56.1%) were found to be experienced in the range of 5-10 years, and less than 5% reported more than 15 years' experience (ref table 36). Teachers in low-cost private schools are expected to teach multiple subjects to the same grade – more than 2/5th of teachers (43.6%) reported teaching all the subjects in the grades that they taught (ref table 36).

Table 36 - Teacher demographics

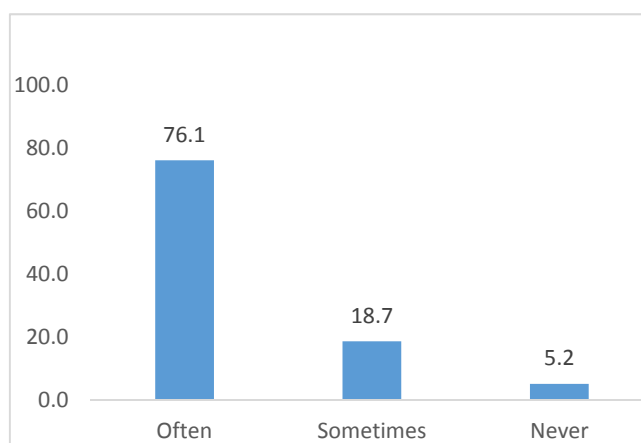
Item	Low-cost private*
Job status - permanent	58.7
Monthly Salary Range (INR/£)	
2500 - 3999 (£27 - £44)	43.6
4000 – 5999 (£44 - £67)	10.7
6000 – 9999 (£68 - £112)	26.9
10000 – 14999 (£113 - £169)	4.3
15000 – 19999 (£170 - £228)	15.4
Educational qualifications	
Below Graduate	21.6
Graduate	63.0
Post graduate	15.4
Teaching experience	
1-3 Years	35.7
3-5 years	4.6
5-10 years	56.1
More than 15 years	3.6
Subjects Taught	
Maths only	18.7
Language only	21.6
EVS (Environmental sciences only)	16.7
All three subjects taught	43.0

4.4.1 Pedagogical practices and teacher attitudes

Teachers were questioned about their pedagogical practices. All teachers interviewed accepted that they read lessons aloud while explaining them to the students and 100% agreed that they ask questions relating to the topic while teaching lessons.

Figure 13 – Worksheets provided by teachers

Learning through drills and repetitive practices is quite a standard way to explain difficult concepts and more than 3/4 of teachers (76.1%) confirmed that they use worksheets for practising problems. All the students were asked to undertake some form of homework daily, as a part of their learning enhancement process (ref fig 13).



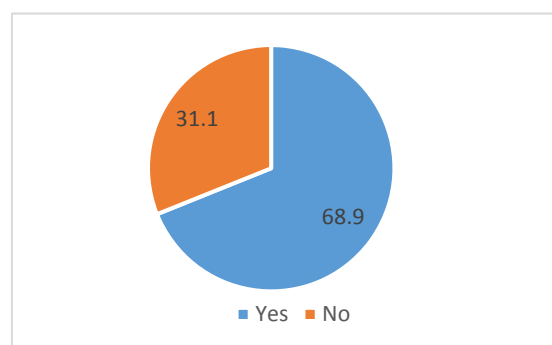
Nearly 3/4th of the teachers (74.4%) denied that they did not encourage memorising lessons given as a part of the homework (ref table 37). 4/5th of the teachers agreed that they gave students mathematical problems and handwriting exercises for students as practice, and nearly a third admitted that they asked students to learn the meaning of ambiguous words as part of their homework (ref table 37).

Table 37 – Homework related practices by teachers

Item	Teacher response (%)
Homework is given to students every day	100
Students discouraged from memorising homework	74.4
Practise mathematics problems for homework	79.3
Practise handwriting for homework	81.3
Learn difficult meanings for homework	64.6

Teacher attitude in the threatened low-cost private schools was measured, with the help of variables like - discipline, loss of respect, punishments, learning capabilities and beliefs prevalent amongst them. The attitude of teachers was found to be authoritative. Nearly 2/3rd (68.9%) believed in punishing students for instilling discipline amongst students (ref fig 14).

Figure 14 – Punishment to be meted out for discipline



Nearly 73% of the teachers felt that they are likely to lose respect if they share jokes with students. More than 90% of the teachers believed that 'students respect teachers only through fear'. More than half of the teachers (57.3%) also had stereotyped beliefs such as the notion that girls are likely to be better at language and boys are likely to be better in science and mathematics (ref table 38).

Table 38 – Teachers attitude towards students

Item	Low-cost private*
Believes in losing respect if he/she shares jokes with students	72.5
Believes that there is no respect without fear	94.1
All children are capable of learning	80.3
Believes that learning abilities of both genders are the same	54.4
Believes that girls perform better in language while boys are strong in maths	57.3

4.4.2 PTR (Pupil Teacher Ratio)

According to the RTE Act's schedule, schools should maintain a PTR of 1:30. Data indicates that six of the schools adhered to this but the remaining four schools exceeded the stipulated norms. One of the reasons for the unusually high numbers enrolled in the schools could be that a new school session had just begun in June. The four schools may not have anticipated the influx so the existing teacher staff would have been asked to manage the new set of students (see table 39).

PTR formulae calculations:

$$PTR = E_t^i / P_i^t$$

Where, E_t^i = Enrolment in school i in year t, P_i^t = total number of primary teachers in school i in year t.

Table 39 – Teachers, and enrolled students in schools

School code	Total students	Total teachers	PTR Ratio
School A	740	12	61.67
School B	1000	33	30.30
School C	126	7	18.00
School D	200	10	20.00
School E	297	9	33.00
School F	300	16	18.75
School G	197	9	21.89
School H	700	40	17.50
School I	350	8	43.75
School J	600	12	50.00
	4510	156	28.91

Following discussion of demographics, pedagogy and PTR across the schools, the next section looks at the second research question which focuses on teacher attributes outlined by the RTE Act and their impact on student outcomes.

4.4.3 Do the RTE Act's teacher indicators have any impact on diagnostic student achievement?

To answer the above research question, I construct two different linear regression models. The first model includes RTE Act components for teachers like training attended, experience, single grade or double grade teacher, single subject or multiple subject teacher. The second model is comprised of components like job status, educational qualifications,

salary range and parent-teacher meetings. The idea of constructing two different models helped to select the best fit. The models also enabled experimentation with different variables and assisted in understanding the impact of each component on student outcome.

Both equations also comprise specific variables which were polytomous (each variable had several categories). Therefore, variables chosen in the regression model were converted to dummy variables by re-coding them as different variables. For instance, training was coded into three different categories — ‘recently attended training’, ‘training in the range of three to five years’, and ‘no training attended’. Similarly, experience was classified as ‘low experience’, ‘moderate experience’ and ‘high experience’.

Using the first equation model the research attempted to identify the impact of the following different co-variates on student achievement

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots + \beta_n X_n + \epsilon$$

Where Y= total test scores x_1 - recently attended training x_2 – training range in three to five years x_3 – highly experience x_4 – moderately experienced, x_5 – single grade teacher, x_6 – multiple grade teacher, x_7 – single subject teacher, x_8 – multiple subject teacher, β_0 is the constant, and β_1 is the sample slope parameter for x_1 , β_2 for x_2 , so on for other constants and ϵ represents the error term. The multiple regression model predicted the impact on diagnostic test scores from the various teacher variables including training attended, experience, subjects and the grades taught.

Regression estimates $R^2 = .112$, explains that combining all the independent variable estimates an 11.2% variation on the dependent variable (i.e. diagnostic test scores). The R^2 determines a positively biased estimate of the model. The adjusted R^2 for the model was 8.8% which is indicative of a small effect size according to Cohen's (1988) classification. Assumptions⁴⁰ related to the model were found to be satisfactory.

Table 41 shows that the regression model is statistically significant to determine the variation, ($P[F(8)>4.6.71]<0.001$) (ref table 40 and 41)

⁴⁰ The residuals were independent, as assessed by Durbin-Watson statistic of 1.72. The model showed no evidence of multicollinearity as the tolerance values were greater than 0.1. Visual examination of the Q-Q plots satisfied the normality conditions

Table 40 - Regression summary – RTE Act teacher indicators on diagnostic test

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1003.569	8	125.446	4.671	.000b
Residual	7949.481	296	26.856		
Total	8953.049	304			

Table 41 - ANOVA table for significance – Teacher indicators on diagnostic test

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.335a	.112	.088	5.182	1.722

Findings from the analysis

The results indicate that teachers who recently attended training and had an opportunity to undergo training in the past three to five years were able to impact test scores positively, compared to those who had never experienced any training.

The positive slope coefficients $B = (2.29, 4.86)$ indicate that schools with trained teachers are likely to have better test scores see (ref table 42). Teachers teaching multiple subjects were able to influence test scores positively compared to those who taught single subjects. The positive slope of the coefficient (2.78) was statistically significant at $p < 0.5$. It is quite likely that those who teach multiple subjects gain competence in different subjects over some time and can differentiate their approach according to students' ability level see (ref table 42).

Teachers with high and moderate experience were likely to influence student achievement positively, compared to teachers with low experience. The slope of the coefficients was positive, 2.92 – highly experienced, 1.49 – moderately experienced.

Similarly, the model reported positive coefficients for single subject teachers, but the findings were not significant (ref table 42).

Table 42 - Overall regression summary teacher indicators on diagnostic test score

	Unstandardized Coefficients		Standardised Coefficients Beta	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	26.89	1.79		15.05	0	23.38	30.41		
Recently attended training	2.29	1.16	0.21	1.98	0.05**	0.01	4.57	0.27	3.64
Training range 3-5 years	4.86	1.67	0.39	2.91	0.00**	1.58	8.15	0.16	6.12
Moderately experienced	1.5	1.16	0.14	1.29	0.2	-0.78	3.77	0.27	3.74
Highly experienced	2.92	2.16	0.1	1.35	0.18	-1.33	7.18	0.54	1.85
Single grade teacher	1.2	1.85	0.11	0.65	0.52	-2.44	4.84	0.11	9.71
Double grade teacher	2.39	2.05	0.2	1.17	0.24	-1.64	6.42	0.11	10.02
Single subject teacher	2.06	1.53	0.15	1.35	0.18	-0.95	5.06	0.25	4.03
Multiple subject teacher	2.78	1.37	0.25	2.04	0.04**	0.09	5.47	0.19	5.19

To summarise the research question, the analysis finds that teachers who attended training recently or had undergone training in the range of 3-5 years were likely to impact test scores positively.

The model also reported that teachers with knowledge on multiple subjects at primary levels could positively influence test scores. Other factors like experience and teachers who taught single or multiple grades had a positive impact on test scores, but these factors were not statistically significant. Having discussed the effects of teacher training, experience and number of subjects taught, the next section focuses on other teacher indicators including educational qualifications, remuneration and PTA (parent-teacher association meetings held in the schools).

4.4.4 Impact of teachers job status, educational qualifications, salary range and (PTA) meetings

The second model predicted the effect on diagnostic test scores of various teacher inputs including job status, educational qualification, salary range and PTA meetings held in schools.

Table 43 shows that the regression model is statistically significant to determine the variation in scores ($P[F(4)] > 8.987 < 0.001$). Assumptions⁴¹ to the regressions were found to be in order. The regression estimate $R^2 = .10$ explains that combining all the covariates accounted for a 10% variation on the diagnostic test scores, indicating a modest correlation (Mujis, 2004). The adjusted R^2 for the model was 9.5%, indicative of a small to medium effect size according to Cohen's (1988) classification (ref table 43 and 44)

Table 43 – Regression summary – teacher indicators

R	R Square	Adjusted R Square	Std. error of the Estimate	Durbin-Watson
.327a	.107	.095	5.162	1.726

Table 44 – Anova's table for significance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	958.013	4	239.503	8.987	.000b
Residual	7995.036	300	26.650		
Total	8953.049	304			

Findings from the analysis

Educational qualification of a teacher revealed a positive effect on student test scores. The slope of the coefficient was significantly positive at 6.082, where $p < 0.5$. (ref table 45)

The nature of teachers contract had a negative impact on student outcomes, with the slope of the coefficient reported at -3.420, where $p < 0.5$. The exact reasons for the negative impact are not clear, but it is plausible that teachers with temporary contracts may be involved at a superficial level, lacking authentic engagement which in-turn is likely to have a deleterious effect on student outcomes. Salaries showed a negative correlation with diagnostic test achievements – the slope of the coefficient was (- 5.690) and statistically significant at $p < 0.5$ (ref table 45). However, again it should be noted that the sample size of teachers was limited so any conclusion from the above analysis should be drawn with caution.

⁴¹ The equation showed that the residuals were independent and the Durbin-Watson statistic almost similar to the first equation (1.72). There was no evidence of multicollinearity as tolerance values were higher than 0.1 and a visual examination of the Q-Q plots satisfied the normality conditions.

PTAs are unlikely to have any impact on student scores. The regression slope coefficient is negative (- 3.581), and the covariate was not statistically significant, ($p=0.001$), $p>.05$ (ref table 46). The qualitative interviews revealed good insights as to why the existence of the PTA's was a mere formality as laid out by the RTE Act, rather than an active body involved in the improvement of academic matters. Most students in these schools come from economically disadvantaged families where both parents are engaged in some manual labour work and earn daily wages to sustain their families. Summoning them to a PTA meeting is not feasible. Further elaborations on the reasons are discussed in chapter five (ref table 45,).

Table 45 – Regression summary for teacher coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	42.069	3.554		11.839	0.000	35.076	49.062		
Job status	-3.420	0.965	-0.311	-3.543	0.000**	-5.319	-1.520	0.387	2.585
Educational qualification	6.082	1.618	0.405	3.759	0.000**	2.898	9.265	0.256	3.904
Salary range	-5.690	1.664	-0.417	-3.419	0.001**	-8.966	-2.415	0.200	5.010
PTA meetings	-3.581	1.022	-0.293	-3.503	0.001**	-5.593	-1.569	0.425	2.352

In retrospect to the research question, the model indicated that teachers with better educational qualifications are likely to impact test scores positively. Many low-cost private schools are expected to hire teachers with senior or senior secondary education. However, the RTE Act has laid out rules for primary teachers and upper primary teachers. Primary teachers are required to have a diploma, and the upper primary teachers are required to hold a B.Ed. Degree at the minimum. It is likely that teachers with better educational qualifications have a better understanding and grasp of the subjects compared to those with a minimum level of qualification. Therefore, they may be capable of planning lesson plans efficiently, helping students achieve the learning objectives and raising learning outcomes. However other factors such as teachers' job status, salary range and the PTA meetings were unlikely to influence the test scores.

Summary of findings

Of the eight RTE teacher variables regressed with academic test scores, five variables were found to be positively associated, and three were found to be negative. Of the five variables, only three variables were determined to be statistically significant. These include teacher training, teachers teaching multiple subjects and educational qualifications. All three variables which were found to be negatively associated with academic outcomes (teachers' job status, salary ranges and the PTA meetings in schools) were found to be statistically significant.

The next section discusses the RTE Act's core academic and institutional guidelines. It focuses on the third and fourth research question, attempting to understand the influence of the guidelines on student outcomes.

4.5 Descriptive findings on the RTE Act's core and academic guidelines

The RTE Act's guidelines include awareness of the Act, teachers attending RTE Act orientation, providing free and compulsory education to children, admitting children without transfer certificates, constituting an SMC in the school and some others outlined in tables 46 and 47. Descriptive findings revealed that although private schools complied with the norms, they candidly admitted that they could not follow every letter of the RTE Act. About 4/5th of the schools (83.7%) reported that there was a copy of the RTE Act on premises at all times. Teacher orientation on the RTE Act was not made mandatory, and only 41.1% of the principals agreed to send their teaching staff to orientations. More than a third of the school leaders (35.4%) reported that education was free in their schools and children aged 6 –11 were not charged tuition fees. Qualitative interviews with principals reported that deserving students were provided with scholarships and bursaries to support their schooling. 77% of the schools said enrolling new students without a transfer certificate (TC) and denied expelling or dismissing children from the school on the grounds of poor performance or as a part of a disciplinary measure. 63.5% of schools confirmed that they encouraged the admission of disabled students (ref table 46).

Table 46 – Core RTE guidelines

Item	Low-cost private*
Awareness of the Act	77.1
Teacher attending Act orientation	41.1
Free and compulsory education for children	35.5
School does not have a reservation policy	78.6
Children are admitted without transfer certificates	78.3
Admission of disabled children in the schools	63.5

The RTE Act prescribes specific governance structures like the presence of school management committees (SMCs) and parent-teacher associations (PTA) for better engagement between parents and school administration. The RTE Act also states that the school should facilitate overall development, build talent and knowledge through methods like ‘learning by doing’. The rationale for such structures is to enhance student engagement and welfare, thereby leading to improved student test scores and high achievement. Moreover, the Act also requires private schools to provide mandatory training to teachers, allow free and compulsory education to 6 –14 year-olds and adopt a reservation policy for the scheduled castes (SC) and scheduled tribes ⁴²(ST). School heads were asked about their opinion on the fundamental RTE Act tenets followed in their school. Table 47 provides detailed findings related to the presence of an SMC and views of principals on the syllabus and curriculum-related parameters as listed in the RTE Act.

Table 47 – SMC, Curriculum and syllabus related findings

Item	Low-cost private (%)
RTE mandates	
Teachers attending RTE orientation	41
Reservation policy followed	21.6
Admission of children with disability	64.6
Presence of an SMC	26.6
PTA meetings established	73.1
RTE’s tenets on curriculum and development	
Syllabus helps in overall development	57.2
Syllabus builds talent and knowledge	58.8
Curriculum places importance to learn through activities	58.2

More than 2/5th of the schools (41%) sent their teacher for RTE Act orientation. Although the Act prescribes free and compulsory education, almost all schools reported charging fees from their students. Reservation policies were evident in 21.6% of the schools. These schools allocated a limited number of seats for children who came from the SC and ST backgrounds. Close to 2/3rd of the schools (64.6%) reported admitting children with a

⁴² Traditionally children from scheduled castes and tribe come from socially and educationally backward class or such other groups having disadvantage owing to social, cultural, economic, geographical, linguistic, gender or such other factors. Such groups are identified and specified by the Government of India

disability. 57.2% of schools said that the syllabus helped the children to some extent in their overall development (ref table 47).

The next section focuses on the third core research question, trying to understand the influence of the Act's core guidelines on student test outcomes.

4.5.1 Does following the RTE Act's core guidelines rigidly have any impact on students' test achievement?

To answer the above question, I use a binomial logistic regression model to estimate the effect of the independent RTE covariates on the dichotomous dependent variable, test scores

$$\text{Logit}(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + e.$$

Where Y is the test score range with a dichotomous response, β_0 is the intercept (constant), β_1 is the slope parameter (slope coefficient) for X_1 , β_2 for X_2 and so on for other constants.

The independent variables include – X_1 = thorough awareness of RTE, X_2 =teachers attending RTE orientation, X_3 = Range of fee charged by the school, X_4 - RTE reservation policy followed by the school, X_5 - disability policy followed by the school, and X_6 - presence of an SMC in the school. e represents the errors/residuals. The model was statistically significant, $\chi^2(6) = 27.79$, $p < .0005$. The equation explained the variation in the ranges of test scores at 12% based on Nagelkerke R^2 and classified 63.3% of the cases accurately.

Of the six predictor variables, only two were statistically significant: a fee category and presence of SMC (ref. table 48 and 49).

Table 48 – Test of significance

	Chi-square	df	Sig.
Step	27.790	6	.000
Block	27.790	6	.000
Model	27.790	6	.000

Table 49 – Regression model summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
395.001a	.087	.116

Findings from the analysis

Unaided schools which charge fees in a higher range, above INR 600 (approximately £7 per month), are less likely to raise their students' test score, compared to those which charge

fees at a lower rate. The negative B coefficient –1.213 is found to be statistically significant, where $p < 0.5$. Further potential causes for this are proposed in the discussion section.

Schools with SMCs are likely to raise test scores. The equation reported a positive coefficient $B = 1.483$, statistically significant at $p < 0.5$. Qualitative interviews indicate that schools with SMCs focus on academic issues and take measures if there are aberrations from set academic targets. Such proactive steps by the SMCs might be assisting in raising the overall achievement of students in the school. Other factors such as thorough knowledge of the Act's norms, teachers attending RTE Act orientation and reservation policy are unlikely to raise test scores. However, the values are not significant: $p > 0.5$.

Inclusion (admitting children with disability) is likely to raise academic achievement. One possible explanation that emerged from the discussions was that the standard PTR was on average 1:30. A student with a disability, when able to gain access to a classroom, benefits from the discussions and interactions of other students. The other possible explanation could be - that teaching children with special needs may require better preparation of subject concepts. Therefore, teachers who have thorough knowledge and conceptual clarity are likely to have good academic discourse in classrooms which in turn could raise achievement levels. However, the effect of this variable was not statistically significant: $p > 0.5$ (ref table 50).

Table 50 - Binomial logistic regression summary with RTE core indicators

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
RTE Act awareness	-.389	.346	1.264	1	.261	.678	.344	1.335
RTE Act orientation	-.512	.475	1.161	1	.281	.599	.236	1.521
Fee category	-1.213	.429	8.001	1	.005**	.297	.128	.689
RTE reservation policy	-.621	.540	1.319	1	.251	.538	.186	1.550
Disabled children	.114	.401	.081	1	.776	1.121	.511	2.461
SMC presence	1.483	.358	17.123	1	.000**	4.405	2.182	8.891
Constant	.962	.587	2.691	1	.101	2.617		

Summary

To, answer the research question, more low-cost private schools need to establish school management committees to strengthen decision making with parents. Improving inclusion in schools is likely to affect test scores positively. However, other factors like providing RTE Act orientation to teachers and following a reservation policy are not expected to yield any positive impact on student outcomes.

Moreover, the model also indicates that private schools need to maintain relatively low fees if they intend to raise achievement scores in the long run.

The next section focuses on analysing the impact of the RTE Act's academic indicators and its effect on the diagnostic test scores involving language, maths and EVS.

4.5.2 Does following the RTE Act's institutional academic indicators have an impact on student achievement?

To answer the above question, I regress the diagnostic test score with academic indicators as listed in the RTE Act. The following equation attempts to determine the relationship between the covariates and test scores.

$$Y = \beta_0 + \beta_1 X_1 + \dots \beta_n X_n + \epsilon$$

Where Y= diagnostic total test scores, x_1 – children are held back in the same class, x_2 – existing curriculum aids to learn through activities, x_3 – Continuous comprehensive evaluation (CCE) undertaken in school, x_4 – Schools not aware about CCE, β_0 is the constant, and β_1 is the sample slope parameter for X_1 , so on for other constants and ϵ represents the error term. Assumptions⁴³ related to the model were found to be in order. The overall model was statistically significant to determine the variation scores ($P[F(4)>3.788]<0.001$). Regression estimates $R^2 =$ reported a 35% variation on the dependent variable diagnostic test scores). The adjusted R^2 for the model was 48%, indicative of medium to large scale effect (ref table 51, 52)

Table 51 - Overall regression summary – RTE Act curriculum indicators

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.219a	.048	.035	5.330	1.895

Table 52 - ANOVA table for significance – RTE Act curriculum related indicators

	Sum of Squares	df	Mean Square	F	Sig.
Regression	430.419	4	107.605	3.788	.005b
Residual	8522.630	300	28.409		
Total	8953.049	304			

⁴³ The Durbin Watson statistic was reported at (1.895) indicating that the residuals were independent. The data showed no signs of multicollinearity, as the tolerance and VIF values were satisfied. The Q-Q plots assessed normality, and the score distributions showed no signs of abnormality.

Table 53 – Individual summary of the curriculum indicators

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B		Collinearity statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF values
(Constant)	30.490	1.846	.091	16.52	.000				
Children are held back in same class	-1.011	.869	.244	1.164	.245	-.088	.067	.524	1.910
Curriculum helps to learn thru activities	2.677	1.019	.032	2.627	.009**	.206	.150	.367	2.727
School undertakes CCE	.381	1.625	-.006	.235	.815	.150	.014	.169	5.935
Schools not aware about CCE activities	-.071	1.886	.091	-.037	.970	-.161	-.002	.136	7.330

Findings from the analysis

Of the four independent variables, only one of the variables seemed to influence the test scores positively and was statistically significant. Schools which followed a ‘learning by doing’ policy influenced the test scores positively. The co-efficient $b = 2.67$ was statistically significant to determine the variations, $p = .009$, where $p < .0005$. Private schools which still follow the traditional ‘rote-based’ learning models are unlikely to raise learning levels. On the other hand, it is quite plausible that schools which allow students to experiment and encourage more ‘hands-on work’ are more likely to motivate students and to learn better which could translate into improved test scores.

CCE was introduced in the RTE Act as a measure of evaluating students not only by academic performance but also taking into account the non-academic traits of the student including accomplishments in arts, music or athletics. Embracing, Continuous, Comprehensive Evaluation (CCE) seems to impact positively on test scores, compared to those schools where heads were not aware of CCE measures as listed in the Act. The coefficient was reported at .381, but it was not significant.

Another critical finding from the regression equation is the schools’ policy of obligating children to repeat the year owing to poor performance in end of year examinations’. Children perceive annual examinations in Indian schools as vital. These academic examinations decide if children have acquired the desired competencies and skills in the current year for progressing to the next year. Children scoring less than a predetermined threshold determined by SMCs must repeat the same year.

Such policies in schools demotivate children as they lose an academic year if they fail to perform in the year-end examinations. The model reports a negative correlation between student achievement and schools that followed this policy. The slope of the coefficient was negative, where $b = -1.011$ but the coefficient was not statistically significant.

Summary of the findings

The model indicated that schools which allowed students to experiment and encouraged 'learning by doing' were likely to see better test outcomes. Assessments followed at regular intervals were likely to boost student achievement rather than one-time examination at the end of the year which caused undue stress and tension amongst students to perform better. Holding children in the same class is highly unlikely to improve student outcomes in schools.

The next section⁴⁴ describes insights from qualitative studies and constructs school monographs based on responses received from school owners and heads on the various issues about infrastructure, teacher indicators and RTE Act-related academic and institutional guidelines.

4.6 ANOVA analysis

Anova analysis was undertaken to overcome the limitation of multiple regression. Multiple regression suffers from the drawback of not having sufficient degrees of freedom to provide a robust picture of the findings from the analysis. Anova analysis, thus determined if there were any significant differences in the test scores within the private schools that aimed to follow the RTE norms.

Table 54 shows the RTE norms that were studied in three areas which include; learning resources, the infrastructure requirements and the teacher effectiveness. Eight norms were studied under the learning resources area, eleven were considered for the infrastructure requirement area, and finally, three were chosen from the teacher effectiveness area for ANOVA analysis.

⁴⁴ A complete section on demographic factors has been included in the appendix. It was critical to understand the demographic factors of the study. However, it was out of the scope and purview of the research as the current thesis focuses on the RTE Act's indicators and their impact on student test outcomes.

Table 54 – Classification of RTE Norms

Learning resources as advised by RTE	Infrastructure as recommended by RTE schedule	Teacher effectiveness as advised by RTE
Library in the school	Availability of a concrete building	Participation in RTE training
Computers in the school	Availability of a drinking water facility	Teachers paid as per RTE norms
Functionality of computers	Availability of electric connection	School's awareness of government norms for teacher pay
Availability of audio-video resources	Serving mid-day meals	
Functionality of audio-video resources	Separate classroom for every teacher	
Toys for supplementing the study	Store and office room	
Availability of charts and maps in the school?	Barrier-free access	
Blackboard in the school	Boundary wall	
	Teaching-learning materials	
	Safe drinking water facility	
	Separate toilet for boys and girls	

Each of the areas was treated as a separate variable and questions on the relevant areas were studied. A binary score of 0 and 1 was assigned to the variables. The variables were further classified into further categories based on their overall scores.

Table 55 – Classification of learning resources

Learning resources variable	Infrastructure variable	Teacher effectiveness variable
<ul style="list-style-type: none"> • Schools with some learning resources • School with most learning resource 	<ul style="list-style-type: none"> • Schools with some infrastructure resources • School with most infrastructure resources 	<ul style="list-style-type: none"> • Schools following some teacher norms • School following most teacher norms

Table 56 – ANOVA between test scores and learning resources

		Sum of Squares	df	Mean Square	F	Sig.
Evs Scores	Between groups	5.195	1	5.195	0.254	0.626
	Within Groups	183.714	9	20.413		
	Total	188.909	10			
Lng. scores	Between groups	0.379	1	0.379	0.651	0.441
	Within Groups	5.243	9	0.583		
	Total	5.622	10			
Maths scores	Between groups	1.014	1	1.014	0.961	0.353
	Within Groups	9.502	9	1.056		
	Total	10.517	10			
Total scores	Between groups	4.75	1	4.75	0.648	0.442
	Within Groups	65.958	9	7.329		
	Total	70.709	10			

Table 57 – ANOVA between test scores and RTE infrastructure parameters

		Sum of Squares	df	Mean Square	F	Sig.
Evs SCORES	Between Groups	74.242	1	74.242	5.827	0.039
	Within Groups	114.667	9	12.741		
	Total	188.909	10			
Lng. Scores	Between Groups	0.589	1	0.589	1.053	0.332
	Within Groups	5.033	9	0.559		
	Total	5.622	10			
Maths Scores	Between Groups	0.097	1	0.097	0.084	0.778
	Within Groups	10.419	9	1.158		
	Total	10.517	10			
Total Scores	Between Groups	10.584	1	10.584	1.584	0.24
	Within Groups	60.125	9	6.681		
	Total	70.709	10			

Table 58 – ANOVA between test scores and teacher effectiveness

		Sum of Squares	df	Mean Square	F	Sig.
Evs SCORES	Between Groups	15.709	1	15.709	0.816	0.39
	Within Groups	173.2	9	19.244		
	Total	188.909	10			
Lng Scores	Between Groups	0.711	1	0.711	1.302	0.283
	Within Groups	4.911	9	0.546		
	Total	5.622	10			
Maths Scores	Between Groups	0.015	1	0.015	0.013	0.913
	Within Groups	10.502	9	1.167		
	Total	10.517	10			
Total scores	Between Groups	6.808	1	6.808	0.959	0.353
	Within Groups	63.9	9	7.1		
	Total	70.709	10			

Findings from ANOVA analysis

Anova analysis indicated that there were no statistically significant in the total scores between the schools with different levels of learning resources, $F(1,9)=0.254$, $p=0.626$. Further, no statistically significant differences were found in language $F(1,9)=0.651$, $p=0.441$, maths $F(1,9)=0.961$, $p=0.353$ and evs scores $F(1,9) = 0.254$, $p=0.626$ and the schools with varied levels of learning resources (Ref table 56)

Table 57 reported no statistically significant difference in the total test scores, between the schools with different levels of learning infrastructure $F(1,9) = 1.584$, $p=0.24$. No significant difference was observed across language $F(1,9) = 1.053$, $p=0.332$, maths $F(1,9) = 0.084$, $p=0.778$ and evs scores $F(1,9) = 5.827$, $p=0.039$ between the schools that some infrastructure and those which had the most in accordance with the RTE stipulations.

Table 58 shows that there was no statistically significant difference in the total test scores, between the schools with varying levels of teacher effectiveness $F(1,9) = 0.959$, $p=0.353$. The findings indicate that there are no significant differences in the means scores of schools with a varied combination of requirements as legislated by the RTE. It implies that the academic and administrative conditions as demanded by the landmark act have whatsoever no influence on the learning levels.

4.7 School Monographs

School heads and owners were interviewed to understand their views on RTE Act regulations. The themes were broadly set out concerning the research questions (shown below) and the interview guideline comprised questions on different issues such as awareness of the RTE Act, infrastructure norms of the Act followed by schools, teacher-related factors and steps taken by the school to fulfil regulatory standards.

The discussions also provided insights on the hassles faced by unrecognised schools while applying for recognition and on school closure and its impact:-

- Is there any relationship between student achievement and the RTE Act's emphasis on physical indicators?
- Do the RTE Act's teacher indicators have any impact on student learning outcomes?
- Does following the RTE Act's core guidelines rigidly have any impact on student test achievement?
- Does following the RTE Act's institutional academic indicators have an impact on student achievement?
- In correlation to the above research questions, how do low-cost school owners view the RTE Act regulations?

This section explores insights generated from discussions undertaken with school heads. The primary data was collected from a sample of ten schools chosen from the different locations of Delhi.

These schools also participated in the diagnostic and Raven's IQ test of matrices and the heads agreed to participate in a personal in-depth interview discussion as they wanted to communicate their concerns associated with the RTE Act.

The schools were selected on the following basis:

- Participated in the testing process
- Threatened by the local state government for closure and struggling to stay active.
- Required to meet certain norms to establish themselves as educational entities
- Providing education to the poor communities in the impoverished regions of Delhi.
- Monthly fees in the range of ₹ 100 – ₹ 1000 (£1.21 to £12.14)
- Did not have any external funding or assistance from the government

A prior appointment was sought with all the schools, and the visits were carried out on the scheduled dates. An in-depth interview guideline was designed to gather insights from the discussions.

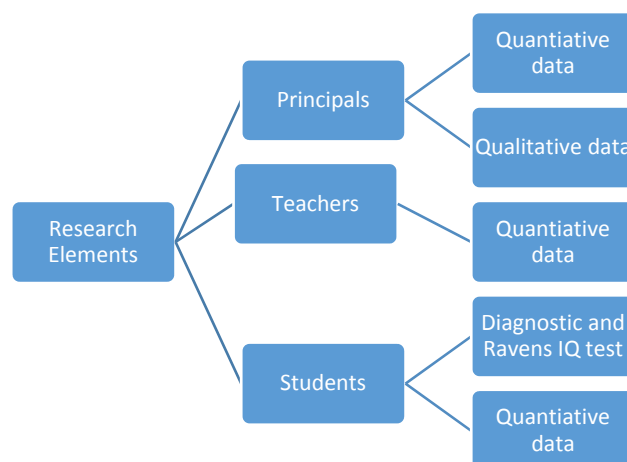
Responses from school heads were recorded in the form of written notes in the in-depth schedule. School heads refused to record the conversations, although confidentiality was assured to them. They believed that controversial aspects were likely to emerge during the discussions so it would not be appropriate to allow a recording of the conversations. The interviews were carried out during July 1st - 22nd 2016. These in-depth interviews were conducted in a guided conversation style.

Ten schools participated in the research and for anonymity reasons the schools were numbered from 1 to 10. School heads and owners were quite receptive and open to probing during the interview, facilitating insights on recognition mechanisms. Participating schools were English-medium, meaning that lessons were conducted in English language. These schools also taught 'Hindi' as a second language. All the schools participating in the research were elementary schools comprising of grades 1-5.

Most of the information shared by the school heads referred to their struggle to remain open and also revealed their extra-legal activities for obtaining government recognition. School heads felt that highlighting these issues with a research scholar associated with an internationally-renowned institution could assist in addressing them. They thought that the study could present the difficulties faced by school owners to comply with the RTE Act's regulations which they found to be rigid and inflexible.

Figure 15 provides information on the various participants associated with the research and the nature of the data supplied by each of them. The findings are presented in the form of school monographs to answer the below research questions and also bind the findings from the quantitative analysis.

Figure 15 – Participants in the research



At the end of the monographs, insights that emerged during the conversation are outlined and supported with the quantitative findings presented earlier in the chapter.

4.7.1 School One

The ethos behind the establishment

Located in the Western district of Delhi and serving poor communities, the school was established by an entrepreneur who hailed from the northwestern state of India, Uttarakhand. The school owner struggled himself to access good quality education so was determined to start a school in the slums of Delhi.

Following discussions with parents in the community, and with his years of experience, he was convinced that first generation children from the slums required good quality education.

"I am happy when children coming from poor and impoverished backgrounds can speak English".

School owner from School One

On infrastructure requirement and school recognition

The school applied for government recognition in 2007. However, due to administrative and legal issues, this was not granted. The owner was aware of the rules and regulations as mentioned in the schedule of the RTE Act.

He views the regulations from more of an administrative angle rather than from an academic standpoint. He further felt that the Act creates a myriad set of rules and expects small budget schools to follow them, even though the extent to which these regulations improve learning outcomes at elementary or secondary levels is dubious.

He further explained that the regulatory norms listed in the Act require more capital investments, which act as massive hurdles for small budget schools. Capital investments were undertaken by the

"RTE regulations do not seem to help improve the learning levels of children, they are created for harassing school owners like us".

School owner from School one

owner to comply with the rules and regulations, so they received recognition in 2015. However, this was 'provisional' which meant that the school was required to renew the recognition certificate every year with the Department of Education.

As shown in table 59 the school followed almost all the regulations as mentioned in the RTE schedule. The school head informed that no child with a disability was, enrolled in the academic year, and hence, no 'barrier-free' entrance was required in the school premises. Children enrolled in the school usually got the meals from their homes, and therefore the school did not provide any free meals to the children. Most books in the library were either related to the academic subjects or were for pleasure reading including short stories books or books with poetries. Books on puzzles, problem-solving were, not found in the library. On being enquired, the owner reported that most children preferred to read books with more images and short stories. Moreover, according to the owner investment in such books assisted in improving the teacher knowledge, and assisted in better classroom transactions, which lead to better scores in internal and external examinations.

"As we charge fees, we understand that we are morally responsible for the performance of children. We ensure that we invest our time and energy in students, as we understand that parents have put their faith and hard earned savings with us".

School owner from school one

Table 59 – School one, RTE Act's schedule checklist

Item	Norms & Standards	Mark (✓) if applicable
No. of Teachers	Number of teachers/days/ hours	
For classes 1 to 5	Up to 60 students	2 ✓
	Between 61 to 90	3
	Between 91 to 120	4
	Between 121 to 200	5
Teaching-learning equipment	Provided to all the classrooms as required	✓
Building	All-weather building consisting of :	✓
	At least one classroom for every teacher and a multipurpose office-store;	✓
	Barrier-free access	X
	Separate toilets for boys and girls.	✓
	Safe and adequate drinking water facility to all children'*	✓
	A kitchen where midday meal is cooked in the school	X
	Playground	✓

Item	Norms & Standards	Mark (✓) if applicable
	Arrangements for securing the school building by boundary wall or fencing	✓
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200 ✓
	For class 6 to 8	220 ✓
	For class 1 to 5 (Instructions hours)	800 ✓
	For class 6 to 8 (Instruction)	1000 ✓
Minimum number of working hours per week for the teacher (Including preparatory)	Forty-five teaching including preparation hours	45 ✓
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-	✓
Play material, games and sports equipment	Shall be provided to each class as required	✓

✓ – Facility present X – Facility not present ∞ – facility status not known

The school charged a monthly tuition fee of INR 500 (approximately £5 - £6) so did not follow the mandate of ‘free education’ provision as outlined by the RTE Act.

There were 700 children in the school, and close to 63% of these were from scheduled caste and scheduled tribe backgrounds⁴⁵.

On teachers, teaching inputs and PTA’s

Academic and subject-specific training was conducted by external experts or teachers from premium private schools. School teachers were employed for 220 working days in a year, the equivalent of 1320

“Our school calls external experts from DPS and Sanskriti schools and the teachers are trained by the experts on the fourth Saturday of every month.”

School owner from school one

instructional hours, which was far more

than the requirement of the RTE Act. PTAs were constituted according to the Act, but they had been dissolved since parents did not attend.

⁴⁵ Refer footnote 30 for details

Feedback on student performance was communicated through the students' handbooks whenever necessary. Parents were summoned to discuss student performance on the day that results were published

School inspection and closure

Educational school inspectors visited the school twice, and the last visit was on the 2nd of May 2016. The inspectors pointed out the absence of a scientific laboratory for children, so the school subsequently invested in these resources.

On the issue of school closure, the owner expressed his concern that teachers would be unemployed and the students would be forced to join the manual labour stream. He mentioned that government schools might not have the intake capacity for admitting more children and most children, no longer in school would be, considered under the 'drop-out'⁴⁶ category.

4.7.2 School Two

Inception and RTE Awareness

The school, established by a couple, aimed to provide education to the poor residents of a community in the Western district of Delhi.

The owners were aware of the RTE Act legislation and had applied for recognition in the year 2012-2013, but due to a lack of fire safety certificate, recognition was refused.

According to the owner, the building complied with all the fire safety norms, but they could not gain a fire safety certificate as officials issuing it had demanded a bribe that the owners were unwilling to pay.

Elaborating further on the issue, the owner explained that the education department had mandated other certificates such as a building health certificate and electricity regulations which initially seem to be useful.

"Going through the RTE makes me feel that the laws focused towards improving infrastructural norms. I don't see any of the regulations aimed at improving classroom instructions"

School owner from school two

⁴⁶ The government of India regular conducts a census for school going children. An increasing number in the 'drop out' category indicates a stagnation in the growth of human capital.

However, in hindsight, they act as mediums that encourage a culture of bribery and unnecessary bureaucratic procedure. Moreover, there was no specific input from the RTE Act towards academic outcomes; the legislation seemed to be skewed towards infrastructure, buildings and to some extent teachers.

Table 60 shows that the school had no provision for barrier-free access, midday meal kitchen or playground. The status of the library and other facilities were not known as the researcher was not allowed to visit the inside premises of the school where learning took place. The school charged a monthly fee of ₹ 400 – ₹ 600 (£4 - £7) a month and provided free textbooks, writing materials and uniforms to the students. The owner finds the Act regulations to be rigid and feels that the government needs to consider relaxing the rules for budget private schools as they are capital-intensive, bureaucratic and promoted graft in the system

On teachers and teaching inputs

The owner's wife was responsible for teacher training. No formal training through an external agency was undertaken in the school. As per the official records of the school, the teachers carried out teaching for the required number of days and hours as mandated by the Act.

School inspection and closures

According to the owner, the inspectors had not made any visit to their school since they had applied for recognition. He believed that only powerful and well-connected people could gain recognition.

"I am struggling for recognition because the government officials expect me to pay a bribe, which I am not willing to do."

School owner from school two

When asked about school closures, the owner responded that it would be devastating as the teachers would become unemployed and most students would drop out as the government schools do not have space for them.

Table 60 - School two, RTE Act's schedule checklist

Item	Norms & Standards		Put a (✓) wherever necessary
No. of Teachers		Number of teachers/days/ hours	
For classes 1 to 5	Up to 60 students	2	✓
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	
Teaching-learning equipment	Provided to all the classrooms as required		✓
Building	All-weather building consisting of		
	At least one classroom for every teacher and a multipurpose office-store		X
	Barrier-free access		X
	Separate toilets for boys and girls.		✓
	Safe and adequate drinking water facility to all children'		✓
	A kitchen where mid-day- meal is cooked in the school		X
	Playground		X
	Arrangements for securing the school building by boundary wall or fencing		✓
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	✓
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books		∞
Play material, games and sports equipment	Shall be provided to each class as required		∞

✓ – Facility present X – Facility not present ∞ - facility status not known

4.7.3 School Three

School inception and establishment

The owner, influenced by his education felt that 'quality education' was the key to the development of society. He claimed that his school was one of the oldest schools of Delhi, established since, 1959, with a mission to provide good quality education to the poor.

"I started the school with two important objectives, first, to provide good quality education and second to bring passionate people into education".

School owner from school three

RTE awareness and recognition

The school owner was not completely aware of the RTE Act's rules and regulations, but he was quick to state that he could not see that it offers any academic benefit. The school attempted to secure recognition from the government in 1980 when the Act was not in place. The owner candidly admitted that he never followed up with the department of education on the status of the recognition due to the lengthy process. The school received no notification from the education department for closure, and the owner reported that there were an estimated 3000-3400 schools in Delhi operating without recognition.

On teachers and teaching inputs

Teacher recruitment was an issue for small budget schools as it was challenging to recruit passionate and well-qualified teachers. The government has mandated that low-cost private schools recruit teachers with minimum qualifications, but the owner thought that many of the teacher training colleges in the country are not sufficiently upgraded. Therefore, teachers lack the necessary skills to teach their relevant subject and struggle to explain difficult concepts to children within a classroom setting. Teachers in the school did not receive any form of in-service training to enhance their pedagogical skills. Three teachers in the school had relevant teacher education qualifications as mandated by the government. Most teachers had been serving the school for more than 20 years.

RTE regulations

The schools struggled to fulfil the Act's requirements due to a lack of capital and the owner's unwillingness to change the outlook of the school regarding upgrading the physical infrastructure with regards to the RTE schedule.

The school was not affiliated to any particular board of education nor did it follow the RTE Act recommendation of providing free and compulsory education to children between 6-14 years as the fee paid by the students was the primary source of revenue to the school to cover its overheads.

“With such overheads in place, how do you expect me to provide free and compulsory education as mandated by the government? The government is not going to pay my bills”.

School owner from school three

Typical overheads for a month included rent for the premises of ₹ 45000 (approximately £495 – £500), water bills of ₹ 10,000 (around £110 – £115) and charges for electricity of ₹ 10,000 (approximately £110 – £115). With such overheads to pay and school fees being the only source of revenue, the school charged a nominal fee of ₹ 700 (approximately £7-£8) per month and did not provide any scholarship or financial incentives to children.

The school provided books and uniforms, charging them on an actual basis. The school struggled to keep up with several requirements of the Act as demonstrated in table 61.

PTAs, formed as a part of the RTE Act requirements, had not been active as working parents were not able to afford time for meetings. Parental feedback or one-to-one conversations related to students’ academic progress were conducted on the day that examination results were announced.

Table 61 – RTE’s schedule for School 3

Item	Norms & Standards	Put a (✓) wherever necessary	
No. of Teachers	Number of teachers/days/ hours		
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	✓
	Between 121 to 200	5	
Teaching-learning equipment	Provided to all the classrooms as required	X	
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store	X	
	Barrier-free access	X	
	Separate toilets for boys and girls.	X	
	Safe and adequate drinking water facility to all children’	✓	

Item	Norms & Standards	Put a (✓) wherever necessary	
	A kitchen where mid-day- meal is cooked in the school	X	
	Playground	X	
	Arrangements for securing the school building by boundary wall or fencing	✓	
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books	X	
Play material, games and sports equipment	Shall be provided to each class as required	✓	

School inspection and closures

No educational inspector had visited the school in recent times. According to the owner, the last visit was in the year 1980, and he candidly admitted that the school would be closed down if they received any notification from the government in the future. He believed that the government needs to take into consideration the fate of such low budget schools before issuing them with closure notices.

4.7.4 School Four

School inception and establishment

Located in the southern district of Delhi and established in the year 2002, the school was started by an ex-military official, who served in one of the 'premium private' ⁴⁷ schools of Delhi.

"I am a dedicated educationist and I have been running this school on a 'no loss no profit basis' and it's my aim in life to educate the poorest kids at the lowest cost"

School owner from school four

RTE awareness and recognition

The owner was quite aware of the RTE Act norms and regulations and had faced difficulties in obtaining recognition as the school was run on rented premises. The Act stipulates a minimum requirement of 200 m² of land to be owned by the person establishing a school and the owner was not capable of meeting this requirement. He explained that land rates in Delhi are quite exorbitant and many low-cost school owners, including himself, are unable to purchase the land due to the high prices. Therefore, most low-cost schools were using rented buildings. The school received a notification from the education department, requesting them to provide details on the health of the building in which they operated through a 'building health certificate'.

On teacher and teaching inputs

Teacher recruitment was a challenge due to the location of the school. The owner carried out a background check on teachers before recruiting them. Training of teachers was undertaken by the school head himself as he had considerable experience of working in a private school for a long time. Moreover, due to limited budgets and cash flow, the school was not capable of hiring external experts for training. Interestingly, the school hired a teacher for supporting children with special needs.

Concerning the RTE Act regulations, the school did not have a kitchen as there was no food served to children. There was no playground in the school as the school itself was on rented premises. There was limited space in the school, and therefore, the owner could not set up a library when it was established. However, other regulations including the number of teachers required per classroom, the working days and hours, provision of toilets and clean drinking water to students were met by the school (ref table 62).

⁴⁷ Premium private schools refers to those schools where the fee ranges from ₹30 - ₹1500 a month and is afforded by the upper middle class and affluent people in Indian society.

Table 62 - RTE regulations checklist and school affiliation

Item	Norms & Standards		Put a (✓) wherever necessary
No. of Teachers		Number of teachers/days/ hours	
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	✓
	Between 121 to 200	5	
Teaching-learning equipment	Provided to all the classrooms as required		✓
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store;		X
	Barrier-free access		X
	Separate toilets for boys and girls.		✓
	Safe and adequate drinking water facility to all children'		✓
	A kitchen where midday meal is cooked in the school		X
	Playground		X
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction hours)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books		X
Play material, games and sports equipment	Shall be provided to each class as required		✓

✓ – Facility present

X – Facility not present

∞ - facility status not known

The school was affiliated with the CBSE board ⁴⁸ curriculum, and the students numbered 300. The school charged a monthly fee of ₹ 500/- (approximately £5 – £6), so there was no provision of free education to children between 6-14 years of age. High-achieving students received scholarships and bursaries amounting to approximately £10-£20, and this incentive helped children from economically weaker backgrounds to pursue their education

School inspections and closures

The owner mentioned that regular inspection was undertaken by the educational officials. The owner found that the school inspections were more of a 'fault finding' mechanism rather than corrective action.

"I am aware of many schools, where inspectors carry out inspections on the pretext of inspection, however, the real motive is to extort bribes"

School owner from school four

He reported that officials who visited the school on the pretext of inspection - often expected bribes in return.

4.7.5 School Five

School inception, RTE awareness and issues

Established, in 2006, the school provides education to children from around the neighbourhood where it is situated. The school administrator had limited knowledge of the rules and regulations of the RTE Act. The school owner was aware of some norms and rules of the Act but was quite sceptical that this awareness could improve the test scores of children enrolled in primary classes.

The school had not applied for any recognition as the owner realised that they did not have the minimum land requirement prescribed by the government.

According to the owner, in a meeting convened by the association of low budget schools, several issues related to the RTE Act were discussed, and a proposal to be submitted to the government was drawn.

⁴⁸ Indian education system mainly comprises of four educational boards. The state board of secondary education, central board of secondary education (CBSE), Indian School Certificate Examination and International Baccalaureate. Schools are free to choose their affiliation to any board, provided they meet the criteria laid out by the boards.

The minimum land requirement stipulated by the government for a primary school is 200m² but there are many unrecognised schools unable to meet this requirement. The school owner believed that if the land requirement rules for schools were reduced to 150m², many budget schools would feel encouraged to apply for recognition.

Another issue highlighted by the school owner was the issuance of different certificates for school recognition from different locations. These comprised of 'structural stability' and 'fire safety' and 'health and safety'. School owners were required to visit the various departments for getting the necessary approvals. A comprehensive 'single window' system where all certificates are granted by one entity could facilitate easy and fast approvals for schools which meet all the requirements.

Teacher inputs

Teachers, were trained by a private NGO based in Delhi. The school was also assisted by teachers from government schools who visited the school periodically to train the teachers. The school followed the norms of the RTE Act in terms of the number of instructional hours and days to be spent by teachers in the classroom in an academic year.

“Teacher trainings help in skilling our workforce and this certainly has impacts on how well children learn in their classrooms”.

School owner from school five

The school charged a fee of ₹ 2000 (£20 - £25) and did not provide free and compulsory education to 6-14-year-olds as stated in the Act. However, the school did provide scholarships to deserving children from economically weaker backgrounds of society.

The school followed the majority of rules listed in the Act which included maintaining PTR ratios, providing separate toilets, clean drinking water, securing the building with a boundary wall or fence and providing the required TLM to students. However, the school did not have a library, playground or kitchen due to space constraints (ref table 63).

The owner reported that there were no visits by any educational inspector to the school in the recent past. Land requirements stipulated by the government are a major challenge for unaided private schools to gain recognition, and more closures could take place if the land norms are not revised for low-cost private schools.

Table 63 - RTE Act regulations checklist

Item	Norms & Standards	Put a (✓) wherever necessary	
No. of Teachers	Number of teachers/days/ hours		
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	✓
Teaching-learning equipment	Provided to all the classrooms as required	✓	
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store	X	
	Barrier-free access	X	
	Separate toilets for boys and girls.	✓	
	Safe and adequate drinking water facility to all children'	✓	
	A kitchen where mid-day meal is cooked in the school	X	
	Playground	X	
Arrangements for securing the school building by boundary wall or fencing	✓		
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction hours)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books	X	
Play material, games and sports equipment	Shall be provided to each class as required	✓	

✓ – Facility present

X – Facility not present

∞ - facility status not known

4.7.6 School Six

School inception and issues with RTE recognition

The school was run by a newly-appointed principal who had recently taken charge. According to the principal, there was a government school in the nearby vicinity which was likely to follow most RTE Act regulations. However, parents in the area are mostly encouraged to enrol their children in private school. The principal was getting to know more about the RTE Act. She was aware that the school owners had applied for recognition in the past and had been trying to gain recognition for 5-6 years. According to the principal, a significant hurdle was the stipulated land requirement. However, finding land and relocating the school to an entirely new location would cause hassle for poor parents who reside in the catchment area.

“The parents in this area are quite poor and they will not be able to afford the transportation cost if the school moves out from here and establishes itself at a new place”

School principal from school six

Views on teacher inputs

Teacher salaries were an issue, and the school principal admitted that they could not afford the high wages paid in government schools. Most teachers in the school had a graduation degree (B.Ed.), a government requirement for hiring teachers.

“We usually have demonstration classes from new hires and we observe them for three to four days before confirming them on the rolls”

School principal from school six

Most of the time, the senior teachers trained junior teachers by passing on their experience and wisdom. Recruitment of teachers was undertaken through in-class demonstrations and depending on performance, their position was confirmed on the school payroll.

The fee was charged at ₹ 1000 a month (approx. £9 – £10) and the school provided textbooks and uniforms at an actual cost. Nearly 10% of the school’s student population was classified as students from economically weaker backgrounds. A limited number of incentives and scholarships was provided to overcome their financial hardships. During the interview, the principal explained that government schools, supposed to provide free education, demanded a bribe from parents to get their children enrolled in the school.

Under the RTE Act regulations, private schools are supposed to reserve 25% seats for children from poorer backgrounds and government schools are required to provide free education. The school complied with most aspects of the Act, but it lacked a playground,

kitchen for the midday meal and barrier-free access due to a lack of space. The principal was not convinced that the RTE Act requirements would lead to better education

Table 64 – RTE regulations and checklist

Item	Norms & Standards		Put a (✓) wherever necessary
No. of Teachers		Number of teachers/days/ hours	
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	✓
Teaching-learning equipment	Provided to all the classrooms as required		✓
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store		X
	Barrier-free access		X
	Separate toilets for boys and girls.		✓
	Safe and adequate drinking water facility to all children'		✓
	A kitchen where mid-day meal is cooked in the school		X
	Playground		X
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction hours)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books		✓
Play material games and sports equipment	Shall be provided to each class as required		✓

✓ – Facility present X – Facility not present ∞ - facility status not known

School inspections and closure implications

Inspectors from THE education department undertook a bi-monthly visit. The principal of the school was not aware of the response mechanism to be adopted in case of a closure notice. Commenting on the issue, the principal felt that forced closures would lead to unemployment of teachers while families could force children to join the labour work. She mentioned that educational entrepreneurs who invested their 'blood and sweat' in building such schools would be demotivated to start educational ventures as they would lose faith in the system. According to her, the government should consider the hurdles faced by unrecognised schools and assist by relaxing the rules to some extent.

"The focus needs to be on improving learning outcomes, rather than asking schools to comply with norms, which may or may not enhance learning. Inspectors checking school requirements do it as ritual rather than a feedback process".

School principal from school six

4.7.7 School Seven

School characteristics and recognition issues

The school in the southern district of Delhi aimed to provide English education to families facing financial difficulties. It failed to obtain recognition due to limited land availability. A nominal fee of ₹ 350 – 500 (£3 – £6) was charged which included the provision of uniforms and books. The school administration recognised high-achieving students through medals, badges and honours.

However, no financial incentive or scholarship was provided as the school could not afford them with its limited financial resources. However, a discount was provided to children whose siblings were enrolled in the same school.

"We see parents shifting their children from government schools to the nearby private schools. Mothers today are quite educated and they can make informed choices for their children".

School owner from school seven

Teacher inputs

Teachers were recruited locally or by word of mouth. There was no formal training, and the school owner was responsible for the orientation of teachers. Regular feedbacks and discussions were held with teachers to improve teaching strategies. The school owner was a teacher herself and believed in sharing experiences and orienting the teachers as and when required. According to the owner, locally hired teachers were loyal and devoted themselves to teach children, more so than teachers in government schools.

RTE regulations

With regards to RTE Act schedule compliance, the school lacked barrier-free access, and there was no library or playground in the school premises. Unlike the other schools, the school had a feeding programme. However, the food was cooked outside, so there was no separate kitchen for cooking midday meals. Other Act regulations like maintaining adequate PTR, library provision, TLM provision, separate toilets for boys and girls and boundary wall around the school were found to be in order. The minimum number of working days, instructional hours in an academic year and the minimum number of working hours per week for the teacher were also found to be in order (ref table 65).

Table 65 – RTE Act regulations and checklist for the school

Item	Norms & Standards	Put a (✓) wherever necessary	
No. of Teachers	Number of teachers/days/ hours		
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	✓
Teaching-learning equipment	Provided to all the classrooms as required	✓	
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store	✓	
	Barrier-free access	X	
	Separate toilets for boys and girls.	✓	
	Safe and adequate drinking water facility to all children'	✓	
	A kitchen where mid-day- meal is cooked in the school	X	
	Playground	X	
	Arrangements for securing the school building by boundary wall or fencing	✓	
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction	1000	

Item	Norms & Standards		Put a (✓) wherever necessary
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	✓
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books		✓
Play material, games and sports equipment	Shall be provided to each class as required		✓

✓ – Facility present X – Facility not present ∞ – facility status not known

School closures and suggestions

No notice of closure was received by the school from the department of education, nor was the school owner aware of any unrecognised school that was closed in the nearby vicinity due to lack of recognition. One major hurdle that the school faced was the limited availability of land and motivation from the regulatory authorities to run and operate the school. At the end of the interview, she mentioned that education departments should facilitate the easy purchase or lease of land which could assist in school setups, thus relaxing the regulations to some extent to support easy recognition.

4.7.8 School Eight

School inception and recognition struggles

The school owner provided private tuitions to children from impoverished backgrounds which led to the inception of the school. Providing a historical account, the school owner mentioned that his financial survival in Delhi in the early days was possible only due to private tuitions that he offered to students. This additional income allowed him to establish a school and provide for the broader population.

Commenting on the setup and recognition of small budget schools, the owner felt that this was quite complicated and arduous. Securing a recognition certificate requires a different set of permissions acquired through various government departments. These permits include a building safety certificate, fire safety certificate and a minimum land requirement of 200m² for primary school and 800m² for a secondary school. Procuring each certificate required extensive time, energy and financial resources. Officials issuing the permissions expected bribes from school owners and entrepreneurs who applied for the recognition process.

Giving an example of his struggle, the school owner admitted that he had resorted to extra-legal activity to secure recognition. Although apologetic about his actions, he defended them as a survival mechanism for an unjust system.

“I did not want to compromise with my principles of honesty, however, I realized that I cannot sustain my school and in order to keep my school up and running and for obtaining the relevant recognitions, I had to resort to paying bribes”.

School owner from school eight

Furthermore, he reported that once a school acquires the necessary certificates, the authorities provide the institution with a provisional registration. Inspection is carried out once every two years, and the school is required to renew the recognition.

On teachers and teaching inputs

Senior, experienced teachers mentored and trained recruits and junior teachers. Feedback was gathered from students taught by newly recruited teachers. Teachers used a combination of pedagogical approaches like project-based learning and live demonstrations. Scientific processes like the digestive system and food chains were taught through visual aids such as dummy models and charts.

The school also invested in low-cost maths toolkits for the tangible realisation of abstract mathematical concepts. According to the owner, training by senior teachers of the school worked well for the recruits; it was not necessary to outsource this to external agencies.

The school received a closure notice, so they applied for recognition. The first application in 2007 was rejected, but in 2009, the school authorities fulfilled all the RTE Act regulations and applied successfully for recognition. However, the school is still unable to receive the final recognition due to the long list of pending applications with the education department (ref table 66).

The school charged fees between ₹ 600 – ₹1200 (approximately £7 – £14) per month and provided textbooks, uniforms and bags which were charged on an actual basis. Apart from that, it also followed the RTE Act policy of offering 25% of places to children from low-income backgrounds.

Table 66 - RTE regulations and school checklist

Item	Norms & Standards	Put a (✓) wherever necessary	
No. of Teachers	Number of teachers/days/ hours		
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	✓
Teaching-learning equipment	Provided to all the classrooms as required	✓	
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store		✓
	Barrier-free access		✓
	Separate toilets for boys and girls.		✓
	Safe and adequate drinking water facility to all children'		✓
	A kitchen where mid-day- meal is cooked in the school		X
	Playground		✓
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction hours)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	✓
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books		✓
Play material, games and sports equipment	Shall be provided to each class as required		✓

✓ – Facility present X – Facility not present ∞ - facility status not known

School closures and suggestions

Commenting on the school closure issue, the owner suggests that small, low-cost private schools should seek NISA's (National Independent School Alliance) advice in case of notifications from the government. NISA, an independent association formed by the owners of the budget schools, has been instrumental in voicing the concerns of low-cost private schools. NISA confronts the regulatory authorities on behalf of budget private schools and has assisted several schools in gaining or renewing recognition in case of closure threats.

4.7.9 School Nine

School inception, recognition issues and RTE awareness

Established, in 1976 the school failed to secure recognition due to the stringent land requirements and the school owner admitted that he did not have sufficient funds to invest in purchasing new land. An area of 190-200m² could cost 10-12 million INR which means that it is near impossible for small schools to meet this requirement.

The school owner was aware of the norms and regulations of the RTE Act but was quite concerned that a majority of government schools in the periphery did not adhere or follow the norms laid out by the education department.

"I doubt if any of the government schools in the area followed the rules as prescribed by the government. I am sure many of them would not be satisfying the requirements of the RTE schedule."

School owner from school nine

On teachers and teaching inputs

The school employed 12 teachers, and all of them were trained and qualified with a B.Ed. Degree as required by the RTE Act. One experienced teacher mostly trained the teachers and no external training was arranged. The owner reported that experienced teachers were better than the external agencies as they are aware of the strengths and gaps of the students enrolled in the schools. The training methods used by the experienced teachers were suited to the requirements of the students which led to improved test scores.

Regarding the RTE Act schedule regulations, the school followed most of them, but three components were lacking: barrier-free access, provision of midday meals and playground. The owner was quite sceptical of the Act's requirements and believed that except for teaching-learning materials, library and play equipment, none of the standards would influence learning outcomes.

There was no free education provided to the students enrolled in the school as per the RTE Act. A nominal fee of ₹ 600 (£6 – £7) was charged every month (ref table 67).

Table 67 – RTE regulations and school checklist

Item	Norms & Standards	Put a (✓) wherever necessary	
No. of Teachers	Number of teachers/days/ hours		
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	✓
Teaching-learning equipment	Provided to all the classrooms as required	✓	
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store		✓
	Barrier-free access		X
	Separate toilets for boys and girls.		✓
	Safe and adequate drinking water facility to all children'		✓
	A kitchen where mid-day- meal is cooked in the school		X
	Playground		X
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction hours)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	✓
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books		✓
Play material, games and sports equipment	Shall be provided to each class as required		✓

✓ – Facility present X – Facility not present ∞ - facility status not known

Limited scholarships were provided to children from extremely impoverished families and to children of war widows. The school followed a reservation policy for admitting students from scheduled caste (SC) and scheduled tribe (ST) backgrounds.

Views on school inspection closures and suggestions

There were no visits by officials from the education department as a monitoring exercise to confirm adherence to the Act specifications. However, the owner specified that usually when officials visit schools, they expect some financial gain in return for a favour.

According to the owner, the Act's regulations are quite stringent, and these need to be relaxed if the government wants budget private schools to flourish. This could come about through:

- Land relaxation – land rates in Delhi are astronomical, and in such a scenario it is almost next to impossible for small schools to own land, so regulatory authorities need to keep the context in mind before enforcing land-related norms on budget private schools.
- Pay scales – Most budget schools earn their income from the fees charged to students. Thus revenue sources for the schools are limited and expecting them to pay government-prescribed scales as per the seventh pay commission while maintaining their overheads is utterly absurd and unwise.

The owner felt that diluting the RTE norms to a considerable extent is the way forward. Concerning school closures, the owner felt that teachers' employment would undoubtedly be of great worry and there could be a significant risk to the student population adding to the proportion of children 'out of school'.

4.7.10 School Ten

School inception and RTE awareness

The owner started the low budget school in 1998 with a mission to provide quality education to the poor as he perceived a gap in the quality of education provided by government schools in the nearby vicinity.

According to the owner, the regulations introduced by the department of education seem to be a 'witch hunt' against the low budget schools and have been introduced as a measure to legalise corruption in the system.

Government authorities expect budget private schools to follow all the norms which are impossible so school owners would expect some leniency from

“The introduction of the RTE has not been of much use, as it does not help in improving any instructional leadership skills, or in any way contribute towards raising his capabilities to teach. They are more like an administrative measure rather than an academic measure, which in many ways are not helpful in learning outcomes”

School owner from school ten

the authorities. In return, the authorities would favour those willing to resort to extra-legal activities such as providing bribe payments.

School – teacher inputs and pedagogical strategies and PTA

During a tour of the school, it was observed that the school complied with the RTE Act schedule. Teachers used ‘learning by doing’ methods in classrooms to teach difficult concepts in maths. Dummy models related to various scientific processes and phenomena were observed during the visit.

The school head explained that the holistic development of students was central to the school’s activities. Apart from the regular education, other activities promoting the mental and physical wellbeing of students included yoga and self-defence classes, dance academy and motivating children for national and state-level sports competitions.

School teachers regularly attended training, and senior teachers mentored the juniors and new arrivals. The school owner compared teachers from the budget private school to those employed by government schools. According to the school owner, teachers in government schools lack the will to teach, seldom attend and make no use of their expensive, government-funded training. On the other hand, low-cost schools hire passionate teachers from the local area, train them with low budgets and make them capable of delivering high-quality classroom transaction. Reinforcing his argument, he mentioned that alumni from the school had been absorbed by major industrial and information technology companies across India.

PTA existed in the school and parents and teachers used the meetings to discuss issues relating to student progress in cases of new interventions undertaken by the school. However, it was challenging to convene meetings regularly as several parents found it difficult to attend due to professional commitments. The majority of parents in the PTA were mothers as working fathers were mostly unable to participate in meetings.

The school followed most RTE Act regulations except for barrier-free access and a kitchen for midday meals (ref table 68). According to the principal, there were no children with special needs enrolled in the school and most children brought their food from home, so no food was served in the school. The school charged a fee of ₹ 770 (approximately £7 – £8) and provided a waiver for high-achieving children from low-income backgrounds.

Table 68 – RTE Act regulations and school checklist

Item	Norms & Standards	Put a (✓) wherever necessary	
No. of Teachers	Number of teachers/days /hours		
For classes 1 to 5	Upto 60 students	2	
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	✓
Teaching-learning equipment	Provided to all the classrooms as required	✓	
Building	All-weather building consisting of :		
	At least one classroom for every teacher and a multipurpose office-store	✓	
	Barrier-free access	X	
	Separate toilets for boys and girls.	✓	
	Safe and adequate drinking water facility to all children'	✓	
	A kitchen where mid-day- meal is cooked in the school	X	
	Playground	✓	
	Arrangements for securing the school building by boundary wall or fencing	✓	
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction)	1000	
Minimum number of working hours per week for the teacher (Including preparatory time)	Forty-five teaching including preparation hours	45	✓
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-books	✓	
Play material, games and sports equipment	Shall be provided to each class as required	✓	

✓ – Facility present X – Facility not present ∞ - facility status not known

Views on schools inspections and closures

Official visits from the department of education were not undertaken, although the owner explained that they were prepared for - any official visit as they complied with most RTE Act regulatory norms.

According to the owner school closures could be the worst measure if the government intends to regulate budget private schools. It could be the break the spirit and moral of the budget private schools which have been serving the impoverished communities across the various parts of the nation.

“Government regulations to budget private schools can ‘bolster or break’ the institutions. It’s up to the officials to think, whether they want the support of the edupreneurs, or continue providing inferior quality education to students.”

School owner from school ten

4.8 Combining insights from quantitative and qualitative approaches

The themes generated from the monographs were, combined with the ideas generated from the analytical models to build a clear picture of the scenario emerging due to the Act.

Views on infrastructure

Quantitative models revealed that of the many infrastructure indicators listed in the RTE Act, most of them had either no impact or a negative impact on test scores. Discussions with the school owners aligned with the quantitative findings as many of them found that the RTE Act regulations relating to infrastructure listed in the schedule did not contribute to the learning outcomes of the children.

School heads believed that the infrastructure norms of the RTE were more likely to be an administrative burden and possibly had no positive academic effects. Infrastructure improvements require extensive capital investments and conversations with school heads revealed that investing an extra piece of land or resources is not likely to improve learning outcomes. Analysis of secondary studies (Abogan 2013, Muralidharan 2012, Bhat 2017) in the literature review are congruent with the qualitative insights found in the research.

Teachers, teaching inputs and Parent-teacher associations

The regression model revealed that teachers who underwent training were capable of influencing test scores positively. The insight aligned perfectly with the narrative accounts

shared by the school heads who mostly used senior teachers or the concept of instructional leadership⁴⁹ in their skills to improve teaching pedagogies.

Quantitative analysis indicated that teachers who taught multiple subjects were likely to impact test scores positively. Interviews with principals revealed that most teachers in the private schools were hired locally from the community, had some form of degree and taught more than one subject. Those teachers were passionate and dedicated more time towards the students to assist them academically.

PTAs showed negative correlations with student test outcome in the quantitative design. However, many school principals had mixed responses to PTAs. On the positive side, PTAs serve as a functional link between parents and teachers to communicate on academic and non-academic issues. However, not all PTAs are successful – several school heads reported that PTAs started strongly but were then dissolved as parents could not attend the meetings due to work commitments.

RTE regulations

Analysis of the observation checklists of the participating schools indicates that most of the schools complied with a majority of regulations listed in the RTE. These include -:

- adequate pupil-teacher ratio
- providing separate toilets for boys and girls
- providing safe drinking water
- adhering to a minimum number of days and hours for teachers
- providing a library and adequate teaching learning material

Provisions of the RTE which were lacking in schools comprised of barrier-free access, provision of a kitchen for the mid-day meals and playground. As there are few or no disabled children in these schools, barrier-free access was not a requirement. However, principals do agree that adding a barrier-free access can allow more disabled children to join mainstream schools. School heads also reported that parents were aware of special schools available for disabled children and therefore many of them preferred those over the regular schools.

⁴⁹ Cotton (2003) defines instructional leadership as the capability of school heads and principals to be engaged in curricular and instructional issues, capable of influencing student outcomes. Similarly King (2002) and Elmore (2000) advocate that instructional leadership comes into play when the role of principal is not confined only to academia.

Similarly, schools which provided meals to children outsourced meal requirements to local NGOs specialising in catering food for educational institutions. School heads believed it was a cumbersome task to manage the kitchen and also monitor and regulate the procurement of raw materials and other ingredients required for food preparations. Finally, land availability in Delhi was scarce due to the burgeoning population, and as a result, procuring land in Delhi was quite expensive so many schools could not afford a playground.

Conclusion

The chapter aimed to understand the impact of different indicators on diagnostic test scores and Raven's IQ test scores. Visual graphical representations indicated that both the diagnostic and the IQ test scores were found to be normally distributed. Data analysis through different prediction models assisted in identifying the actors likely to have an impact on the diagnostic and IQ test scores.

A multiple regression model indicated that specific factors mandated by the RTE such as the provision of mid-day meals, the presence of a library are likely to have a significant positive impact on test scores. However other factors such as separate toilets, barrier-free access in schools, charts and maps as mandated by the RTE may not be useful in improving test scores or learning levels.

A separate model for teachers indicated that those who had recently attended training had experience in the range of 5-10 years or who taught multiple subjects were capable of influencing test scores positively. On the other hand, teacher contracts, salary range of teachers and parent-teacher meetings may not be essential measures to raise student outcomes. The binomial regression model regressed on the RTE Act core indicators reported that schools charging fees and arranging RTE Act orientations are more likely to improve learning achievements. However, the presence of a school management committee (SMC) or provision of disability quota can reduce the probability of raising test scores for students.

Qualitative insights in discussion with school heads and principals revealed that the RTE Act regulations were more likely to be an administrative burden, rather than academic support. Most schools were likely to follow the RTE regulations, except the ones which may not be necessary or that were likely to be capital intensive.

School visits by inspectors were infrequent, and most visits were undertaken with the intention of monetary compensation from the owners in the form of bribe.

School owners used multiple strategies to prevent school closure. These included:

- Applying for recognition by fulfilling the requirements of the RTE Act schedule and by obtaining the necessary certificates from the local council. The process may be longer, and schools may not necessarily obtain recognition the first time.
- Resorting to extra-legal activities to hasten up the process for securing recognition. The process is likely to yield quick results and schools may even get recognition at the first attempt.
- Schools with temporary recognition and the ones who had their recognitions expired made efforts to renew their recognition with the department of education.

The next chapter discusses the impact of each finding in detail and outlines the alignment of the results with the existing literature, the effect of the research, future implications and the limitations of the current study.

Chapter Five: Discussion

5.1 Introduction

This chapter presents the overall findings and connects them with the existing literature undertaken in developing parts of the globe. Using, different regression models in the previous chapter, this research complements a large body of literature (Abogan, 2013; Glewwe et al., 2012; Hanushek, 2003; Mukerji & Walton, 2012), concluding that insisting on an input-based policy may not lead to improving student outcomes. It encompasses insights, useful for designing critical acts and reforms, which could have a balanced outlook towards inputs and outcomes, rather than a skewed approach. Focusing on the different input-based norms of the RTE Act about infrastructure, teacher demographics and organisation factors, this research sets out the inputs that are capable of improving or worsening student test scores. The chapter also discusses the implications of the findings for threatened low-cost private schools and measures that could be undertaken to ensure the co-existence of such schools with state schools. Limitations of the current research and directions for future research are also discussed.

5.2 Impact of physical facilities on academic learning outcomes

The first part of the research attempted to understand the impact of physical indicators as listed in the RTE Act and its impact on different test outcomes. To, measure the student outcomes, two different tests were used – a diagnostic test and Raven’s IQ test. The diagnostic test included subject-based questions from language, maths and environmental sciences and Raven’s IQ test measured students’ intellectual capabilities. A school questionnaire captured the different infrastructural and physical facilities in the school. Separate regression models were designed to assess the impact of each input on student outcomes. The following research question attempted to determine the relationship between various infrastructural facilities in private schools and their relation to student outcomes.

Is there any relationship between student achievement and the RTE Act’s emphasis on physical indicators?

A combination of different RTE Act factors was considered to determine their impact on diagnostic test scores. Some factors such as concrete building, provision of drinking water and electricity were excluded from the regression model as all the schools had such essential amenities. However, specific factors that differed within the private schools were included such as midday meals in the school, barrier-free access, separate toilets for boys and girls and whether or not the school had a library.

The model also considered IQ test scores to explain the variance of the model concerning the relative contribution of each of the predictors.

5.2.1 IQ tests indicate a positive impact on academic test scores

Students, who were, administered diagnostic tests were, also encouraged to take Raven's IQ test, so that their scores could be matched. Pearson's product moment correlation indicated a significant positive correlation. A strong relationship was also observed between maths test scores and IQ test scores. This finding is consistent with studies undertaken by Finn et al. (2014) who find substantial correlations between cognitive skills and achievement in tests, more specifically in maths. Other studies which align with similar correlations include (Alloway & Passolunghi, 2011; Gathercole et al., 2004 and St Clair-Thompson & Gathercole, 2006).

5.2.2 School feeding is likely to improve academic test scores

Schools feeding programmes were likely to have a positive effect on test scores. However, qualitative interviews revealed that providing meals to children involves enormous costs and logistics. Moreover, many children enrolled in the schools bring their lunch, so schools did not offer a separate feeding programme. The findings of the current study were significant at 5% level, and this is an alignment with Chakraborty and Jayaraman (2016) who find a positive relationship between learning and midday meals in schools.

Furthermore, their evidence also indicates that providing school meals accounts for raising reading test scores by 18% and maths test scores by 9%. In a similar vein, other small-scale studies such as Singh (2008) note the positive influence of midday meals on vocabulary tests. Afridi et al. (2014) observe significant improvement in attention span and ability to solve complicated puzzles due to midday meals.

The literature supports the view that school feeding programmes are capable of positively influencing academic test scores and many of them outline two major reasons. First, a free meal acts as an incentive so boosts enrolment and attendance in schools, both of which provide an opportunity for children to learn. Second, provision of food addresses hunger and raises the nutritional intake for children which in turn leads to better concentration and ultimately better test scores. Low-cost private schools could consider cooperating with local NGOs or large-scale food providers such as 'Akshaya Patra' which provide nutritious food and manage the logistics.

Lack of a counterfactual can be a major limitation of the finding as it would have been interesting to view the effects of feeding programmes in government schools which are likely to have one due to the RTE Act's mandate.

Secondly, the sample size is too small to conclusively determine the actual effects of a school feeding programme on student outcomes.

5.2.3 Libraries in schools can positively influence academic test scores

Estimates of the regression model indicate that schools which invested in a library are likely to have better test gains. Previous work by Willms and Somers (2001), Lonsdale (2003) and Murillo and Roman (2011) find that presence of a library and the size and quality of book collections can positively influence academic outcomes. Qualitative interviews with principals and school owners revealed that schools with libraries were encouraged to invest in books capable of raising learning outcomes.

During conversations with school owners, it was mentioned that libraries in schools fostered a collaborative relationship between teachers and students. A similar insight is proposed by Lonsdale (2003) who mentions collaboration as a factor likely to have a positive impact on test outcomes.

Investment in a library and resources requires capital investments so schools which do not have libraries may struggle if they are required to acquire one. The Delhi School Education Rules (DSEAR), 1973 stipulate a minimum of 10 books per student in a school library. However, the average requirement of books for the participating schools was 4500. Assuming that each of the books is available at a discounted rate of ₹80-₹100 INR (approximately £8-£10), the total cost of investment in library books can escalate to ₹3,60,000-₹4,50,000 INR (approximately £4000- £5000). Such an investment can be quite a significant amount for many of the low-cost schools as the majority of these schools' revenue is generated through school fees.

One effective strategy to deal with such a scenario would be to pool resources. For instance, a low-cost private school which already has a library could work with other schools in the area which lack library facilities. These schools could then share the costs which include procurement of new volumes, maintenance of the libraries and sharing the utility bills in exchange for access. Such a measure would benefit all parties. The school which gains access to a library can expect a positive influence on the academic outcome while the school which provides access is likely to benefit due to the influx of students and teachers from other schools as well as lower costs.

Thus budget private schools should be given an option to share libraries or even to share libraries with government schools which are likely to have resources that possibly may be underused.

5.2.4 Influence of other RTE Act infrastructure factors

Influence of other factors such as the provision of gender-specific toilets, availability of audio and video resources in the school and the provision of barrier-free access were also studied to determine their impact on test scores. The magnitudes of the coefficients were found to be quite small and not statistically significant.

Provision of gender-specific toilets had a negative impact on students. These findings are consistent with Adukia (2016), finding no statistically significant relationship between sanitation infrastructure and student achievement. In another study carried out in Andhra Pradesh using the regression approach and large-scale data, Wadhwa (2016) finds no relationship between usable toilets in schools and maths and Telugu test scores. School visits on the field confirmed that across several schools, the quality of toilets provided was not up to standard. Several places lacked hygiene and suffered from issues like running water and a lack of privacy

Although this research finds no significant relationship between the provision of toilets and test scores, it should be borne in mind that there could be several other reasons for constituting gender specific toilets in schools. Firstly, the lack of proper toilet facilities for adolescent girls could discourage them from attending schools. Studies by Levy and Houston (2017) show that lack of safe, private toilets is likely to cause absenteeism 20% of the school year. Hence, constituting toilets specifically for adolescent girls can improve attendance, lower dropout rates and improve educational efficiency.

Secondly, provision of toilets for girls can protect them from violence and assault. The peril of a sexual assault and violence increases, especially in developing countries when girls defecate in open or are coerced to use shared toilets. A survey in South Africa showed that around a third of the girls were raped when schools had no toilets, when they were forced to share toilets or when the toilets were located in desolated places. Violent acts such as these are a significant impediment to school attendance, significantly affecting the self-esteem of girls who have undergone such trauma and languishes the desire to learn.

Provision of barrier-free access in schools was found to be negatively correlated with test scores. Very few studies have focused on this parameter so a decline in academic achievement cannot be precisely attributed to the factor. However, one large-scale study carried out in the four districts of Gujarat across the primary grades reports the average achievement test scores before and after the introduction of barrier-free access in school (Patel, 2016). This study finds an overall decrease in academic achievement across all grades following the introduction of barrier-free access in the schools.

5.3 Impact of RTE teacher indicator on the academic outcomes

The second part of the study focused on understanding the various RTE Act teacher indicators. A detailed teacher questionnaire captured the variables relating to teachers in low-cost private schools. This comprised information about job status, experience levels, educational qualifications, pay grades and subjects taught. Using OLS (Ordinary Least Square) estimates, and the following research question, the research attempted to study the impact of the different teacher covariates, on student achievement.

Do the RTE Act teacher indicators have any impact on diagnostic student achievement?

Different RTE Act indicators were combined to understand their impact on diagnostic test scores. These indicators included teacher training, experience, teaching multiple subjects, job status, salary range, educational qualification and parent-teacher meetings in schools.

5.3.1 Teacher training and impact on academic performance

The model indicated that teachers who attended the training in the recent past and in a time frame between 3-5 years were likely to improve academic test scores, compared to those who had never participated in any training programme. These findings are similar to Evans and Popova (2015), He, Linden & MacLeod (2008), Nannyonjo (2007) and Abogan (2013) who all find teacher training to be a strong indicator of student achievement.

Providing teacher training also proved to be useful for improving the Raven's progressive matrices. Teachers who recently received training were capable of positively impacting the IQ performance, and the findings were significant at a 95% confidence level.

Further conversations with school owners revealed that in most schools, teacher training was undertaken by the most experienced teacher or by the school heads themselves. Some of the schools summoned experts from premium private schools, approached NGOs or religious or charitable organisations capable of providing training at low cost. Most school heads agreed that training teachers were not a major overhead to the costs. However, most school heads collectively agreed that teachers learned better through on-the-job training compared to the training received during the academic tenure.

Although teacher training impacts positively on student test scores, it is not entirely clear what kind of training programmes were effective and efficient. Combining the primary research as well as the evidence available, it seems that teacher training translates into improved learning outcomes and better test scores.

5.3.2 Teachers teaching multiple subjects

Teachers across private schools were asked if they taught a single subject, double subjects or multiple subjects in schools. The model predicted that teachers who taught multiple subjects across different grades influenced test scores positively. This finding aligns with Harbison and Hanushek (1992) and Evans and Popova (2015) who find that teachers' subject competence and knowledge raises student achievement. Lockheed and Verspoor (1991) and Govinda and Varghese (1993) find that in the context of developing countries, teachers' subject knowledge is likely to have a significant positive effect on student achievement.

Another logical explanation could be that those who teach multiple subjects gain mastery over the subject content and are likely to tailor lessons to individual students, thereby improving academic performance.

5.3.3 Teachers' educational qualifications

Educational qualifications of teachers are likely to yield positive test outcomes. These findings are consistent with Zuzovsky (2003) who analysed the TIMSS 2003 data to study the relationship between teacher educational qualification and student achievement. In the context of the Indian sub-continent, Govinda and Varghese (1993) report that students score highest when taught by teachers with a postgraduate or Master's degree qualification. Willms and Somers (2001), in research conducted across Latin American countries, find that students tend to score 5 points higher when taught by teachers who completed four years of post-secondary education, compared to those taught by teachers who completed two years of post-secondary education.

5.3.4 Job status Teacher contracts

Teachers were divided into two categories – those with a permanent contract and those with temporary contracts. The model indicates that teachers with temporary contracts are likely to influence student outcomes negatively. These findings are similar to Vegas and De Laat (2003) who find that teachers with a permanent contract tend to produce better student outcomes compared to contract teachers. However, other studies by Goyal and Pandey (2011), Banerjee (2007) and Kingdon et al. (2013) find that teachers with temporary contracts tend to perform better as they exert more effort compared to permanent teachers and tend to produce better academic outcomes. It is difficult to determine the exact causes precisely. However, one likely reason could be that contract teacher may be dissatisfied with their status and may tend to lessen rather than increase their efforts in classrooms. This lack of rigour and authentic engagement is likely to affect scores negatively.

5.3.5 Teacher salaries

Teacher salaries reported an adverse effect on test achievements. The salaries were classified into two ranges – lower and upper. Several studies concur with the current research and find either negative or no correlation between teachers' earnings and students' learning. Commenting on the relationship between the two, Muralidharan (2013) concludes: "the correlations typically point towards a negative relationship between teacher salaries and gains in student test scores" (K. Muralidharan 2013, 10). Kingdon and Teal (2010) report that student achievement is strongly reduced when teachers receive better or higher pay. Harbison and Hanushek (1992) evaluate teacher salaries for three years persistently and find a negligible impact on student achievement. As stated in the literature review earlier, teacher salaries are highly unlikely to influence student test outcomes significantly.

5.3.6 Teachers' experience

Teacher experience as an input indicator was regressed with academic test scores, and the model predicted a positive coefficient for teachers with moderate and high experience. A moderately experienced teacher was classified as someone with an experience range of 3-9 years and teachers with more than nine years' experience were classified as highly experienced teachers.

The findings are consistent with Hanushek (2015) who finds in his meta-analysis that nearly 1/3rd of the studies (29%) indicate a positive correlation between teacher experience and student achievement. While determining the association between student achievement and teacher experience, Nannyonjo (2007) finds that test scores in mathematics and English plateau after five years and start declining after ten years. Similiary, Leclercq (2005) reports a positive but depleting association between experience and student outcomes.

Furthermore, Govinda and Varghese (1993) indicate a very similar pattern of findings to the ones above. They conclude that teachers above 10-15 years of experience are effective. However, they suggest that long-term experience needs to be supplemented by teacher training to ensure prolonged efficiency.

5.3.7 PTA meetings

One of the requirements of the RTE Act is the formation of an association known as a parent-teacher association (PTA). The underlying idea behind the PTA is to have regular interactions between parents and teachers so that appropriate measures can be taken to improve students' performance.

The model showed that constituting a PTA is likely to yield adverse student outcomes. Qualitative interviews with school heads gave some insights, as to why PTA's formed in the schools may not be a great idea to boost student achievement.

Firstly, in cases, where parents were found to be working, they avoided PTA meetings as they were likely to lose wages if they attended the meeting and hence, the loss of daily wages discouraged them from attending the meetings in the school.

Secondly, illiterate parents, or those having minimal education, thought that it's the school's job to check the academic progress, and PTA meetings would not be of much help to raise learning levels.

Third parent-teacher meetings in several schools were held on a one-on-one basis. For instance, it teachers met parents on the day when the student results were to be declared.

Schools rarely had the opportunity to have cohesive meetings with the parent fraternity as many owners pointed out that organising such meetings would involve costs, and they would instead invest their money to improve learning outcomes, instead of holding meetings on such a large scale.

5.4 Impact of the RTE Act's organisational factors on student achievement

To, understand the impact of organisational factors, a binomial logistic regression was undertaken. The model predicted the possibility of scoring on a higher or lower range by regressing the Act's organisational indicators followed by a school while controlling other factors. The indicators comprised awareness of the RTE Act, RTE Act training orientation, a high or low fee charged, reservation policy followed by the school, admission policy for disabled children, knowledge about salary norms and the presence of an SMC in the school. The headline findings are as follows:

5.4.1 Charging a lower fee is likely to raise student test outcomes

All the schools participating in the research were split into two categories – low fee-paying and high fee-paying schools. Schools which charged fees below INR 600 (approximately £7 per month) were categorised as low fee-paying, and those above INR 600 were defined as high fee-paying. The findings revealed that private unaided schools which charged below INR 600 are more likely to raise student test scores compared to those which charged fees at a higher rate.

The findings align with Kingdon (2017) who finds a higher per pupil expenditure (PPE) in government schools compared to a majority of private schools where fee levels are far lower, and learning outcomes are better.

The realisation that in the majority of private schools, fee levels are far lower than government schools' per pupil expenditure causes Kingdon to question: "*how can private schools do so (without public subsidy) since the majority of them run on a small fraction of the unit cost of government schools.* (Kingdon 2017, p. 23).

It is likely that higher fee-charging schools in the sample may not manage their finances effectively leading to higher per pupil expenditure (PPE). Higher fee-charging schools are likely to be greater in size compared to their counterparts. These could include better and bigger infrastructure, more teachers and administrative complexities. As a result, it is quite likely that higher charging fee schools have significant overheads in terms of fixed and maintenance costs, salaries and other administrative costs which can reduce the overall surplus if not appropriately managed. A lower surplus would mean less reinvestment in the educational institution which could subsequently lower student outcomes whereas lower fee-charging schools seem to manage their finances better reinvest surplus to improve the quality of educational resources and improve student outcomes.

5.4.2 Presence of SMC's in schools

The RTE Act mandates the formation of SMCs, the primary objective of which is to involve the community to monitor the operations of the school and create and recommend school development plans for student welfare leading to better student achievement.

The results report that schools with an SMC are likely to score on a higher spectrum in diagnostic tests. Qualitative interviews indicate that schools with active SMCs focused on academic issues and took measures if there were aberrations from set academic targets. There is ample evidence that school function improves to a considerable extent with an active SMC (Ramachandran, 2001; Govinda & Diwan, 2003). Similarly, Govinda and Badhopadhyay (2010) argue that SMCs are capable of defending 'education exclusion' by raising awareness about educational issues and by active participation in school meetings and decision-making processes (Govinda & Bandyopadhyay, 2010). Bruns et al. (2011) show that community participation in school management leads to better student achievement in Latin America. Even in the rural parts of Malawi, the involvement of community members indicated a positive relationship with student outcomes (Taniguchi and Hirakawa, 2016). Proactive measures by SMCs and their active participation in crucial decisions are likely to be a cause for improving learning outcomes.

5.4.3 Impact of other RTE Act's organisational guidelines

Other organisational factors that were examined to understand the variation in scores include knowledge of RTE Act norms, RTE Act orientation and reservation policies in

schools. The models report a negative coefficient which indicates that following the RTE Act's organisational guidelines is unlikely to raise test scores.

Qualitative interviews with principals indicate that knowledge of the RTE Act did not assist in improving their 'instructional leadership'. According to Hallinger (2005), the role of the principal is more that of an administrator. A school head is an educator, coach and mentor. With time, the school principal's responsibilities have further broadened, and these include saving failing schools, being an active leader, motivating the stakeholders associated with the schooling ecosystem and altering the school from a mere functional workplace to a productive learning environment (Hallinger, 2005). School heads believed that attending the RTE Act orientation would not increase their subject knowledge on subjects or motivate them to teach effectively in the classroom.

Knowledge of RTE Act norms and orientations do not seem to improve the instructional ability of teachers or principals which would aid in raising test scores and enhancing the reputation of the school. Further research in this area would yield more insights as to why the RTE Act norms are skewed towards strengthening the administrative environment rather than the academic one

5.4.4 Reservation policies of the RTE

According to the World Bank, children from the wealthier areas with an educated family background usually show more tendency towards higher skill development and have better learning outcomes compared to those from deprived backgrounds (World Bank, 2015). The RTE Act through its reservation policy attempts to bridge learning disparities between children who come from wealthier families and those from disadvantaged backgrounds. It tries to do this by reserving 25% of seats in private schools for underprivileged children. It seems that the reservation policy of the RTE Act is not efficiently structured to assist children from disadvantaged backgrounds who may develop an inferiority complex when confronted with children from wealthier backgrounds. Such an effect is likely to have a negative impact on learning outcomes, and that is reflected in the analysis section. Future research in this area can determine what specific measures regarding reservation policies could strengthen learning outcomes in schools.

5.4.5 Schools practising inclusion policies

Low-cost private schools which admitted children with disabilities and followed inclusive practices were more likely to have higher test scores. The findings are consistent with Robbins (2010) who finds that all-inclusive schools which admit non-disabled students produce better results in reading and mathematics.

Klingner et al. (1998), Saint-Laurent et al. (1998) and Rea et al., (2002) also support the current findings. Walker and Ovington (1998) compare two scenarios. Scenario one is a general classroom comprised of twenty or more students that allow disabled students to engage in lessons actively. When included in mainstream schooling, they are likely to benefit from the broad level of conversations and the divergent thinking of the group. Scenario two is where students with different levels of disabilities participate in drills and repetitive methods in secluded settings. Walker and Ovington (1998) argue that students with a disability learn better in the former scenario compared to the latter.

5.5 Impact of the RTE Act's institutional academic indicators on student achievement

The RTE Act outlines specific academic indicators such as a 'no detention policy', facilitating 'learning by doing' and undertaking continuous, comprehensive evaluation (CCE) in schools. A binomial logistic regression was undertaken on the covariates to determine the influence on student test score outcomes.

Schools which promoted learning by doing as instructed in the curriculum are more likely to improve test scores. Private schools which placed less emphasis on rote and mechanised learning and whose curriculum promoted 'learning by doing' were likely to raise test scores. These findings align with Cindy (1998) who reports that curricula which place undue emphasis on rote and memorised learning cause poor performance. Furthermore, the study reveals that providing hands-on materials to students raised involvement and peer learning, fostering better learning and thinking and leading to higher test scores in mathematics).

Mullis and Jenkins (1988) surveyed two large-scale assessment programmes in the United States - the National Assessment of Educational Progress (NAEP) and the National Longitudinal Survey (NELS). They report that students who are often involved in innovative and hands-on activities score higher test in science compared to those who have a low level of exposure to hands-on activities (Mullis and Jenkins 1988).

5.5.1 Usage of continuous, comprehensive evaluation (CCE) in schools

One of the RTE Act's academic indicators is the launch of CCE in schools for encouraging schools to evaluate students holistically at regular intervals. Private schools which followed the CCE method of evaluation (providing grades instead of marks and assess the students through curricular and extra-curricular activities in tandem with academic assessment) were found to have better odds of scoring higher on the diagnostic tests. Earlier assessment methods in schools involved only a single test to assess the capabilities of children, but with CCE, schools have an opportunity to carry out assessments multiple times in an annual

year. Saxena and Tyagi (2014) report an overall improvement in student scores and combined pass percentages since the introduction of CCE in schools.

End-of-year examinations conducted in Indian schools can instil fear due to the high stakes associated with them (Deb et al. 2015; Times of India, 2017). The current system of assessment through annual examinations puts severe stress on students due to academic and parental pressure, and students have been reported to have psychiatric symptoms and examination-related anxiety (Deb et al. 2015). Therefore, it is plausible that CCE interventions are capable of motivating students to perform better.

A formative assessment system such as CCE, regularly conducted in a non-threatening manner is likely to encourage students to perform academically and beyond by mitigating the stress caused by high stakes testing through annual examinations.

5.5.2 Retaining students in the same class

Before the RTE Act, primary and secondary schools in India were allowed to hold back students in the same grade. However, the Act prohibits this up until the end of primary education. The intent behind the 'no detention policy' (NDP) was to ensure automatic yearly promotions for children, to reduce dropouts and to eliminate the fear of failure in exams. The model indicated a negative correlation – schools that followed a detention policy were likely to have lower test scores compared to those schools which had more liberal policies on promotion.

Stopping children from progressing onto the next year group harms self-esteem, causes an inferiority complex and leads to humiliation and embarrassment for students who are placed with those younger than they are (Government of India, 2016). Moreover, this policy has a huge social stigma attached to it and has shown to have “deeply damaging effects on the psyche of the child” (Government of India 2016, p.77). Thus, allowing automatic progress to the next year group is likely to reduce this fear and trauma in the minds of the children which could eventually lead to better learning outcomes.

However, the RTE Act's NDP has been criticised by many experts in recent times due to several reasons. These include a lack of preparation by the education system to support the policy, easy promotions disincentivising students, lowering enthusiasm in hard-working students and lowering accountability of teachers, leading to lower learning outcomes (KPMG, 2016; Bhukkal, 2014).

Further longitudinal research could assess the impacts of learning levels amongst students who did not progress onto the next academic year and their peers and its effects on overall learning levels of students in private and government schools.

Conclusion

To, understand the impact of the RTE Act's organisational and academic indicators on scoring abilities, nine variables were chosen. Of these, six were organisational, and the remaining three were academic.

Four indicators of the total six showed a negative impact on student outcomes. These include RTE Act awareness, RTE Act orientation, high fee-charging and reservation policies. Of these four indicators, one covariate was statistically significant.

In the case of the remaining two organisational indicators, the inclusion of disabled children and the presence of SMC showed a positive association with academic test scores, but only one was categorised as statistically significant.

5.6 Limitations and challenges to the study

All large-scale research studies do suffer from certain limitations and biases. These need to be discussed in the light of methodological stances, along with their impact on the interpretation of findings and insights, restraints around generalizability, and finally, the feasibility of implementation also need to be highlighted.

5.6.1 Concrete counterfactual

The initial stages of the study considered including government schools as the schools were supposed to comply with the RTE Act and would have represented a sound counterfactual. Repeated attempts to seek permission from the government authorities did not materialise, and permission was sought from only one school. The reason as to why these schools would have made an excellent counterfactual is because, as per section 8 (G) of the RTE Act, government schools are required to comply with the norms of the schedule (MHRD, 2011). However, they are not required to attain a recognition certificate or face any penalties for noncompliance. Data from the government's foremost educational institution, NUEPA, reports that even government schools do not comply with all the Act's regulations. In spite of this, none of the government schools has been issued with closure notices. While, on the contrary, NISA (2016) and Kingdon (2017) cite evidence from government documents, which indicate that private schools have either received a threat for closure or have been closed down (Kingdon 2017; NISA 2016). Comparing academic outcomes from government schools with those of threatened private schools could have strengthened the case to outline the gaps and inconsistencies in the RTE Act. However, due to the unavailability of the government schools, the research was restricted to observe the variation in academic outcomes caused due to the RTE Act indicators within the private schools themselves.

5.6.2 Limited sample size

The sample size was quite limited. The overall participation comprised ten low-cost private schools, 33 teachers and 305 students participating in the diagnostic and IQ test. Due to the time and cost constraints, a more substantial number of schools could not be included in the study. Therefore, the significant associations between the RTE Act indicators and student outcomes will need to be considered with caution.

Statistical associations have found to be counter-intuitive on a few occasions. For instance, teachers' salary range was negatively correlated with student test outcomes. Similarly, even in case of infrastructure, the presence of toilets and audio-video resources have been indicated to have negative effects on student achievement.

Research in the future undertaken with a broader sample size could investigate more certain reasons for such associations and thereby add weight to policy implications.

5.6.3 Potential bias in the research

The sample size was quite limited. The overall participation comprised ten low-cost private schools, 33 teachers and 305 students participating in the diagnostic and IQ test. Due to the time and cost constraints, a more substantial number of schools could not be included in the study. Therefore, the significant associations between the RTE Act indicators and student outcomes will need to be considered with caution as there may be some element of bias while selecting the sample, collecting the data, as well as interpreting the results.

Certain low-cost private schools were omitted during the design stage, such as those, which had temporary principals⁵⁰, if they were not traceable, or if they were closed during pre-survey. The omission of such schools from the sample could have caused an inclusion bias, meaning although they represented several characteristics of the actual sample they had to be excluded due to some of the reasons listed above. The inclusion of such schools in the study could have potentially altered the findings.

Schools, which voluntarily refused testing due to the fear of being prosecuted by the government could have been better or poor performing schools. If they were better performing schools, following minimal RTE rules, or if they were not, despite following the RTE regulations, they still could have altered the existing relationships earlier described in

⁵⁰ Temporary principals were heads of schools placed for an interim time period and they informed that they had no substantial power in terms of decision making, and thus they were not in a position to allow the research process to take place in the schools.

the analysis section. The absence of such schools from the research which satisfied the conditions required for the sample, however, could prove to be a major limitation to the research.

The RTE does not have any clear learning objectives for children. Most regulations outlined in the RTE focus heavily on infrastructure norms, teacher policies and recognition for schools. These regulations require a significant capital investment, which most of the times is beyond the reach of low-cost private schools and indeed it's also a question of huge opportunity cost. The government, apparently also seems to ignore the trade-off associated with such investments and learning gains. For instance, it is quite likely that the low-cost private schools by having fewer classrooms or no library can manage to have smaller class sizes. Thus even if all the variables had a positive relationship with learning outcomes, the example suggests that low-cost schools should not be implementing all the requirements of the act to achieve the maximum rise in learning gains. This indicates that if requiring more of one thing allows schools to provide less of something else, for those schools who do not meet the requirements currently, implementing the act might potentially decrease learning gains.

Data collection tools were assessed for validity and reliability; however; it is possible that the instruments may not have been calibrated accurately and hence, there is a likelihood of minor measurement errors in the evidence uncovered. For instance, the schools which were found to be performing better as they embraced the regulations, doesn't necessarily mean that rolling out the RTE regulations to other schools could better their performance. It is quietly likely that the better performing schools may have derived good benefits by allocating the resources wisely. Hence, it is difficult to ascertain that implementing the rules may not necessarily improve performance although statistical tests may suggest a relationship.

Statistical associations have found to be counter-intuitive on a few occasions. For instance, teachers' salary range was negatively correlated with student test outcomes. Similarly, even in case of infrastructure, the presence of toilets and audio-video resources have been indicated to have negative effects on student achievement. Research in the future undertaken with a broader sample size could investigate more certain reasons for such associations and thereby add weight to policy implications.

5.6.4 Limitations of data set and interpretations

Principals and schools heads reported the data on school-related RTE Act indicators from various schools. It must be acknowledged that self-reporting on sensitive issues may not yield the best results.

In this case, the reporting on several parameters of the RTE Act was akin to a double-edged sword. On the one hand, school heads were sceptical of divulging too much information for fear of being prosecuted if their identities were discovered. On the other hand, they felt the urge to share as much information as possible as they believed that the outcomes for better or for worse would at least narrate some part of their story. Robust checks and skips were incorporated into the questionnaire to ensure response accuracy. However, it is still likely that some participants, unintentionally, would have intended to project maximum compliance to RTE indicators on specific sensitive issues. For instance, responses on the sensitive matters could include; salary levels, holding back students in the same grade and transfer certificate issued by schools. Responses to such issues were taken at face value.

Similarly, data on student indicators were gathered from the students themselves, and it is likely that students may not have an accurate memory of their family background or any other variable related to socio-economic status. Robust checks and back-checks were put in place, and any error noticed in the data was corrected with participants the following day. However, in spite of all the steps taken to avert the errors, there is a slim chance that data errors might have crept in due to the volume of data so certain results associated with the respective variables need to be interpreted with caution.

5.7 Future explorations and conclusion

The research indicates some interesting areas in which future work could be undertaken. These include areas such as school management committees (SMCs), parent-teacher associations (PTAs) and their effects on academic outcomes. The discussion chapter outlined the findings from the research and aligned them with the second chapter (literature review) around the impact of the RTE Act indicators on student outcomes. The concluding chapter presents a summary of the findings around the research questions, the policy impact on budget private schools across the globe and highlights the original contribution towards knowledge.

Chapter Six: Conclusion – The road ahead and the way for future research

6.1. Introduction

The first chapter explores the reasons for the introduction of the RTE Act. The chapter outlined the beginnings of the RTE Act and suggested that it is skewed to support government schools over private schools. Examination of the various sections of the Act showed that many of them were inherently detrimental to the growth of low-cost private schools in India. The current research indicates that low-cost private schools not only impart better quality education but they also keep their costs lower than their government counterparts. Low-cost private schools across the country are being threatened with forced closure, directly impacting the learning outcomes of children enrolled in them.

The RTE Act guarantees free and compulsory education to children between 6-14 years. Threatening schools with closure not only jeopardises the future of the millions of children enrolled in low-cost private schools but also seems to contradict the Act's ethos. The historical scenario laid out in chapter one studied the history of Indian education in five phases, and it was discovered that even during the early 18th and 19th century, the private sector was encouraged to engage in education provision for the masses. However, state-based education took over following India's independence, marginalising the private sector. The historical timeline also traces the various acts, commissions and the transfer of control of the education sector to the government after the colonial era and India's independence.

Tracking the history of the RTE Act in India, it is evident that the bill had a long history before being implemented across the states of India. However, a 'concurrent theme' in India meant that the states of India could adapt it to their convenience and have state-specific acts parallel to the main one laid out by the federal government. For instance, the state of Delhi has two acts – the Delhi Primary Education Act, 1970 and the RTE Act of 2010.

The thesis mainly focused on the state of Delhi as the government threatened to close down 300 schools in the region for weak compliance with RTE Act indicators. The research revealed that many schools are unable to comply with the indicators due to the enormous capital expenditure involved. Moreover, chapter two discussed in detail the different physical indicators related to schools and the teacher indicators which may or may not have an impact on student learning.

Chapter two surveyed the literature around the world to determine the impact of various educational inputs such as the physical indicators as well as teacher-related factors on student learning outcomes from developing parts of the globe.

The review sensed a gap between the inputs and educational outcomes and found that some were capable of influencing outcomes while others had a negative impact or no impact at all. The effects of many inputs remained indeterminate.

Data collection was carried out through different instruments, and chapter three provides a detailed account of their draft, design and implementation. For measuring learning outcomes, a subject-specialised diagnostic test was used, and for determining the innate ability of the students, Raven's progressive matrices were utilised. A semi-structured questionnaire assisted in collecting information on the RTE Act parameters from the school as well as the teachers. To capture the narratives and experiences of the schools' owners, a detailed, in-depth guideline was designed. The research project was high time-bound and it was a major challenge to get the schools to agree to test during the same period. More than 300 students were tested in a two-week time frame, and the data was carefully collected, monitored, validated and analysed.

Chapter four reported the findings from the research, and it transpired that most indicators listed in the RTE Act did not have any significant impact on learning outcomes. The following research questions were explored, and the findings were laid out concerning the quantitative and qualitative analysis:

1. Is there any relationship between student achievement and the RTE Act's emphasis on physical indicators?
2. Do the RTE Act teacher indicators have any impact on students' learning outcomes?
3. Does following certain RTE Act core guidelines rigidly have any impact on students' test achievement?
4. Does following the RTE Act's institutional academic indicators have an impact on student achievement?
5. In correlation with the above questions, how do low-cost private school owners view the RTE Act regulations?

The first question explored the infrastructure mandates required by the RTE Act. The analysis revealed that most infrastructure requirements had no significant impact on student learning outcomes except for two indicators which included the provision of meals and library in the school. The second question constituted of eight different variables relating to teacher indicators reported that teacher training, those who teach multiple subjects and educational qualifications of the teacher had a positive impact on student outcomes. While on the other hand, the job status of the teachers, salary ranges and the PTAs were found to be negatively associated with student achievement.

The third question comprised the RTE Act's academic indicators. The indicators chosen included awareness of the RTE Act, RTE Act orientation for teachers, the range of fee charged by a school, practising inclusion, disability policy and the presence of an SMC in the school. Only one factor (practising inclusion) was found to be positively significant to learning outcomes.

Similarly, the fourth and final question related to institutional indicators which included children being denied progress to the following year group, aids to promote learning activities and schools which undertook assessments at regular intervals. The findings revealed that only schools that allowed 'learning by doing' were able to influence test scores positively.

The qualitative insights from the schools revealed the following insights:

- Schools threatened by the government were complying with most of the RTE Act laws. However, they could not actively comply with all the regulations as it required substantial capital investments from the school owners which they could not afford.
- Most school owners realised and acknowledged that norms listed under the RTE Act were associated with enhancing infrastructure requirements and were quite clear that the RTE Act's regulations do not contribute towards the enhancement of student learning or achievement.
- School owners felt that most regulations were a formality and the checklist constituted by the RTE, fostered corruption in the system
- The RTE Act has rigid regulations on teacher hiring, training and salaries. Owners of low-cost private schools believed that it was almost impossible to follow the regulations as they may not have the resources, networks and assistance found in government schools or affluent private schools.
- Several schools struggled to comply with the RTE Act due to the lengthy bureaucratic process. For instance, schools were required to obtain different kinds of certificates for operational purposes: a fire safety certificate, a structural stability certificate etc. However, these certificates were available at different government office locations, which often charged bribes for issuing the certificates, instead of a central location providing all certificates.

The above research questions aimed to understand the RTE Act's regulatory mechanism from an inputs-based perspective. By examining the findings, it is quite evident that the RTE Act's regulations are skewed towards input mechanism rather than the output-based measure.

However, one must acknowledge that a major limitation with the findings is the limited sample size available for the study. The next section discusses the consequences of such a state-promoted act which is likely to harm the growth of free-market enterprise and entrepreneurship.

6.2. Consequences of the RTE Act in its current form

In light of the current research, it is important to understand the implications of the Right to Education Act on various areas and highlight some of the detrimental consequences arising due to its implementation. The RTE legislation was designed to promote inclusion and quality education to children but it seems that these stringent regulations for low-cost private schools with a focus on an input-based approach lead to adverse implications.

- The RTE Act's inflexible input-based policies are capable of jeopardising low-cost private schools' objectives of providing affordable education to poorer families. From the findings of the research, it is evident that most low-cost private schools focus on improving learning outcomes by hiring local teachers and skilling them internally. Federal and state governments enforcing an input-based policy on these schools can derail them from their mission.
- The RTE Act regulations also foster fear and ambiguity as the threat of closure will coerce schools to comply. Coerced compliances shall lead to more corruption in the system and entrepreneurs are then likely to justify corruption as the 'only means' to conform with the requirements.
- The regimental regulations of the Act could plausibly usher an atmosphere of mistrust and hostility towards the government. The nebulous nature of the RTE Act could erode faith in the governmental system, specifically for those educational entrepreneurs who are likely to set up new schools.
- Closure of low-cost private schools would coerce parents to admit their children into government schools. This is likely to prevent children from obtaining a quality education at affordable costs. As a consequence, parents will be forced to send their children to government schools instead of better quality, low-cost private schools. This leads to violation of Article 21⁵¹ and 21A of the Indian constitution.

⁵¹ Article 21 of the Indian constitution states that no person shall be deprived of his life or personal liberty except according to procedure established by law.

- The inability of the school owners to adhere to the laws of the educational department could harm their entrepreneurial spirit and stifle the developmental agenda promoted by the current government.
- Finally, the RTE regulations pose a major threat to the free market economy and discourage a market-based approach to improve the quality of education in the country. Moreover, by doing so, it sets up a poor precedent for the neighbouring countries in the south Asian region, which are likely to emulate India's policy measures as they look upon India major emerging economy across the globe.

The next section considers the contribution of the study towards the knowledge repository.

6.3. Contribution of research to the knowledge repository

The research can be considered novel and unique in many ways. Although the sample size of the study was limited to the depth and breadth of the learnings from the study are capable of adding rich insights to the vast body of knowledge prevalent in this area.

Firstly, the research could be pioneering due to the nature of the schools participating in the study. The government has threatened these schools for closure. Previous research (Baird, 2009; De, Noronha & Samson, 2002; Tooley & Dixon, 2005; Tooley & Longfield, 2014) investigated low-cost private schools as a whole unit, possibly because the threat scenario from the regulatory environment had not emerged. However, following the RTE Act, schools were given notices for closure or closed down in case of weak compliance (NISA, 2016; Ramachandran & Reddy, 2015). The dynamics of the schools threatened with closure is distinct in the sense that these schools struggle to remain in operation and persistently reinvent themselves due to the challenging environment created by the regulatory authorities.

Secondly, however, several studies investigate the infrastructure elements and attempt to ascertain the link, if any, between inputs and educational achievement. The current research focuses explicitly on the RTE Act infrastructure indicators and attempts to establish the extent of any links between infrastructure elements and learning outcomes. The findings suggest that several input indicators listed in the RTE had no or minimal impact on how children learned in school. This could have disastrous results as governmental bodies, and education departments could end up spending resources on indicators which may not be relevant to raise learning outcomes.

Thirdly, the study looks at some of the unique input parameters associated with the RTE Act: awareness of the Act, RTE Act orientation for teachers, the range of fee charged by a

school, inclusion practices, disability policy and the presence of an SMC in a school. Including these parameters makes the study more robust as it covers the landmark act in its breadth and depth. Thus, it contributes towards the limited literature available in the domain of RTE Act indicators and enriches the knowledge repository with some unique findings applicable to the context of the RTE Act.

Fourthly, the study addresses misconceptions amongst policymakers relating to teachers. The RTE Act places heavy emphasis on teacher recruitment by mandating stringent criteria such as compulsory teacher training, minimum level qualifications and recruitment of teachers on permanent rolls. Insights from interviews revealed that when teachers were hired locally and trained in-house by experienced teachers, they tend to produce better results. In that sense, the study overcomes misconceptions by contributing rich insights at a policy level and can assist in building a robust policy, fair and acceptable for all schools whether government or private.

Finally, several countries in South Asia such as Pakistan, Bangladesh and Sri Lanka are likely to take a cue from India's policy regulations. Even in many countries of sub-Saharan Africa, such regulations focus on inputs and are skewed towards supply-based interventions. This thwarts the growth of market-based education and the spread of low-cost private schools. The current work will benefit other developing countries which may try and emulate the policy regulations. It highlights the pitfalls and perils of embracing a skewed policy focused merely on inputs which ignore the primary goal of learning outcomes.

6.4. Implications of the study on policy on the low-cost private schooling sector

Chapter one outlined the increasing demand for education; almost 96% of children in India are enrolled in government and private schools, with an ever-increasing demand for private schools. However, close to 100 percent enrollment in school has only resolved part of the problem – the next major challenge is to improve learning outcomes. According to ASER (2013), just a fifth of grade 3 students in government schools could solve basic arithmetic computations like additions and subtractions, compared to 50% in private schools. This finding worsens as the grades progress. To address such significant levels of 'learning crisis' would require a major overhaul of the Act itself, in the event that the current conclusions were agreed and accepted. Based on the research results and the study of the RTE Act sections in chapter one, the following implications are uncovered and recommendations outlined:

The RTE act was drafted to inject the integral components, i.e. quality and equity to schooling. However, it seems that the act has been imposing stringent standards on the behest of implementing the components has done considerable harm to the low-cost private schooling system (Brinkmann 2012, Centre for Civil Society 2015) rather than improving it.

Firstly, the decline in quality and some of the reasons associated with it have been discussed below:

Lack of remedial support to weaker students – Before the introduction of the RTE Act private and government schools were allowed to hold back students in case of poor performance and assist them in improving their competencies and skills in their core subjects. However, after the introduction of the RTE act, it was a mandatory requirement for the schools to promote students to the next grades irrespective of their performance. Such a policy creates a cohort of students who would lack a basic understanding of crucial subjects like mathematics, reading and sciences. Private schools, mandatorily are now required to promote weaker children year-on-year, as an obligation to the act and the regulation deters them from providing remedial support to weaker students.

Mandatory imposition of regulation and absence of learning objective – The RTE which is a landmark act does not have any clear learning objectives for children. Most regulations outlined in the RTE focus heavily on infrastructure norms, teacher policies and recognition for schools. These regulations require a significant capital infusion, which sometimes is beyond the reach of low-cost private schools and hence, they are forced to shut down. The consequences of such a monumental error in such a landmark act can prove to be catastrophic, and it is quite likely that more and more schools which currently fall under the ambit of the act are likely to discontinue operations.

Secondly, the RTE intended to promote social equity through compulsory schooling of 6 -14 years of age, and it attempts to do that through section 12(i) (c). The section mandates that private schools are required to reserve 25% of their seats to children from economically weaker sections (EWS) of the society. There is no doubt that such regulation shall help the poor to avail of a good education at an affordable cost. However, a careful examination of the section indicates that government assures to reimburse the fees of those children enrolled under the EWS quota. Information from the media, qualitative interviews with the principals and school owners indicate that the reimbursement policies have been vaguely framed. Private schools have expressed grievance that they have neither received any payment nor any communication from the government, as to when they could expect the payments.

Low-cost private schools, do face capital deficits and the lack of capital injection, when required hurts them and indeed, affects their ability to make any innovations to their learning and pedagogical strategy.

Discouraging school choice - The RTE Act discourages parents' school choice through catchment areas, whereby parents are encouraged to enrol their children in the nearest government school. However, the density of population in areas where people from lower socio-economic backgrounds reside differs to a great extent. Therefore, it is likely that schools could be over or under-subscribed. Catchment areas limit choice and low-income families' access to low-cost private schools. The RTE Act's definition of 'neighbourhood schools' which constitute catchment areas should thus comprise all types of school rather than being limited to government schools. Moreover, the discouraging choice for parents as to which schools they should choose for their children also kills competition among schools

6.5. Remedial measures to bridge the gaps in the RTE Act

The RTE directs unaided private schools to reserve 25% of places for disadvantaged children. It further assures that the government shall reimburse the school for this. However, that is not sufficient as several schools do not receive this money in due course. The government needs to ensure that all arrears are paid completely and transparency in payments must be established through a tracker published on the website periodically. Moreover, failure to pay the private schools should incur a penalty, and the appropriate government (federal or state) should be liable to pay the fines with interest. In this manner, the state can be made accountable to unaided private schools. The RTE Act mandates a certificate of recognition for private schools. However, evidence exists to prove that government schools themselves fail to comply with the RTE norms (Ashwathi, 2012). In spite of this, government schools are recognised by default and have minimal or no scrutiny. The Act should have standard accreditation procedures for all kinds of schools. An independent consulting or evaluating agency should be constituted for periodic assessment of schools.

Evidence from the current research and previous studies indicates that the RTE Act is skewed towards an input-based policy, even though neither the government nor the private schools are capable of adhering to the norms completely. In such a scenario, a complex regulation with much emphasis on input-based norms should be replaced by the overall performance of the educational institutions including improvement in learning outcomes with minimum weighting for infrastructure. Gujarat, an Indian state has made sweeping changes to the RTE and has reduced the weightage of input-based norms, replacing them with learning outcomes.

Component norm	Strategic initiative	Impact	Weightage in the Act
Student learning outcomes – (Absolute levels)	Use independent internal and external assessments to measure student learning levels, focused not just on rote but also higher order skills like critical thinking, communication, collaboration and creativity.	A focus on improving learning outcomes will prepare students for the 21 st century in a burgeoning global knowledge economy.	30%
Student learning outcomes – (School's past performance comparisons)	Introducing this component enables the monitoring of two scenarios a) Schools simply do not show inflated results by avoiding weaker students b) Effect of the better performance of the school is not reflected due to the students who come from wealthier families	Schools will have a good blend of students from all strata of society and improving the performance of mixed cohorts shall enable the progress of society at an overall level.	40%
Holistic student development – focusing on non-academic outcomes, including sports, personality development and parental feedback	The components would try and achieve the two objectives: a) Measure student progress on a wholsitic basis through a random sample of parents b) Encourage schools to develop standardised tools for measuring non-academic outcomes	Focusing on 'wholistic development' would avoid the pitfalls of 'teaching to test' and thus preparing students for a better future and institutions for excelling at all parameters.	20%

Component norm	Strategic initiative	Impact	Weightage in the Act
Inputs (facilities and teacher qualifications)	These comprise the norms and standards as listed in the schedule of the RTE Act	Decreasing the weightage of inputs from the schedule will enable private and government schools to focus on priority areas.	10%

(Gujarat government 2012)

The RTE Act currently describes SMCs very vaguely, and there is no clarity in terms of authority and responsibility. Merely constituting a committee and enlisting it in the Act is not sufficient. Such committees should be empowered to hold government and private schools accountable for their actions. Moreover, members of the SMCs need to receive financial and technical training.

The Act in its present form dictates regulations concerning teachers and attempts to impose them on private and government schools. Regulations about teachers such as their recruitment, remuneration and training should be flexible. Competition and market forces should dictate terms of employment and salary structure in private schools.

Finally, if private schools struggle to meet the RTE standards, the appropriate government should refrain from threatening them with closure. A better solution would be to allow a financially healthy school to take responsibility for the failing school or to transfer the management to an appropriate entity that can assist it to succeed.

6.6. Conclusion way forward and areas for further explorations

The current research attempted to ascertain whether the regulatory norms of the RTE Act, including its physical, institutional, teaching and academic indicators, had any impact on the learning levels of children. The research finds that the certain legislations of the RTE Act are failing to impact the educational outcomes of children in the threatened low-cost private schools of Delhi.

Emphasis on physical indicators and mandating schools to develop infrastructure facilities can lead to disastrous results. Similarly, teacher policies emphasising non-core areas and academic as well as institutional indicators targeted towards incorrect goals will lead to trivial outcomes.

Low-cost private schools operating across the length and breadth of India are struggling to keep themselves afloat due to the hostile policies of the government. Moreover, the aggressive policies have pushed these schools to resort to an extra-legal sector, and they attempt to gain freedom from the government legislations by resorting to bribes and corruption. Therefore, the recommendations provided in the current chapter attempt to bridge the gaps existing in the RTE Act. The current research can act as a catalyst for future research that assists in resolving the perennial problems that affect the education sector adversely. There is an essential need to undertake large-scale research encompassing diagnostic tests to check the health of the educational system regularly. The current research can also help in strengthening the regulatory Act across Indian states. Further study can be undertaken in the following areas:

- Comparing private and public schooling systems with regards to student outcomes, school efficacy and efficiency – (including per student spending, teacher recruitment, motivation and retention) concerning the RTE Act indicators.
- Reviewing and creating an index of best practices about the RTE Act and embracing the regulatory norms adopted by other emerging and developing nations suited to India's context.
- Exploring core RTE Act indicators with a larger sample size especially to study areas like school management committees (SMCs), parent-teacher associations (PTAs) and their effect on academic outcomes.

6.7. Epilogue

The thesis began with a personal story of how deprivation to education can dash the hopes of the poor. There is ample evidence of how the quality of learning can raise the standard of living, and how depriving education for the poor can push them in a vicious cycle of poverty. In this context, the RTE which is likely to be the turning stone in the field of education and has the potential to change the conditions for future generations cannot be solely focused on inputs. The perils of such a skewed policy can be far-reaching and could have widespread effects. Already, poor learning outcomes, one such significant influence has been outlined time and again. The literature review found that learning outcomes in the have fallen since the introduction of the RTE Act and the Annual Status of Education Report (ASER) is a testimony to that fact, clearly outlining the falling levels of learning in language and mathematics. In that context, the RTE Act has miserably failed to transform 'schooling into learning', and schooling without learning is pointless as it leads to the potential loss of talent amongst schoolchildren.

With a population of more than a billion and considered to be an emerging economy in the global spectrum, it is crucial that India's education policy embraces a paradigm shift from an

'input-based' approach to an 'output-based' approach. Moreover, India's sovereign parliament is accountable to the people, so it is crucial that budgetary spending attains a balanced approach to inject efficiency and efficacy to build robust policies.

The current research shares an in-depth understanding of the RTE Act regulations and their impact on learning outcomes, especially concerning threatened low-cost private schools. It provides recommendations as to how governments can work closely with the private sector. The research hopes to play a crucial role in the cornerstone of reforms envisaged in the education sector in the next decade to come.

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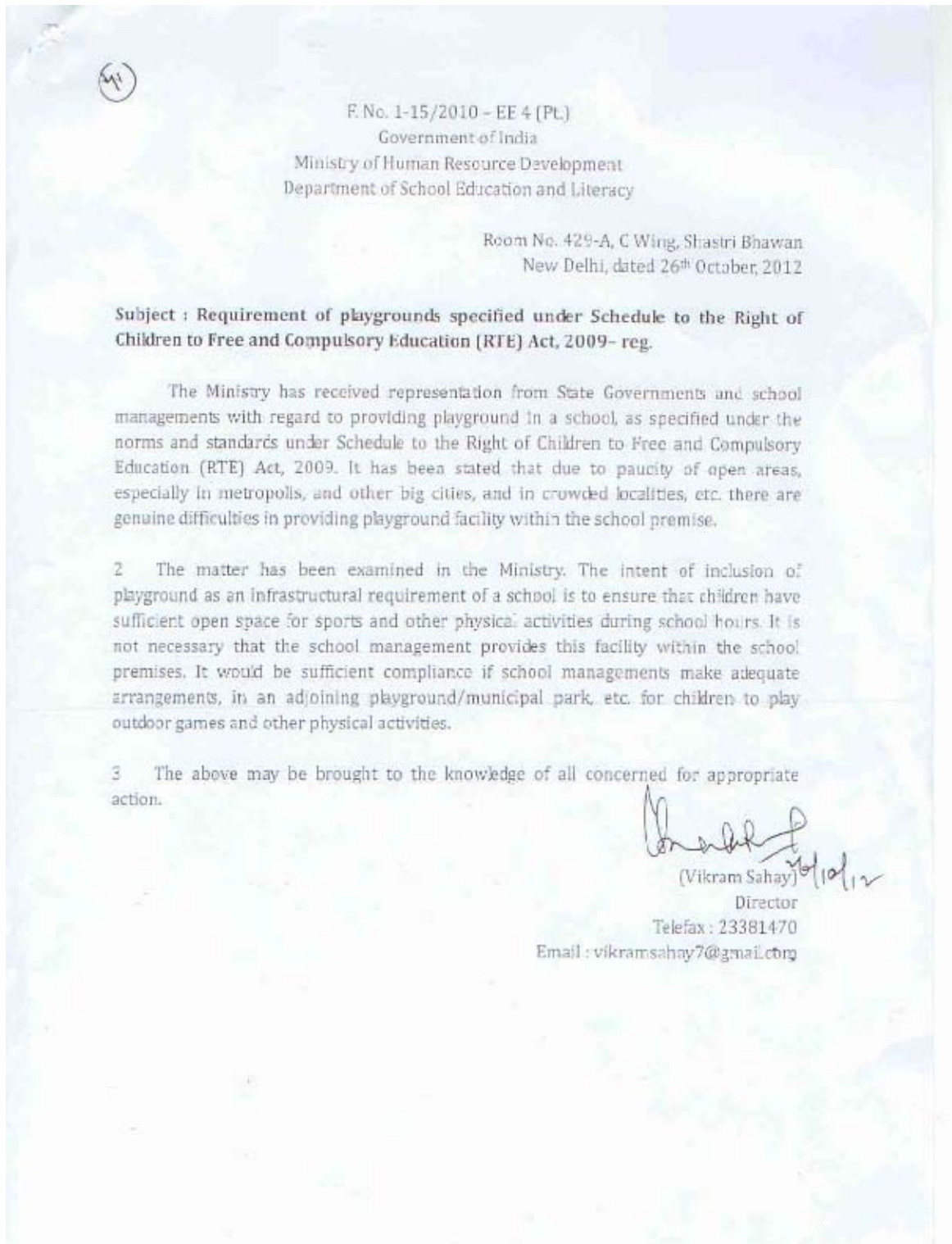
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Appendix

Appendix 1 – Playground notification for schools



Appendix 2 - Specimen of Memorandum of Association (Moa) for educational societies

MEMORANDUM OF ASSOCIATION

1. Name of the Society: The name of the society shall be 'ABC.'
2. The registered office of the society shall be situated in the National Capital Territory of Delhi, at present, it is at

3. AIMS & OBJECTIVES

- i. To open and run, educational and vocational schools or institutions to bring education within reach of poor & backward children, in the National Capital Territory of Delhi.
- ii. To provide libraries, publish books on educational, cultural & social subjects, organise discussions & seminars to impart knowledge & understanding amongst the people.
- iii. To provide hostels & residential accommodation that may be considered necessary for the students & for each member of the staff that may be made eligible for it.
- iv. To establish & maintain institutions for the handicapped & for adult education, like vocational training in vocations of household industry, semi-skilled jobs for self-employment, shorthand & type-writing, social science, languages, fine arts, crafts, music, painting, modelling, physical training etc.
- v. To provide the best education available in some of the best schools in Delhi. Emphasis would be on character building, self-discipline & the development of the creative & social faculties. The society aims at producing well informed & well assured young children just the kind of children that our country needs.
- vi. To strive to meet changing need of providing comprehensive education to develop various facets of personality and to impart education to children on the most modern lines & provide an environment congenial to growth & development of the children.
- vii. To arrange and organize the social, cultural and educational programmes from time to time
- viii. All the income, earning, movable & immovable properties of the society shall be solely utilized & applied towards the promotion of its aim & objects only as set forth in the memorandum of association & no portion thereof shall be paid or transferred directly or indirectly by way of dividends, bonus, profits or in any manner whatsoever to the present or past members of the society or to any person claiming through any one or more of the present or the past members. No member of the society shall have any personal claim on any moveable property of the society or make any profit, whatsoever, by his/her membership.

Appendix 3 – School registration requirements

FORM-1(A)

SELF-DECLARATION FORM FOR RECOGNIZED SCHOOL

To,

The Director of
Education, Directorate of
Education, Government
of NCT of Delhi.

Sir,

I forward herewith a self-declaration form regarding compliance with the norms and standards prescribed under the **Right of Children to Free and Compulsory Education Act, 2009** for recognition to

(Name of school).....

..... (Address)

With effect from the commencement of the Academic year 20.....-20.....

Note: - Before filling-up the self-declaration form, the management may refer to the **Right of Children for Free and Compulsory Education Act, 2009**, thoroughly.

A. SCHOOL DETAILS		
1.	Name of school with school I.D. NO.	
2	Aided/ Unaided	
3	District & Zone	
4	Postal address	
5	Pin Code	
6	Phone No. with STD Code	
7	Fax No.	
8	E-mail address, if any	

B. GENERAL INFORMATION		
1.	Date of First Opening of School. (DD/MM/YYYY)	
2	Name of Trust/Society running the School.	
3	Whether Proof of non-proprietary character of the Trust/Society is attached?	
4	Whether list of members of Managing Committee with their addresses qualification & occupation is attached?	Yes/No (Please Tick)

B. GENERAL INFORMATION				
5	Whether SOM approved?		Yes/No (Please Tick)	
6	Details of Manager of the school:-			
	(a) Name :-			
	(b) Address:-			
	(c) Academic Qualification (proof to be attached)			
	(d) Teaching Experience (in years, along with experience certificate countersigned by EO/DEO)			
	(e) Administrative Experience (in years)			
	(f) Phone (s)		(OFFICE) (RES.) (MOBILE)	
7	Statement of Income and Expenditure (last three years) as per Balance Sheet			
	Year	Income	Expenditure	Surplus/Deficit

C. NATURE & AREA OF SCHOOL		
1	Medium of Institution	
2	Type of School (specify entry & exit classes).	
3	If Aided, the name of Govt./Agency/Deptt., from which Aid is being received and percentage of	
4	Whether the school is being run by society at its land & building or on rent/lease basis?	Owned or Rent/Lease (Please Tick)
5	Whether the school building or other structures or the playground are used only for education and skill development?	Yes/No (Please Tick)

D. Land & Building details (Area in Sq. Mtrs).	
1. Total Number of Rooms.	
2. Number of Classrooms.	
3. Head-Teacher/Principal Room	
4. Staff Room.	
5. Office Room.	
6. Store Room.	

7. Laboratory, if any,	
8. Whether School has a boundary wall? If not, whether the school has proper	Yes/No (Please Tick) Yes/No (Please Tick)
9. Total Area of School Land including Building & Play Ground	
10. Area of constructed School Building	
11. Total covered area of the School Building (including all floors).	
12. Area of Play Ground.	

E. Other Facilities:-	
Whether all facilities have barrier-free access?	Yes/No (Please Tick)
Library :	
Number of Books in Library	
Number of newspapers (daily subscription)	
Number of magazines (Monthly subscription).	
Whether the list of Sports & Play equipment attached or not?	Yes/No (Please Tick)
(i) Number of Toilets for Boys.	
(ii) Number of Toilets for Girls	
(iii) Number of Toilets for CWSN(Person with disabilities)	
Whether safe and adequate drinking water facilities is available to all Children and Staff?	Yes/No (Please Tick)
Whether Teaching Learning Material is available	Yes/No (Please Tick)
Whether Kitchen is available?	Yes/No (Please Tick)
Whether the list of Sports & Play equipment attached or not?	Yes/No (Please Tick)

Total Number of Subject Teacher	
F. Teacher and Student Ratio: -----	
Total Number of Students	
(a) Class I to V	Ratio :
(b) Class VI to VIII	Ratio :
Note:- The Teacher do not include Lab Assistant, Coaches & Clerical Account Staff etc.	

G. Details of Teachers:- Number
(a) Principal/ Headmaster
(b) TGT (s)
(i) English
(ii) Hindi
(iii) Sanskrit or any other Language (as per three Language formula)
(iv) Natural Science
(v) Social Science
(vi) Mathematics
(c) Assistant. Teachers
(d) PET
(e) Work Education Teacher
(f) Art Education Teacher.

H. Class wise Enrolment of Students:-			
Class	Number of Sections	Number of Students Enrolled	Number of Students under EWS and Disadvantaged Group Quota
Pre-Primary			
I			
II			
III			
IV			
V			
Total			

I. Working days/Instructional hours in an academic year			
1	(a) Class I to V	Number of working	
		Number of Instructional	
	(b) Class VI to VIII	Number of working	
		Number of Instructional	
2	Number of working hours for the	Primary Teachers	
		TGTs/PGTs.	

It is to undertake that the school is open for inspection by any officer authorized by the appropriate authority.

Certified that the school undertakes to furnish such reports and information as may be required by the Director of Education from time to time and complies with such instructions of the appropriate authority or the D.D.E or Education Officer as may be issued to secure the continued fulfilment of the condition of recognition or the removal of deficiencies in working of the school.

Certified that records of the school pertinent to the implementation of this Act shall be open to inspection by any officer authorized by the Directorate of Education or appropriate authority at any time, and the school shall furnish all such information as may be necessary to enable the Central and/or State Government/Local Body or the Administration to discharge its or his obligations to Parliament/ Legislative Assembly of the State/Panchayat/ Municipal Corporation, as the case may be.

Total No. of Enclosures:

Place:

Dated :

Signature with Stamp of the Manager

Appendix 4 – Closure notification

**GOVERNMENT OF NATIONAL CAPITAL TERRITORY OF DELHI
DIRECTORATE OF EDUCATION
ACT-1 BRANCH, OLD SECRETARIAT,
DELHI-110054**

NO. DE-15/Act-1/WPC 43/06/2015/3317-3322

Dated: 08/09/2015

CIRCULAR

Hon'ble High Court of Delhi vide judgement dated 7/5/2015 decided the Civil Miscellaneous application no. 20634/2014 filed in WPC 43/2006 titled Social Jurist, a Civil Rights Group Vs Govt. of NCT of Delhi & Ors. and directed as under:

(I) DoE, MCD, NDMC, EDMC and DDA to ensure immediate closure/shifting of those unrecognised schools which are housed in any premises which may pose a threat to the safety of the children studying therein.

(II) All concerned authorities have also been directed to expeditiously decide the issue of regularisation if any, to be granted because of the change if any to be made in the norms prescribed for recognition of the schools.

Further, Hon'ble Court has reminded the Govt. agencies of provisions sections 18 and 19(2) of the RTE Act, 2009 which these agencies are to comply in any case.

That section 18 of RTE Act has a provision that no school to be established without obtaining certificate from the appropriate authority after the commencement of this Act and Section 19(2) has a provision that if any school does not fulfil the norms and standards specified under the Act, it shall take steps to fulfil the same within a period of three years from the date of commencement of RTE Act, 2009. The RTE Act came into force w.e.f. 1/4/2010.


That this department has already given provisional recognition to about 800 unrecognised schools but still about 300 schools are running unrecognised, for the fact that these schools do not meet the minimum land requirement. The file for closure of these schools is under process.

That while considering the cases for grant of provisional recognition of the schools, structural stability certificate/building fitness certificate issued by the competent authorities, are obtained by the department to ensure the structural stability of the school building but department has 'no structural stability' record of those schools which are not even provisionally recognised due to non-fulfilment of land norms.

That district wise list of unrecognised schools & those unrecognised schools whose cases for provisional recognition have been turned down by the deptt. is annexed with this circular.

In view of above, it is directed that All Unrecognized Private Schools running in NCT of Delhi to submit 'Structural Stability record/certificate' of the building in which these schools are housed within seven days from the date of issue of this circular, failing which it would be presumed that school does not have any such document/record and further action for closure of such school shall be started without further notice.

This issues with the prior approval of the Competent Authority.


Additional Director of Education (Act -1)

To

HoS, All Unrecognised Private Unaided Schools of Delhi.

NO. DE-15/Act-1/WPC 43/06/2015/3317-3322

Dated: 08/09/2015

Copy for information to:-

1. P.S. to Principal Secretary (Education), GNCTD.
2. P.S. to Director (Education), Directorate of Education.
3. All Regional Directors of Education.
4. All District DDEs.
5. All District DDEs Zones
6. O.S. (I.T.) with the direction to place the circular on the link 'Public Circulars'.


Additional Director of Education (Act - 1)

Appendix 5 – Student Questionnaire with academic indicators

Sl. No	Questions and filters	Coding Category	Codes						
A.	Date of Survey		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> <div style="display: flex; justify-content: space-around; width: 100%;"> DD MM YR </div>						
B.	School Code		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>						
C.	Gender	Boy Girl	1 2						
D.	Grade/Class		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>						

Sl. No.	Questions and filters	Coding category	Codes and Skips	
			Codes	Skip
101.	Which language do you speak at home?	Hindi Gujarati Marawadi Bihari Haryanvi Punjabi Awadhi Kashmiri Garhwali Other	1 2 3 4 5 6 7 8 9 10	
102.	Which of the following items do you have in your household? (Multiple responses)	TV DVD player Smartphone/Mobile Computer/Laptop Gas stove Refrigerator Air cooler Livestock (cow/goats/Buffalo) Scooter/motorcycle Car Property Any other asset	1 2 3 4 5 6 7 8 9 10 11 12	
103.	Which of these is used in your house to cook Food?	Firewood Cooking gas Kerosene Stove	1 2 3	
104.	Do you go to tuitions?	Yes No	1 2	

Sl. No.	Questions and filters	Coding category	Codes and Skips	
105.	For which subjects do you go to tuitions?	Language Maths Evs All of the above	1 2 3 4	
106.	What do you do in school most of the time?	Working Playing Studying Sleeping	1 2 3 4	
107.	How many times do you receive homework at school?	Everyday One day in a week Two or three times a week No homework is given	1 2 3 4 5 →	Skip to 112
108.	Are you told to learn by heart for the homework given to you?	Yes No	1 2	
109.	For homework, does your teacher tell you to write a question and answers by yourself?	Yes No	1 2	
110.	I am made to read full lessons as given in the textbook, for my homework	Yes No	1 2	
111.	I am made to do a lot of mathematical sums, as a part of my homework	Yes No	1 2	
112.	You come to school because	Parents send me forcibly Enjoy coming to school Find a job when you grow up	1 2 3	
113.	I have textbooks for the following subjects	Language Maths EVS All of the above	1 2 3 4	
114.	In school time, I do the following?	Work Play Study Sleep	1 2 3 4	
115.	There are enough teaching-learning materials for all of us for supporting our study (charts, books, audio video)	Yes No	1 2	

Thank you for your co-operation

Appendix 6 – Student questionnaire with demographic indicators

SI. No	Questions and filters	Codes													
A.	Date of Survey	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td colspan="2" style="text-align: center;">DD</td> <td colspan="2" style="text-align: center;">MM</td> <td colspan="2" style="text-align: center;">YR</td> </tr> </table>								DD		MM		YR	
DD		MM		YR											
B.	Name of the school (Code)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>													
C.	Your Age in	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td colspan="2" style="text-align: center;">Years</td> <td colspan="2" style="text-align: center;">Months</td> </tr> </table>						Years		Months					
Years		Months													
D.	How many members are there in your family? (write the number in the adjacent cell including yourself) Men – 18 years and above Women – 18 Years and above	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 50px;">Men</td> <td style="width: 50px;"></td> </tr> <tr> <td>Boys</td> <td></td> </tr> <tr> <td>Girl</td> <td></td> </tr> <tr> <td>Women</td> <td></td> </tr> </table>		Men		Boys		Girl		Women					
Men															
Boys															
Girl															
Women															

SI. No.	Questions and filters	Coding category	Codes and Skips	
			Codes	Skip
101.	Which language do you speak at home?	Hindi Gujarati Marawadi Bihari Haryanvi Punjabi Awadhi Kashmiri Garhwali Other <hr style="width: 100px; margin-left: 0;"/>	1 2 3 4 5 6 7 8 9 10	
102.	Can any older member of your family write and/or speak English fluently?	Yes No	1 2	
103.	Are there any older brothers or sisters that can read English in your family?	Yes No	1 2	

Sl. No.	Questions and filters	Coding category	Codes and Skips
104.	How many brothers and sisters do you have in your family (not including you)?		<input type="text"/>
105.	Which position in the children do you come in your family?	Eldest Youngest In between, not the eldest or youngest.	1 2 3
106.	How many members are there in your family?		<input type="text"/>
107.	How many earning members are there in your family?		<input type="text"/>
108.	Do you own or rent a house?	Own Rent	1 2
109.	Does your family own any of the following items? Please circle all that your family has: (Multiple responses)	Electricity TV DVD player Smartphone/Mobile Computer/Laptop Gas stove Refrigerator Air cooler Livestock (Cow/Goats/Buffalo) Bicycle Scooter/motorcycle any two wheeler) Car or jeep (any four wheeler) Shop or housing plot	1 2 3 4 5 6 7 8 9 10 11 12 13

SI. No.	Questions and filters	Coding category	Codes and Skips	
110.	What type of building is your home?	Building or concrete building Semi-permanent building Wooden and tin sheet building Mud building Other (specify) _____	1 2 3 4 5	
111.	Does your household have a toilet?	Yes No	1 2	
112.	Does your house have a separate kitchen for your family to use?	Yes No	1 2	

Questions about the guardian

SI. No.	Questions and filters	Coding Category	Codes and Skips	
201.	Does your father/(male guardian) have a monthly/weekly income?	Yes No	1 2	
202.	Does your mother /(female guardian) have a monthly/weekly income?	Yes No	1 2	
203.	What was the highest level of education your father (male guardian) completed? (only tick one) (single response)	Illiterate Primary pass Secondary pass Below graduate Graduate Post Graduate PhD Other _____	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
204.	What was the highest level of education your mother (female guardian) completed? (only tick one)	Illiterate Primary pass Secondary pass Below graduate	1 2 3 4	1 2 3 4

Sl. No.	Questions and filters	Coding Category	Codes and Skips	
		Graduate	5	5
		Post Graduate	6	6
		PhD	7	7
		Other	8	8

205.

Sl. No.	Questions and filters	Codes and Skips			
		Coding category	Father	Coding category	Mother
	What do your parents (father/mother/guardians) do as a job? (single response)	Unemployed	1	Housewife	1
		Daily wage labourer	2	Housemaid	2
		Petty trader	3	Daily wage labourer	3
		Carpenter	4	Laundry	4
		Fitter/mechanic/plumber	5	Trader	5
		Driver	6	Police	6
		Government job	7	Government job	7
		Other	8	Other	8
		_____		_____	
		_____		_____	

Appendix 7 – Principal questionnaire

Sl. No	Questions and filters	Coding category	Codes												
A.	Date of Survey		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td colspan="2" style="text-align: center;">DD</td> <td colspan="2" style="text-align: center;">MM</td> <td colspan="2" style="text-align: center;">YR</td> </tr> </table>							DD		MM		YR	
DD		MM		YR											
B.	State (Name & Code)		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
C.	District (Name & Code)		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
D.	Type of school (Area) Encircle and enter the code in the box	1. Urban 2. Rural	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
E.	Name of the school (Code)		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
F.	Education level Enter code in box	1. Primary 2. Upper primary 3. High Schl/Sen.Secondary 4. Primary+Upper primary+Higher Secondary 5. Other _____	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
G.	Standards in School	From Std <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> to Std <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>													
H.	School Managed by Enter code in the box	State Govt.	1												
		Central Govt.	2												
		Private Aided	3												
		Low-Cost Private Unaided	4												
		Local body/Panchayat/Municipal Corporation	5												
		Social Welfare Dept.	6												
		Others _____	7												
I.	What is the type of school?	Boys 1 Girls 2 Co-education 3													
J.	The strength of school Children (Children Enrolled)	Boys Girls Total	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
K.	Name and contact number of Head Master/ Principal	Name of Head Master/ Principal:.....													

		Phone:.....Mobile:.....
	Postal Address	Name of school:..... Name of P.O:..... Taluk/Block:..... District:.....PIN Code:

Awareness' and Information about the RTE Act

Sl. No.	Questions and filters	Coding category	Codes and Skips	
			Codes	Skip
113.	Have you heard/ (or aware) about the RTE Act 2009?	Yes No	1 2 →	201
114.	Is there an RTE copy available with the school?	Yes No	1 2	
115.	Have any of the members of the school attended any orientation programme about the RTE Act?	Yes No	1 2	
116.	How many members of the staff have attended the orientation programme of the RTE Act?		<input type="text"/>	<input type="text"/>

Sl. No.	Questions and filters	Coding category	Codes and Skips	
			Codes	Skip
201.	Does your school follow the norm of free and compulsory education for students between 6-14 years of age?	Yes No	1 2	
202.	How many children in the school are between the age group of 6-14?		<input type="text"/>	
203.	Do you charge fees from the students between six to fourteen years of age?	Yes No	1 2→	205
204.	What is the monthly tuition fee charged from the students?		<input type="text"/>	
205.	Does the school follow a reservation policy while admitting students?	Yes No	1 2	
206.	Were children from the SC/ST category admitted in the schools?	Yes No	1 2→	208

Sl. No.	Questions and filters	Coding category	Codes and Skips	
		Can't say/Not aware	3	
207.	Can you recall how many children were admitted in this category?	SC ST	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
208.	Do you allow school transfer to children, on their request?	Yes No No transfer policy Cannot issue T.C (transfer certificate) <u>Other</u>	1 2 3 4 7	
209.	Do you provide admission to children who do not possess a transfer certificate?	Yes No Transfer certificate is mandatory Other <u> </u> <u> </u>	1 2 3 7	
210.	Does the school detain or expel any student in the last year?	Yes No Cannot share information	1 2→ 3	212
211.	How many children have been expelled from the school since 2010? (Give approx. number)	Primary Upper primary Secondary	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	

Sl. No.	Questions and filters	Coding category	Codes and Skips
212.	Are there any children in your school with a disability?	Yes No	1 2→301
213.	Can you share the approx? Number of children with disability in your school?	Primary Upper primary Secondary	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Information about school staff

Sl. No.	Questions and filters	Coding Category	Codes and skips	
			Codes	Skip
301.	How many teachers are there in the school?	Primary Upper primary Secondary Higher secondary	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
302.	What are the minimum qualifications for teachers in the schools? (Please provide the number in the adjacent column) – Multiple responses possible	Below Graduate Graduate (B.A, B.Com, B.Ed) Post Graduate (M.A, M.Com, M.Ed) PhD	1 2 3 4	
303.	Have your teachers received any training?	Yes No	1 2	
304.	Do you know what government norms are there for teacher pay?	Yes No	1 2	

Sl. No.	Questions and filters	Coding Category	Codes and skips	
305.	What is the range of salaries for teachers in your school and how many teachers are there in each of the category? (Monthly figure) (Single option only)	1000-2999	1	
		3000-5999	2	
		6000-9999	3	
		10000-14999	4	
		15000-19999	5	
		20000-24999	6	
		25000-29999	7	
		30000-39999	8	
		40000 & above	9	
306.	Does the school conduct PTA (parent-teacher association) meetings?	Yes	1	401
		No	2→	
307.	Can you tell me the two dates when the last PTA meeting was held?	Date 1	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
		Date 2	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	

Information about school infrastructure

Sl. No.	Questions and filters	Coding category	Codes and Skips	
			Codes	Skip
1.	Does the school have a 'pucca building'?	Yes	1	
		No	2→	
2.	Does the school have a drinking water facility?	Yes	1	
		No	2	
3.	Does the school have an electricity connection in functional condition?	Yes	1	
		No	2	
4.	Does the school serve mid-day meals to the children?	Yes	1	
		No	2→	
5.	Is there a separate room for cooking and storing the mid-day meals?	For cooking	1	
		For storage	2	
		For both	3	
		None	4	

406. Does the school have the following provision in terms of infrastructure complying with the laws of the Right to Education Act?

Sl. No.	Coding category	Codes				
		Yes	No			
1.	Separate classroom for every teacher	1	2			
2.	Store cum office room	1	2			
3.	Barrier-free access	1	2			
4.	Boundary wall	1	2			
5.	Teaching-learning materials	1	2			
6.	Safe drinking water facility	1	2			
7.	Separate toilet for boys and girls	1	2			
8.	Library in the school	1	2			
	If yes then mention the number of books in the library	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>				
9.	Computer lab in the school	1	2			
	If yes then mention the number of computer in the lab	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>				

Functional Learning resources

Sl. No.	Questions and filters	Coding category	Codes and Skips	
			Codes	Skip
501.	Are the students of your school allowed to choose the books they want to read from the library books?	Yes	1	
		No	2	
502.	Are the computers in the computer lab functional?	Yes	1	
		No	2	
503.	Are there audio-video resources (TV/Radio) available in the school?	Yes	1	
		No	2	
504.	Are the audio/video resources functional?	Yes	1	
		No	2	
505.	Are there enough toys and games available for children to supplement their study?	Yes	1	
		No	2	
506.	Are there charts and maps available in the school?	Yes	1	
		No	2	
507.	Is there a blackboard	Yes	1	
		No	2	

Governance of the school

SI. No.	Questions and filters	Coding category	Codes					
601.	Is there an SMC (school management committee) in the school?	Yes No	1 2→	601				
602.	How many members represent the SMC? Males Female		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>					
603.	What are the functions of the SMC?	Monitor Grant utilisation Ensure the enrolment of children from neighbourhood areas Report deviation in child rights including mental and physical harassment of children, denial of admission, and timely provision of free entitlement Monitor mid-day meal programme Monitor the receipts and expenditure of the school Monitor the identify, enrolment of children with disabilities, and ensure their participation in education Other	1 2 3 4 5 6 7					
604.	Does the SMC help in monitoring the curricular and co-curricular activities?	Yes No	1 2					
605.	Who provides the structure for the SMC?	State Government Local government Headmaster Others <hr/> <hr/> <hr/>	1 2 3 07					

Information on curriculum and elementary education

Sl. No.	Questions and filters	Coding category	Private School	
			Codes	Skip
701	Is the prescribed syllabus in each class is helpful for the all-around development of the child?	Quite helpful Useful to some extent Not useful at all Can't say/Not aware	1 2 3 4	
702	Is the prescribed curriculum for the grades helpful to build the knowledge and talent of children?	Yes No Can't say/Not aware	1 2 3	
703	Does the curriculum give importance to learning through activities?	Yes No Can't say/Not aware	1 2 3	
704	Are any of the children in a particular grade detained or not allowed to go to the next higher class?	Yes No Can't say/Not aware	1 2 3	
705	Does your school undertake CCE (continuous, comprehensive evaluation)	Yes No Can't say/Not aware	1 2 3	

Only for low-cost private schools

Sl. No.	Questions and filters	Coding category	Codes and Skips				
			Codes	Skip			
801	Do you know any of the schools that have been closed owing to RTE?	Yes No	1 2→	Say thank you and terminate the interview			
802	If yes can you tell us how many have been closed due to the RTE?		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 30px; height: 20px;"></td> <td style="width: 30px; height: 20px;"></td> <td style="width: 30px; height: 20px;"></td> </tr> </table>				

Can you name share the names as well as the contact details of schools that have been closed in the last six to seven months?

S.No.	Name of the School	Address of the school	Contact Details Phone/Email
1.			
2.			
3.			
4.			
5.			

Thank you for your co-operation

Appendix 8 – Teacher questionnaire

Sl. No	Questions and filters	Coding Category	Codes												
A.	Date of Survey		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td colspan="2" style="text-align: center;">DD</td> <td colspan="2" style="text-align: center;">MM</td> <td colspan="2" style="text-align: center;">YR</td> </tr> </table>							DD		MM		YR	
DD		MM		YR											
B.	State (Name & Code)		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
C.	District (Name & Code)		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
D.	Type of school (Area) Encircle and enter the code in the box	1. Urban 2. Rural	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
E.	Name of the school (Code)		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
F.	Education level Enter code in box	1. Primary 2. Upper primary 3. High Schl/Sen.Secondary 4. Primary+Upper primary+Higher Secondary 5. Other _____	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
G.	Standards in School	From Std <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table> to Std <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>													
H.	School Managed by Enter code in the box	State Govt.	1												
		Central Govt.	2												
		Private Aided	3												
		Low-Cost Private Unaided	4												
		Local body/Panchayat/Municipal Corporation	5												
		Social Welfare Dept.	6												
		Others _____	7												
I.	What is the type of school?	Boys Girls Co-education	1 2 3												
J.	Strength of school Children (Children Enrolled)	Boys Girls Total	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>												
K.	Name of the Teacher	Name of Teacher interviewed:..... Phone:.....Mobile:.....													

Teacher Information

Sl. No.	Questions and filters	Coding category	Teacher 1	Teacher 2	Teacher 3
101.	Gender of the teacher	Male	1	1	1
		Female	2	2	2
102.	Status of the teacher	Permanent teacher	1	1	1
		Temporary teacher	2	2	2
		Teacher on contract	3	3	3
		Trainee teacher	4	4	4
103.	What is the range of your salary per month?	0-499	1	1	1
		500-999	2	2	2
		1000-1499	3	3	3
		1500-1999	4	4	4
		2000-2499	5	5	5
		3000-3999	6	6	6
		4000-5999	7	7	7
		6000-9999	8	8	8
		10000-14999	10	10	10
		15000-19999	11	11	11
		20000-24999	12	12	12
		25000-29999	13	13	13
		30000 and above	14	14	14
		104.	What is your educational qualification?	Below Graduate	1
Graduate (B.A, B.Com, B.Ed)	2			2	2
Post Graduate (M.A, M.Com, M. Ed)	3			3	3
PhD	4			4	4

Sl. No.	Questions and filters	Coding category	Teacher 1	Teacher 2	Teacher 3
105.	When was the last in-service training programme you attended?	In last 6 months In last 12 months In last 1-3 years In last 3-5 years In last 5-10 years Over 10 years ago Never attended training	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
106.	What is your total teaching experience?	Less than one year 1-3 years 3-5 years 5-10 years 10-15 years More than 15 years	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
107.	Which grades do you teach?	Class 2 Class 4 Class 5 Classes 2 & 4 Classes 2 & 5 Classes 4 & 5 Cl 2, 4 & 5	1 2 3 4 5 5 7	1 2 3 4 5 5 7	1 2 3 4 5 5 7
108.	Which subjects do you teach?	Language Maths EVS Language and Maths Language and EVS Maths and EVS Language, Maths and EVS	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7

Homework related information

Sl. No.	Questions and filters	Coding category	T 1	T2	T3
201.	How often do you give homework to your students?	Almost everyday	1	1	1
		More than thrice in a week	2	2	2
		Thrice in a week	3	3	3
		Less than thrice in a week	4	4	4
		Never – I don't assign homework	5	5	5
202.	For homework, do you ask students to learn questions by heart?	Yes	1	1	1
		No	2	2	2
203.	For homework, do you ask students to write answers to questions from the textbook?	Yes	1	1	1
		No	2	2	2
204.	For homework, do you ask students to do mathematics sums?	Yes	1	1	1
		No	2	2	2
205.	For homework, do you give students handwriting practice?	Yes	1	1	1
		No	2	2	2
206.	For homework, do you ask students to learn meanings of difficult words?	Yes	1	1	1
		No	2	2	2
207.	Do you prepare and give additional worksheets to your students?	Often	1	1	1
		Sometimes	2	2	2
		Never	3	3	3

Information related to classroom transaction

Sl. No.	Questions and filters	Coding category	Teacher 1	Teacher 2	Teacher 3
	In the classroom, do your students read aloud and you explain?	Yes	1	1	1
		No	2	2	2
	In the classroom, do you read and explain	Yes	1	1	1
		No	2	2	2

	In the classroom, do you ask questions to students related to the study topic during class?	Yes No	1 2	1 2	1 2
	Do you explain mathematics sums to students?	Yes No	1 2	1 2	1 2
	In your opinion is strict discipline necessary for teacher's control on students?	Yes No	1 2	1 2	1 2
	Do you think that teacher loses respect if she/he plays and cracks jokes with the students?	Yes No	1 2	1 2	1 2
	As a teacher, I believe there can be no discipline without fear of the teacher in students	Yes No	1 2	1 2	1 2
	As a teacher that students should be punished if they don't pay attention	Yes No	1 2	1 2	1 2
	It is ok to punish students who are are not disciplined	Yes No	1 2	1 2	1 2
	Do you think all children are capable of learning	Yes No	1 2	1 2	1 2
	Do you think the learning abilities of girls and boys are the same	Yes No	1 2	1 2	1 2
	Girls are better at language and boys are better at mathematics	Yes No	1 2	1 2	1 2

Thank you for your co-operation

Appendix 9 – Principal in-depth interview questionnaire

SCHOOL ID PARTICULARS

SI. No	Questions and filters	Coding Category	Codes												
A.	Date of Survey		<table border="1"> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td></td> <td>DD</td> <td>MM</td> <td>YR</td> <td></td> <td></td> </tr> </table>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		DD	MM	YR		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>										
	DD	MM	YR												
B.	State (Name & Code)		<input type="text"/> <input type="text"/>												
C.	District (Name & Code)		<input type="text"/>												
D.	Type of school (Area) Encircle and enter the code in the box	1. Urban 2. Rural	<input type="text"/>												
E.	Name of the school (Code)		<input type="text"/> <input type="text"/>												
F.	Block/Taluka (Name)		<input type="text"/> <input type="text"/>												
G.	Village/Town/City (Name)		<input type="text"/> <input type="text"/>												
H.	Education level Enter code in box	1. Primary 2. Upper primary 3. High Schl/Sen.Secondary 4. Primary+Upper primary+Higher Secondary 5. Other _____	<input type="text"/>												
I.	Standards in School	From Std <input type="text"/> <input type="text"/> to S <input type="text"/> <input type="text"/>													
J.	School Managed by Enter code in box	State Govt.	1												
		Central Govt.	2												
		Private Aided	3												
		Private Unaided	4												
		Local body/Panchayat/Municipal Corporation	5												
		Social Welfare Dept.	6												
		Others _____	7												
K.	Strength of school Children (Children Enrolled)	Boys	<input type="text"/> <input type="text"/> <input type="text"/>												
		Girls	<input type="text"/> <input type="text"/> <input type="text"/>												
		Total	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>												

L.	Name and contact number of Head Master/ Principal	Name of Head Master/ Principal:..... Phone:.....Mobile:.....
	Postal Address	Name of school:..... Name of P.O:..... Taluk/Block:..... District:.....PIN Code:

Personal Interview

1. Are you aware about the RTE Act 2009?

2. Do you know if the provisions of the RTE are applicable to your school/project?
(Y/N/Not sure)

3. Have you applied or received Government recognition? If not, are you aware of the procedures to get Government recognition? Have you submitted the required forms to the District Education Officer? (Each state has outlined the procedures and requirements that you need to fulfill to get Government recognition)?

4. Can you let us know what hurdles do you face when you apply for recognition? What happens when you are not able to obtain the recognition from the local authorities?

5. How many times have you received notices for non-compliance with the RTE norms and regulations?

6. Do all students in your school get free education? (Y/N). If there is a fee for students, how many students pay the fee? How much is the fee?

7. How many of your students belong to SC/ST and OBC categories? Do you have students from Below Poverty Level (BPL) families?

Number of Students from BPL families			
Category	SC	ST	OBC
Primary (Classes 1-5)			
Upper Primary (Classes 6-8)			

8. What is the curriculum does your school follow? Do you follow CBSE/ICSE/State syllabi? If not, are you confident that the school curriculum meets the prescribed RTE norms?

9. Does your school provide free textbooks, writing materials and uniforms to all students? Can you share the details?

10. Does the school offer scholarships or financial incentives to the enrolled students?

11. Did your teachers receive any kind of training in the recent past? If yes, what training did they receive and who trained these teachers?

12. How many working days does your school have every year for Primary Classes? What is that number for Upper Primary Classes? What are the school hours on a daily basis?

Category	Working days	Working hours
Primary (Classes 1-5)		
Upper Primary (Classes 6-8)		

13. Does your school meet the requirements as stated in the RTE schedule of the Act? Please consider the below aspects of the RTE and confirm if they comply with the below standards?

S.No.	Item	Norms & Standards	Put a (✓) wherever necessary	
1.	No. of Teachers		Number of teachers/Days/Hours	
	For classes 1 to 5	Upto 60 students	2	
		Between 61 to 90	3	
		Between 91 to 120	4	
		Between 121 to 200	5	
For classes 6 to 8	At least one teacher per class so that there shall be at least one teacher each for (Science & Mathematics, social studies and Language)			
	At least one teacher for every thirty-five children			
	If the school has more than 100 children			
	A full-time head-teacher; and a part-time teacher for Art Education Health and Physical Education Work Education			
2	Teaching-learning equipment	Provided to all the classrooms as required		
3	Building	All-weather building consisting of		
		At least one class-room for every teacher and an office-cum-store-cum-Head teacher's room;		
		Barrier-free access		
		Separate toilets for boys and girls.		
		Safe and adequate drinking water facility to all children'		
		A kitchen where mid-day- meal is cooked in the school		
Playground				

S.No.	Item	Norms & Standards		Put a (✓) wherever necessary
		Arrangements for securing the school building by boundary wall or fencing		
4	Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	
		For class 6 to 8	220	
		For class 1 to 5 (Instructions hours)	800	
		For class 6 to 8 (Instruction)	1000	
5	Minimum number of working hours per week for the teacher (Including preparatory)	Forty-five teaching including preparation hours	45	
6	Library	Library in each school providing newspaper, magazines and books on all subjects, including		
7	Play material, games and sports equipment	Shall be provided to each class as required		

14. Did any school inspector visit the school in the recent past? If yes, when was the last visit? How often do they visit? Was there any communication with reference to the RTE?

15. What do school inspectors do when they find the school non-compliant with RTE? How do you usually cope up with the inspection visit?

16. What mechanisms do you adopt in case of a school closure notice?

17. What happens to the teachers, who are associated with the school in the advent of a school closure?

18. Is there any other additional information present in the RTE provisions, which you like to share, apart from the ones not covered in the questionnaire?

Appendix 10 – Pre-survey responses

District Name	5th Grade not present	Temp. Principal	Not Surveyed	Not Traceable	Refused Testing	Residential Building	School Closed	Special School	Small School	Willing to test	Grand Total
Central									1	5	6
East	7										7
New Delhi	1								1		2
North	3	1								1	5
North West A	2									1	3
North West B	3			1							4
South	4	1	1	2			2		4	9	23
South West A	3			2				1	2	1	9
South West B	3	1							1	1	6
West A	7	1		2	2	1			1	5	19
West B	5			2			1		2	2	12
Grand Total	38	4	1	9	2	1	3	1	12	25	96

Appendix 11 – List of schools selected for sampling and final sample schools

S.No. (A)	District Name (B)	School Name (C)	Total Students Enrolled (D)	MOS (E)	CMOS (F)	Sampled Schools (G)	
1.	West A	Daffodils Convent School	700	45	45	S1	
2.	Central	Himgiri School	150	42	87	S2	
3.	South	new nanki public school	500	40	127	S3	
4.	Central	Sharda Vidya Kendra School	175	35	162	S4	
5.	Central	Sona Devi Public School	250	30	192	S5	
6.	North	S.D Saini Public School	225	25	217	S6	
7.	South	Divine Public School	150	25	242	S7	
8.	West A	K. D. junior public school	200	25	267	S8	
9.	West B	Columbia City School	180	25	292		
10	South	PTR Memorial Model School	200	20	312	S9	
11	South West B	Children's Paradise School	350	20	332		
12	West A	New Navdeep Public School	250	20	352	S10	
13	Central	New Janta Montessori School	180	18	370	S11	
14	North West A	Krishna Convent School	150	15	385		
15	West A	Satguru GURU KRIPA Children School	150	15	400	S12	
16	South	Modern Fairfield Public School	150	13	413		
17	South	St. Luke Public School	125	12	425		
18	South	Guru Amardas Public School	65	10	435	S13	
19	South	Zion Public School	150	10	445		
20	South	N P Public School	350	10	455		
21	South West A	Anand Saraswati Public School	100	10	465		
22	West A	Janhit Public School	60	10	475	S14	
23	West B	Soni Public School	50	10	485		
24	Central	Zuby Public school	180	8	493		
25	South	Shiv Public School	100	8	501	S15	
		*Indicates sampled schools					

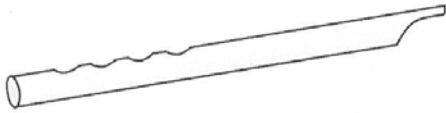
Appendix 12 – Names and role of volunteers participating in the study.

S.Number	Name of the volunteer	Role
1.	Ankit Dixit	Logistics co-ordinator
2.	Amit	Test volunteer
3.	Sonveer	Test volunteer
4.	Abhimanyu	Test volunteer
5.	Aakash	Test volunteer
6.	Deepak	Test volunteer
7.	Sachin	Test volunteer
8.	Rajat	Test volunteer
9.	Manish	Test volunteer
10.	Manoj	Test volunteer
11.	Kiran	Test volunteer
12.	Pooja	Test volunteer
13.	Dipti	Test volunteer

Appendix 13 - Diagnostic test paper

MEASURING STUDENT ACHIEVEMENT			
Name छात्र/ छात्रा का नाम _____			
(Boy) / लड़का	(Girl) / लड़की _____	Date/ दिनांक - <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>	
School Code	<input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>	State Code	<input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>
Paper Code	<input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>	District Code	<input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>
Evaluator Code	<input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>	Duration: 105 Minutes.	

1. Tick (☐) the word for this picture.



- A. Damroo (Drum)
- B. Bansuri (Flute)
- C. Tabla (Tabla)
- D. Haarmoniyaam (Harmonium)

2. Tick (☐) the word that is correctly spelt.

- A. gubara B. gubbbara C. gubbara D. gobara

For questions 3 – 7, tick (✓) the appropriate (suitable) word to fill the blank.

3. We can go for a swim in the _____.

- A. Pahaad (Mountain) B. Nadi (River) C. Aakash (Sky) D. Registan (Desert)

4. Chitra mein ladkiyan naach _____.
(In the picture, the girls are dance _____)



- A. rahe hain B. rahi hain C. raha hai D. rahi hai

5. In the picture below, the first ball is big, while the second ball is ____.



- A. Chotii (small) B. Laambii (tall) C. Patelii (thin) D. Motii (fat)

6. Kheer is _____ to taste.

- A. Kadavaa (bitter) B. Miithaa (sweet) C. Chatpataa (spicy) D. Khataa (sour)

7. Tick (✓) the answer that best matches the picture.



- A. Bandaar kela kha raha hai.
(The monkey is eating a banana.)
- B. Bandaar gaird se khail raha hai.
(The monkey is playing with a ball.)

8. Read the sentences below and tick (✓) the answer to the question.

Radha: Every day I get up at 5 o'clock in the morning.
Priya: I am still having dreams at that time.
Neela: Oh! By that time I finish my prayers!

Who gets up first?

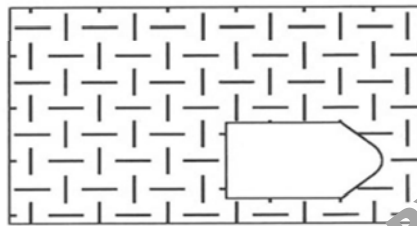
- A. Radha B. Priya C. Neela D. They all get up at the same time

Appendix 14 – Raven’s test of matrices

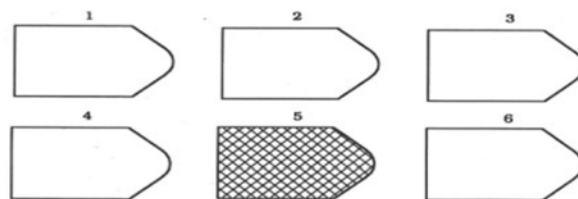
MEASURING STUDENT ACHIEVEMENT

Name छात्र/छात्रा का नाम	
Boy/ लडका <input type="checkbox"/>	Girl/लडकी <input type="checkbox"/>
School Code - स्कूल कोड <input type="text"/> <input type="text"/> <input type="text"/>	State Code - राज्य कोड <input type="text"/> <input type="text"/> <input type="text"/>
Paper Code - पेपर कोड <input type="text"/> <input type="text"/> <input type="text"/>	District Code - जिला कोड <input type="text"/> <input type="text"/> <input type="text"/>
Evaluator Code - परीक्षक कोड	<input type="text"/> <input type="text"/> <input type="text"/>

A1



A2



Appendix 15 – Score Card for diagnostic test

Scoring card for comprehensive paper

For each of the question, refer to the table below and enter the codes on your top Sheet in the corresponding boxes to the answer written by the student.

Note:

1. Items that have been not attempted at all should be coded as 88
2. Invalid answers (e.g. question copied, more than one option ticked in multiple choice questions, crossed out responses, illegible answers) should be coded as 86.
3. Spellings are not to be checked unless explicitly indicated.
4. Instead of ticking, if a child crosses or circles or marks an option in any other way, or rewrites one of the options, that option should be treated as their choice.

1.	Option ticked (enter option A, B, C, D in English)	<Option letter>
2.	Option ticked (enter option A, B, C, D in English)	<Option letter>
3.	Option ticked (enter option A, B, C, D in English)	<Option letter>
4.	Option ticked (enter option A, B, C, D in English)	<Option letter>
5.	Option ticked (enter option A, B, C, D in English)	<Option letter>
6.	Option ticked (enter option A, B, C, D in English)	<Option letter>
7.	Option ticked (enter option A, B in English)	<Option letter>
8.	Option ticked (enter option A, B, C, D in English)	<Option letter>
9.	Option ticked (enter option A, B in English)	<Option letter>
10.	Option ticked (enter option A, B, C, D in English)	<Option letter>
11.	Option ticked (enter option A, B in English)	<Option letter>
12.	Option ticked (enter option A, B, C, D in English)	<Option letter>
13.	Option ticked (enter option A, B in English)	<Option letter>
14.	Option ticked (enter option A, B, C, D in English)	<Option letter>
15.	Option ticked (enter option A, B in English)	<Option letter>

16.

Correct answer in complete sentence mentioning 'kitchen' (Eg.. "Sarala was having tea in the kitchen")	01
Other variations of the correct answer (Eg. "Sarala was having tea with her mummy in the kitchen".	02
Correct answer in a word or phrase (Eg. In the kitchen)	11
'Ghar Mein'	21
Any other answer	85

Note: Do not check for spelling errors

17.

Correct answer in a complete sentence mentioning that the tiger was 'hungry' or 'wanted something to eat or drink.' (Eg. The tiger came as he was hungry and wanted something to eat and	01
Other variations of the correct answer (Eg. The tiger came, as he wanted to have tea.)	02
Correct answer in a word or phrase (Eg.. hungry)	11
Any other answer	85

Note: Do not check for spelling errors

18.

29	01
39	81
Any other wrong answer	85

19.

34 pencils/34/Thirty four pencils/Thirty-four	01
30	81
7	82
430 or 4 30	83
43	84
Any other wrong answer	85

20.

Option ticked (enter option A, B, C, D in English)	<Option letter>
--	-----------------

21.

Option ticked (enter option A, B, C, D in English)	<Option letter>
--	-----------------

22.

103	01
93	81
913	82
Any other wrong answer	85

23.

27	01
----	----

37	81
33	82
Any other wrong answer	85

24.

86	01
45	81
Any other wrong answer	85

25.

4	01
25	81
15	82
Any other wrong answer	85

26.

Option ticked (enter option A, B, C, D in English)	<Option letter>
--	-----------------

27.

6 /six /6 o'clock /6a.m / 6p.m	01
12.30 (any other related form)	81
Any other wrong answer	85

28.

4 / four	01
Four not written but clear division showing four groups of bananas	11
8	81
Any other wrong answer	85

29.

22 / twenty two / Rupees 22 (any related form)	01
20 (any related form)	81
Any other wrong answer	85

30.

Option ticked (enter option A, B, C, D in English)	<Option letter>
--	-----------------

31.

5	01
6	81
Any other wrong answer	85

32.

Option ticked (enter option A, B, C, D in English)	<Option letter>
--	-----------------

33.

4	01
12	81
15	82
Any other wrong answer	85

34.

6/six/6 legs/six legs	01
Three pairs	02
3	81
8	82
Any other wrong answer	85

35.

Any fruit that is commonly eaten with the peel. (<i>eg. guava/grapes/berries/plums/jamun/gooseberry</i>)	01
Any fruit that is normally eaten without the peel, but can also be eaten with the peel. (<i>eg. mango/Chiku/apple</i>)	02
Any vegetable that is scientifically a fruit and is eaten with the peel (<i>e.g. Tomato, cucumber</i>)	03
Any fruit that is normally not eaten with peel (<i>e.g. banana, oranges</i>)	81
Any other vegetable that is scientifically not a fruit and is eaten with or without peel (<i>e.g.: brinjal, carrot, potato, radish, beetroot</i>)	82
Any other wrong answer	85

36.

Teeth (<i>any other containing 'teeth' should be accepted. E.g. back of teeth</i>)	01
Palette (upper part of the mouth)	81
Any other wrong answer	85

37.

15 th August 1947/15-08-1947 (<i>any other acceptable date forms</i>)	01
15 th August (date and month correct, year missing)	11
26 th January, 2 nd October, (with any year)	81
Any other wrong answer	85

38.

Taj Mahal/ Taj	01
Any wrong answer	85

39.

Punjab	01
Chandigarh, New Delhi, Delhi	81
Any other wrong answer	85

40. Option ticked (enter option A, B, C, D in English) <Option letter>

41. Option ticked (enter option A, B, C, D in English) <Option letter>

42. Option ticked (enter option A, B, C, D in English) <Option letter>

43. Option ticked (enter option A, B, C, D in English) <Option letter>

44. Option ticked (enter option A, B, C, D in English) <Option letter>

45. Option ticked (enter option A, B, C, D in English) <Option letter>

46. Option ticked (enter option A, B, C, D in English) <Option letter>

47.

900 grams / 900 or in words	01
1kilo/1 kg / 1	81
100 grams / 100	82
Any other wrong answer	85

48. Option ticked (enter option A, B, C, D in English) <Option letter>

49. Option ticked (enter option A, B, C, D in English) <Option letter>

50. Option ticked (enter option A, B, C, D in English) <Option letter>

Appendix 16 – Top sheet

Measuring Student Achievement in public and low cost private schools

TOPSHEET

PLEASE ENTER USING BLUE BALL-POINT PENS ONLY NOT PENCILS OR INK PENS					
Name -					
Boy - <input type="checkbox"/> Girl- <input type="checkbox"/>					
School Code - <input type="text"/> <input type="text"/> <input type="text"/>			State Code - <input type="text"/> <input type="text"/> <input type="text"/>		
Paper Code - <input type="text"/> <input type="text"/> <input type="text"/>			District Code - <input type="text"/> <input type="text"/> <input type="text"/>		
Evaluator Code - <input type="text"/> <input type="text"/> <input type="text"/>					
LANGUAGE		MATHS		EVS	
Q.NO.	Answer Code	Q.NO.	Answer Code	Q.NO.	Answer Code
1.		18.		34.	
2.		19.		35.	
3.		20.		36.	
4.		21.		37.	
5.		22.		38.	
6.		23.		39.	
7.		24.		40.	
8.		25.		41.	
9.		26.		42.	
10.		27.		43.	
11.		28.		44.	
12.		29.		45.	
13.		30.		46.	
14.		31.		47.	
15.		32.		48.	
16.		33.		49.	
17.				50.	

TOPSHEET

PLEASE ENTER RESPONSES USING PENCILS AND DO NOT SPOIL THE SHEET			
Measuring Student Achievement in Government and Low Cost Private Schools			
Name -			
Boy -	<input type="checkbox"/>	Girl-	<input type="checkbox"/>
School Code -	<input type="text"/> <input type="text"/> <input type="text"/>	State Code	<input type="text"/> <input type="text"/> <input type="text"/>
Paper Code -	<input type="text"/> <input type="text"/> <input type="text"/>	District Code	<input type="text"/> <input type="text"/> <input type="text"/>
Evaluator Code -	<input type="text"/> <input type="text"/> <input type="text"/>		

Section A		Section B		Section C		Section D		Section E	
A1		B1		C1		D1		E1	
A2		B2		C2		D2		E2	
A3		B3		C3		D3		E3	
A4		B4		C4		D4		E4	
A5		B5		C5		D5		E5	
A6		B6		C6		D6		E6	
A7		B7		C7		D7		E7	
A8		B8		C8		D8		E8	
A9		B9		C9		D9		E9	
A10		B10		C10		D10		E10	
A11		B11		C11		D11		E11	
A12		B12		C12		D12		E12	
T		T		T		T		T	

Appendix 17 – Language competency framework

S. No	Competency tested	Total question	Question Nos. in the test
1	The student identifies names of objects, birds and animals not seen in daily life and words denoting actions	3	13,14,15
2	The student reads and writes moderately difficult words that have 4–5 letters with vowels and conjunct letters	3	1,2,3
3	The student uses words appropriate to the context based on their meanings, opposites and gender endings	3	4,5,6,
4	Student - reads, understands, writes and constructs three simple and short sentences that have less than five words in a sentence	2	7,8
5	The student understands simple, short stories of 10-12 sentences when told and comprehends beyond the stated facts	2	16,17
6	The student reads a short text of 5-6 sentences that describe the daily activity, routine context, simple description, simple story independently and comprehends stated facts	4	9,10,11,12
Total		17	

Appendix 18 – Maths competency framework

S. No	Competency tested	Total question	Question Nos. in the test
1	Number concepts (Number sequencing, Ordering, Naming numbers and Place Value)		
2	Operations on whole numbers (Addition, Subtraction, Multiplication and Divisions)		
3	Fraction concepts		
4	Measurement and applications		
5	Shapes and Geometry (Understanding of shapes)		
6	Problem Solving (Word problems and Reasoning)		
Total			

Appendix 19 – Science competency framework

S. No	Competency tested	The Body	The Living Environment	The Physical Environment	Science and Technology	The Universe	Man and society	Total number of questions
1	Recall of facts							
2	Observation							
3	Identification, pattern recognition and classifications							
4	Reasoning and Analysis							
5	Visual interpretation							
6	Estimation and Measurement							
7	Drawing a conclusion from designed experiments							
	Total No of Q							

Appendix 20 – Descriptive statistics for Language test scores

Name of the school	N	Mean	Median	Min.	Max.	Range	Std. Dev.	Variance
School A	66	12.9265	13	7	16	9	1.94181	3.771
School B	51	12.6667	14	5	17	12	3.02435	9.147
School C	16	13.3125	13.5	10	16	6	1.92246	3.696
School D	18	12.7895	13	7	16	9	2.55123	6.509
School E	12	13	13	4	17	13	3.16228	10
School F	14	14.4286	14.5	11	17	6	1.78516	3.187
School G	11	13.7273	15	9	16	7	2.3277	5.418
School H	57	12.7931	13	3	17	14	3.08794	9.535
School I	13	12.2857	12.5	1	17	16	3.81149	14.527
School J	47	13.102	13	3	16	13	2.61602	6.844
Total	305	12.858	13	1	17	16	2.67461	7.154

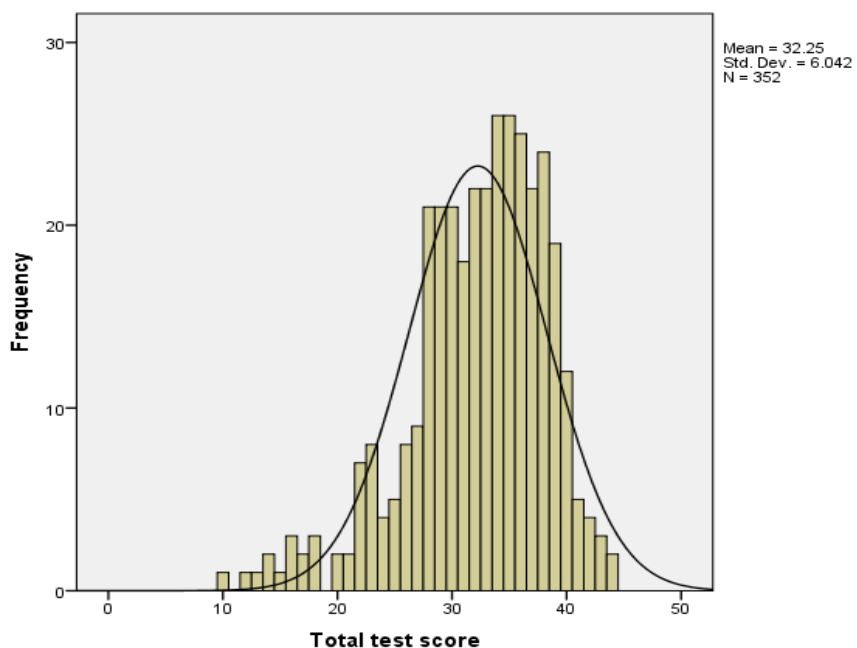
Appendix 21 -Descriptive statistics for Mathematics test

Name of the school	N	Mean	Median	Min.	Max.	Range	Std. Dev.	Variance
School A	66	10.25	10.00	3.00	14.00	11.00	2.21	4.88
School B	51	10.49	11.00	4.00	15.00	11.00	2.73	7.46
School C	16	10.94	11.50	8.00	14.00	6.00	1.77	3.13
School D	18	12.16	13.00	9.00	15.00	6.00	1.83	3.36
School E	12	9.93	10.50	6.00	13.00	7.00	2.13	4.53
School F	14	11.79	12.00	10.00	14.00	4.00	1.12	1.26
School G	11	11.73	12.00	9.00	14.00	5.00	1.74	3.02
School H	57	10.19	10.00	5.00	14.00	9.00	2.20	4.82
School I	13	9.00	8.00	7.00	11.00	4.00	1.62	2.62
School J	47	12.24	13.00	5.00	14.00	9.00	1.73	2.98
Total	305	10.7585	11	2	15	13	2.30846	5.329

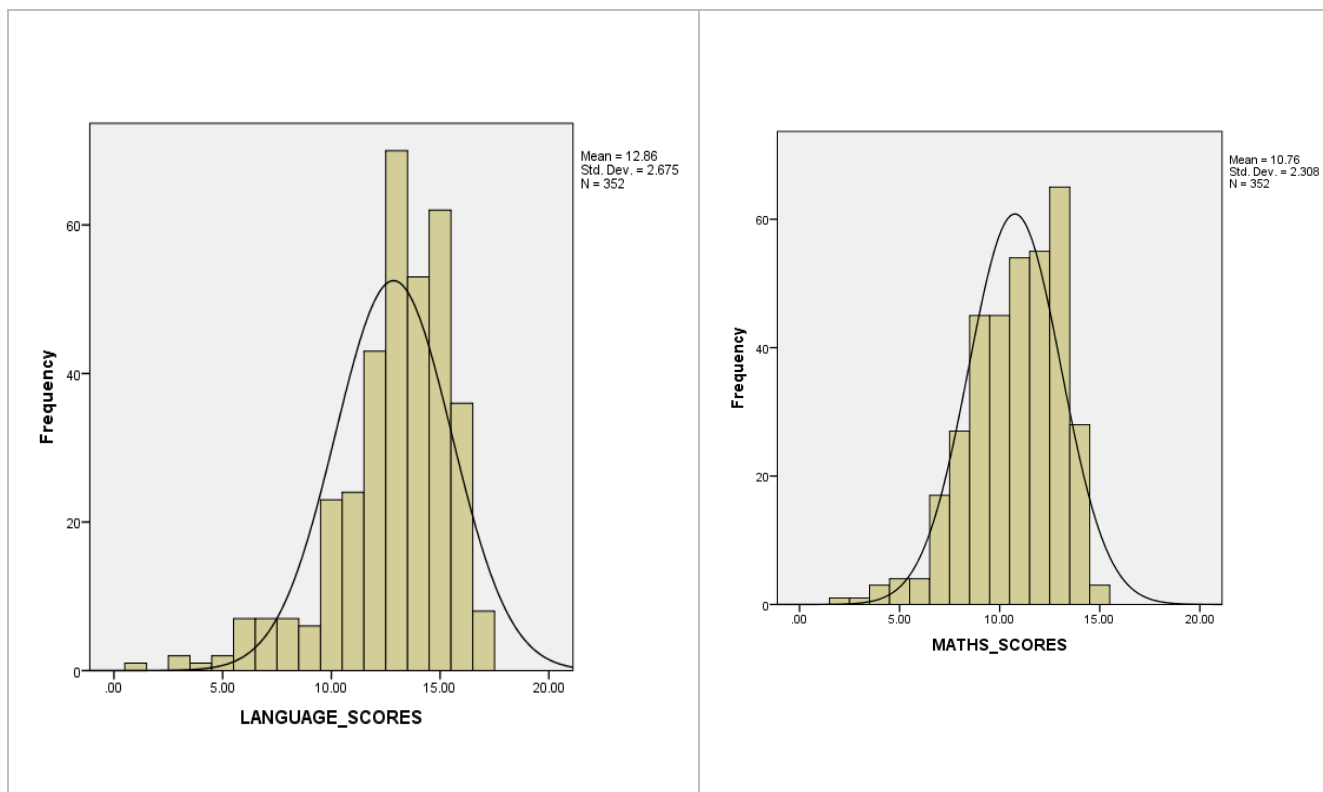
Appendix 22 - Descriptive statistics for Science test

Name of the school	N	Mean	Median	Min.	Max.	Range	Std. Dev.	Variance
School A	66	8.13	8.00	3.00	13.00	10.00	2.05	4.21
School B	51	8.73	9.00	1.00	14.00	13.00	2.46	6.04
School C	16	8.13	8.00	0.00	12.00	12.00	2.87	8.25
School D	18	9.00	9.00	5.00	12.00	7.00	1.89	3.56
School E	12	8.71	9.00	4.00	12.00	8.00	2.33	5.45
School F	14	10.71	11.00	8.00	13.00	5.00	1.49	2.22
School G	11	10.64	11.00	8.00	14.00	6.00	1.86	3.46
School H	57	8.40	9.00	2.00	12.00	10.00	2.25	5.05
School I	13	7.29	8.00	4.00	10.00	6.00	1.77	3.14
School J	47	9.67	10.00	0.00	15.00	15.00	2.93	8.60
Total	305	9.67	10.00	0.00	15.00	15.00	2.93	8.60

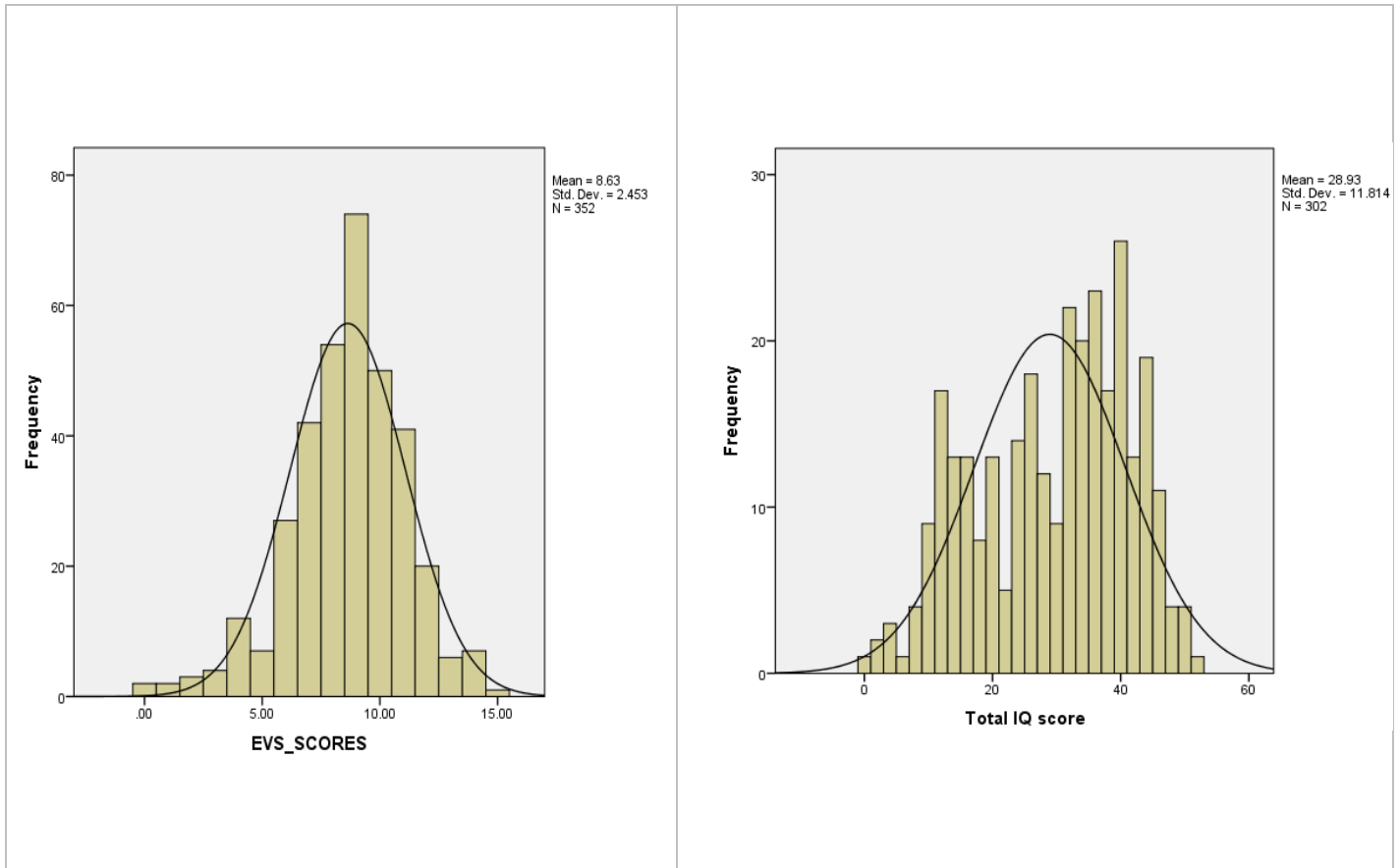
Appendix 23 - Normal distribution of diagnostic test scores



Appendix 24 – Normal distribution for language and maths scores



Appendix 25 - Normal distribution for EVS and IQ test



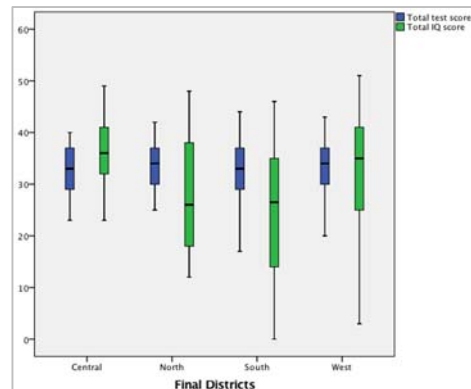
Appendix 26 – Assumptions in MANOVA analysis

A six-step assumptions check was undertaken before reaching to the conclusion through the main test. Step one checks the univariate outliers through box plots; the second step reports abnormality in the data through QQ plots. The third step verifies the presence of collinearity through Pearson's regression model and in the fourth step reports the linearity among the variables through a scatter plot. The fifth checks the multivariate outliers through Mahalanobis distance and finally, the sample size, homogeneity of variance and covariance matrices is verified with the help of Box's M test.

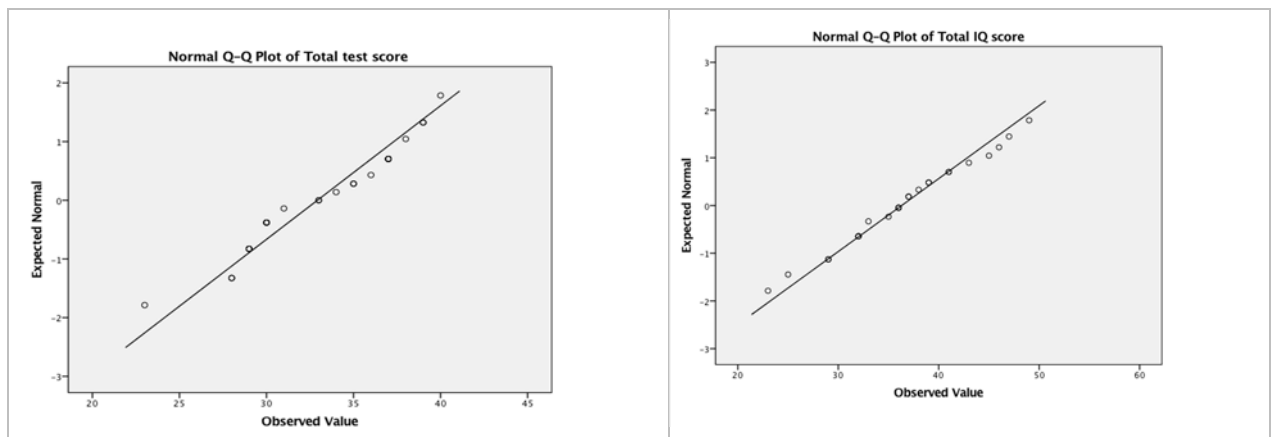
Step 1 – Determining univariate outliers through box plots

Figure 16- Box plots for Diagnostic and IQ test scores

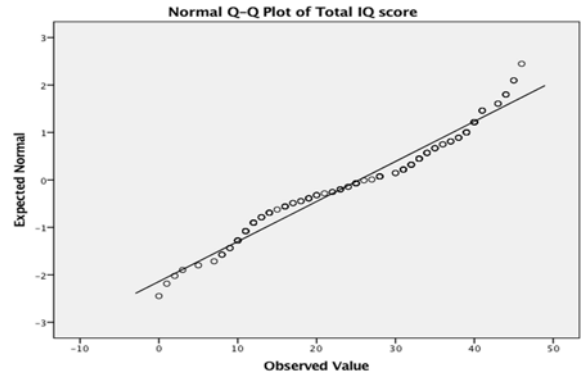
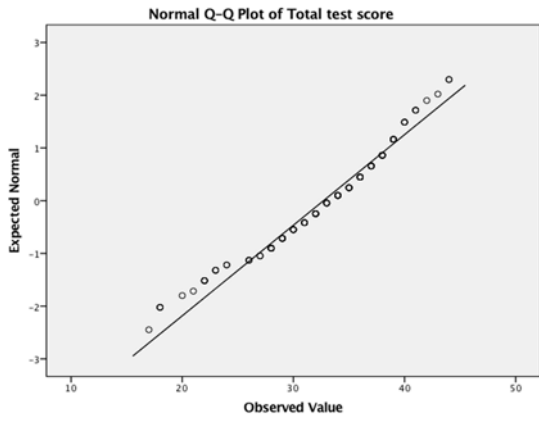
Figure F represents the box plots for the test scores, the blue plots represent the total diagnostic test scores, and the green plots show the total IQ test across the various districts of Delhi. The box plot reveals that there were no outliers observed across the districts for both, the diagnostic test scores and the IQ tests.



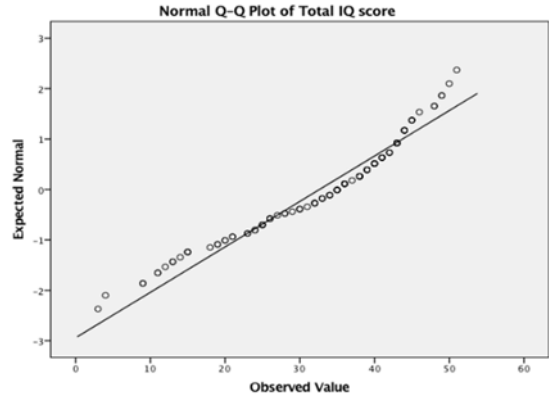
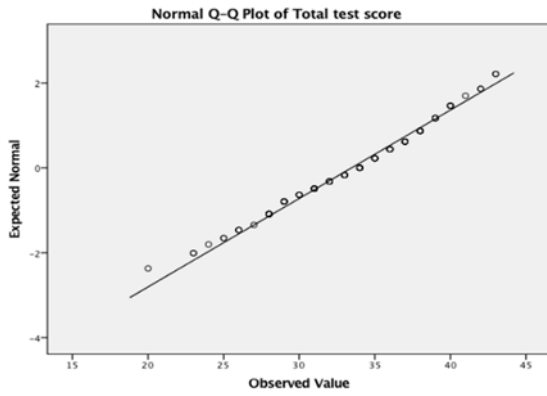
Step 2 – Checking abnormality through QQ plots



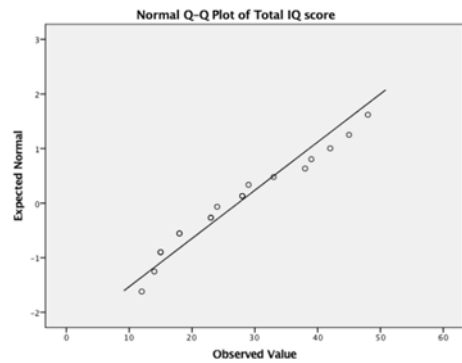
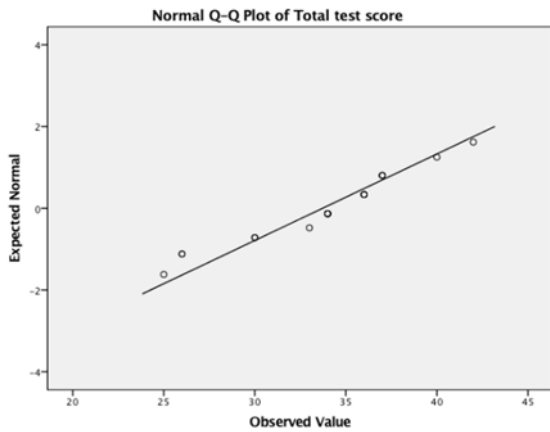
Southern districts normality plots for test scores



Western districts normality plots for test scores



Northern district normality plots



The sample data is considered to be, normally distributed if the circular dots, representing the data points are, clustered around the diagonal line. Figures 11 -14 representing the normal Q-Q plots for the test scores across the four districts of Delhi do not report any abnormality.

Step 3 –Verifying collinearity

Pearson’s regression model

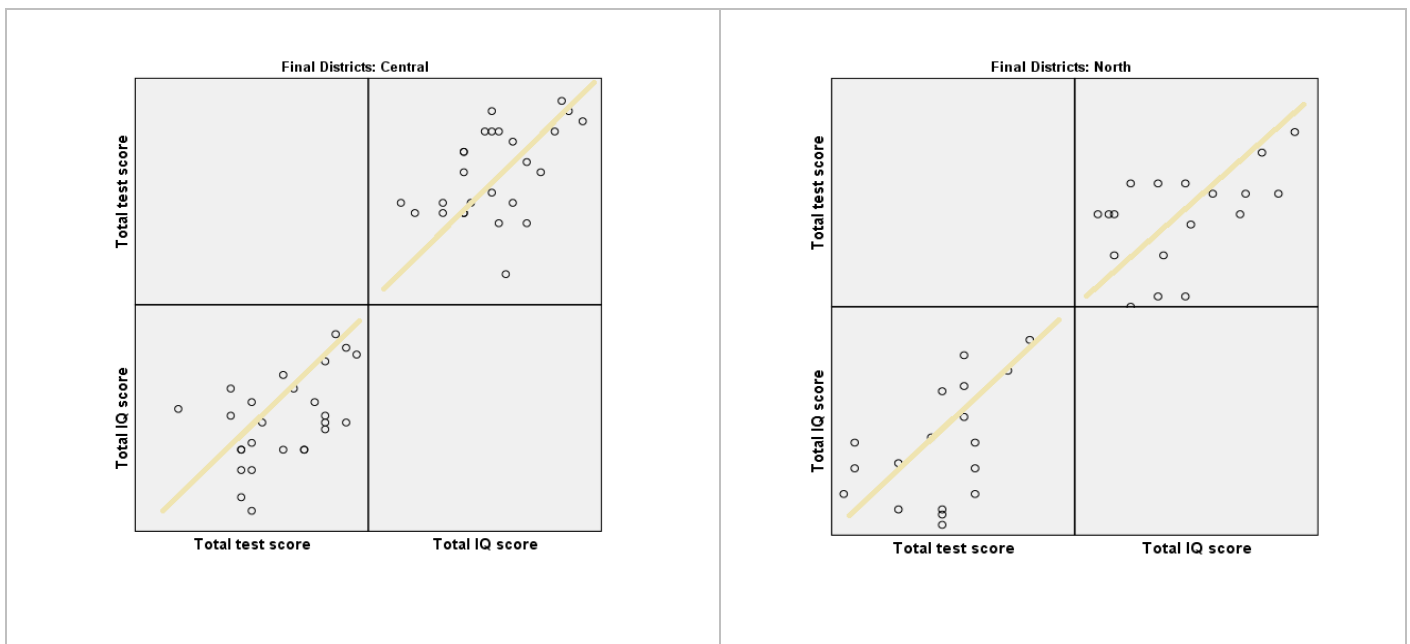
		Total test score	Total IQ score
Total test score Pearson Correlation		1	.392**
	Sig. (2-tailed)		0.000
	N	343	293
Total IQ score Pearson Correlation		.392**	1
	Sig. (2-tailed)	0	
	N	293	293

** Correlation is significant at the 0.01 level (2-tailed).

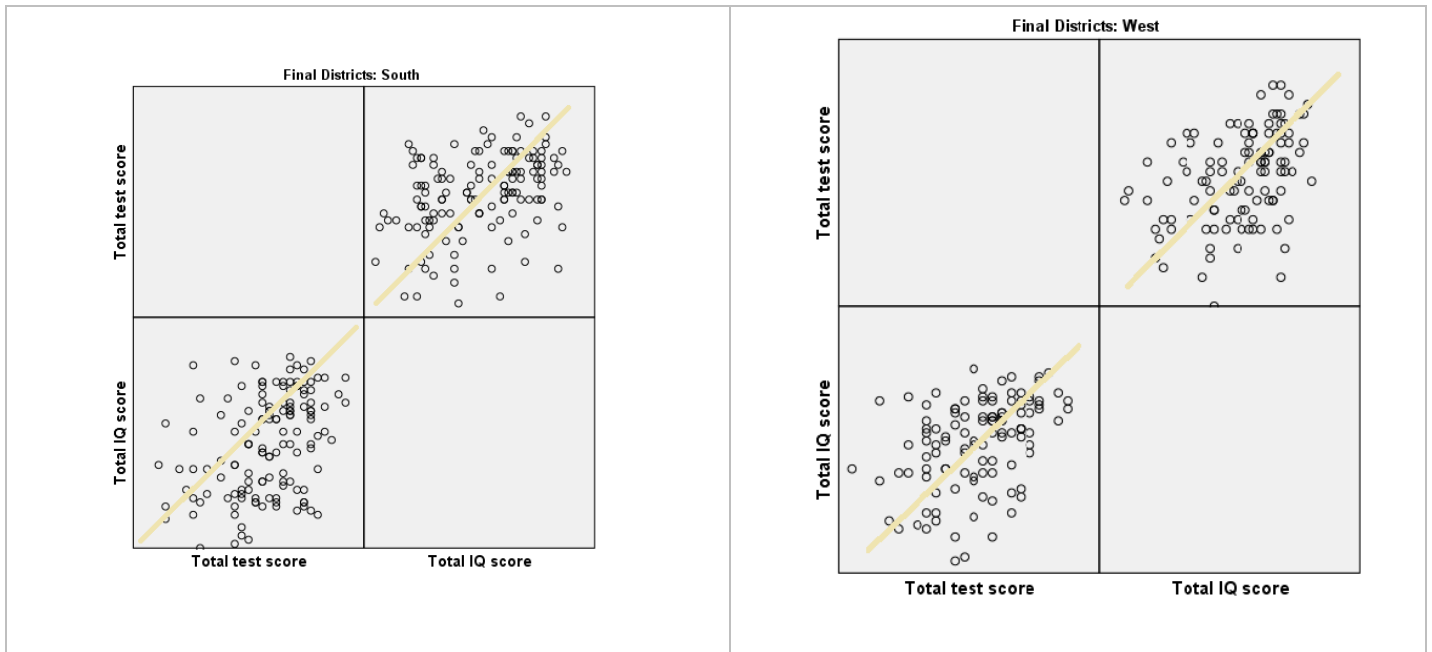
Table 21 shows the correlation between the two-dependent variable is .392, indicating a moderate correlation between the variables, indicating no evidence of multicollinearity between the variables.

Step 4 – Determining linearity through scatter plot

Scatter plots for Central and Northern districts



Scatter plots for Southern and Western districts



Figures 15 and 16 represent the scatter plots for the four districts, i.e., Central, North, South and Western indicating that there is a linear relationship between the test scores of the different districts. The linear relationship is determined by an imaginary line represented across the data points. Looking at the graphs, it is quite evident, that all the plots allow the formation of a straight line across the data points.

Step 5 – Determining multivariate outliers in the data

Step 1, determined the univariate outliers, which determined the unusual values within each group of the independent variable. However, to proceed with MANOVA analysis, it is imperative to identify the multivariate outliers in the data as well. Multivariate outliers are slightly different from the univariate, as these are data points having an unusual combination of values on the dependent variables. The research uses 'Mahalanobis distance' to determine if a particular case (test scores, in our case) is a multivariate outlier. To, calculate the distance, a unique student id was, allocated to all students. The procedure used the dependent variables, i.e., total test scores and IQ test scores to predict the distance from the student id by calculating the Mahalanobis distance. Each case would have a Mahalanobis distance calculated, and this was carried out by splitting the independent group, 'district', comprising of all the four districts of Delhi.

Figure 17– Screen shot of Mahalanobis distance

To determine the multivariate outlier one needs to look at the newly formed variable MAH-2, which indicates the Mahalanobis distance from each case. Unusual data points in a data set are, identified through the larger values created under MAH-2, and hence, the data is sorted in descending order, to bring the largest value is brought to the top.

Does_curriculum...	Are_children_det...	Do_children_und...	Do_you_know_sc...	MAH_2
1	1	1	2	10.89306
1	1	1	2	9.88702
1	1	1	2	9.48663
1	1	1	2	8.34930
1	1	1	2	7.68361
1	2	1	2	7.53181
3	2	1	2	7.26191
1	2	1	2	6.56509
1	1	1	2	6.53036
3	3	3	2	6.20238
1	1	1	2	6.19875
3	3	3	2	6.04235
3	2	1	2	5.96171
1	1	1	2	5.84411
1	1	1	2	5.40879
3	3	3	2	5.38787
3	3	3	2	5.37629
3	2	1	2	5.13317
1	1	1	2	5.07048
1	1	1	2	5.00193
3	3	3	2	4.61315
3	3	3	2	4.56637
3	3	3	2	4.49568
1	1	1	2	4.49069
3	3	3	2	4.44641
4	4	4	2	4.40882

Each Mahalanobis distance is compared against a chi-square value (χ^2) distribution with degrees of freedom equal to the number of dependent variables at an alpha level of .001 (i.e., $p < .001$). The below table provides t values for Mahalanobis distance for the alpha level for up to five dependent variables

No. of Dependent Variables	Critical Value
2	13.82
3	16.27
4	18.47
5	20.52

In our case, we have two dependent variables, and hence, the Mahalanobis distance needs to be, compared against the critical value of 13.82. Figure 17 indicates that largest value is 10.89, which is smaller than the critical value. Hence, it can be, concluded that there are no multivariate outliers in the data points assessed by Mahalanobis distance ($p > .001$).

Step 6 – Determining adequate sample size, equality of variance and homogeneity of variance

Sample size determination

Between-Subjects Factors			
		Value Label	N
Final Districts	1.00	Central	26
	2.00	North	18
	3.00	South	138
	4.00	West	111

The "N" column in table 22 shows the number of cases in each district group. This indicates that the sample size is sufficient to undertake the analysis.

Table 69 – Box test for Equality of covariance

Box's M	21.107
F	2.281
df1	9
df2	25687.105
Sig.	.015

To, determine the equality of co-variance and covariance matrices, the box test represents the significance level (p-value). For the values to have homogeneity of variance and covariance matrices the p-value should not be statistically significant, in other words ($p > .001$). In our case, the 'sig' value is greater than .001 ($p=.015$) indicating that the assumption of homogeneity of variance-covariance matrices is satisfied. In technical terms, the homogeneity of variance-covariance matrices, assessed by Box's test of equality of covariance matrices is reported ($p=.015$).

Appendix 27 - Demographic factors affecting student test scores

Information on student background characteristics included; the language spoke at home, the employment status, and the literacy levels of both the parents. More than 97.5 percent of the households spoke Hindi. In terms, of parental employment, more than 2/3rd of the mothers were not employed (83.4%), and less than five percent of the mothers were, categorised as professionals (4.6%). Close to 1/4th of the fathers were, categorised as unskilled (22%), around 2/5th of them reported themselves to be skilled (37.9%), and more than a third were, classified as professionals (36%) (ref table 54).

Most mothers had some form of education; less than 10% reported to be illiterate. Nearly a third of the mothers, stated, that they had education till secondary levels. Close to 1/4th said having a higher secondary (18.5%) or a higher education degree (16.9%). In the case of fathers, less than 2% reported having no formal education nearly a fourth (25.1%) reported to have obtained higher education. 60% of the fathers were reported to have a secondary pass or a higher secondary degree (ref table 54).

More than 3/4th of the students (78.8%) reported that an elderly family member was capable of conversing in English fluently. (68.3%) said that their siblings could understand English, this indicates that students enrolled in low-cost private schools are likely to have siblings enrolled in the same or different private schools located in the nearby periphery (ref table 54).

Table 70 – Family background of the children attending the schools

Item	Low-cost private (%)
Language spoken at home	
Hindi	97.5
Employment status of Mother	
Not Working	83.4
Unskilled	8.8
Skilled	3.1
Professional	4.7
Employment status of Father	
Not Working	4.0
Unskilled	22.0
Skilled	38.0
Professional	36.0
Education, level of Mother	

Item	Low-cost private (%)
Illiterate	9.0
Primary pass	27.5
Secondary Pass	28.1
Higher secondary	18.5
Higher education	16.9
Education level of Father	
Illiterate	1.7
Primary Pass	14.2
Secondary Pass	28.4
Higher secondary	30.7
Higher education	25.0

Table 71 – Capability to speak English by elderly or siblings

Item	Low-cost private
English is spoken by an elderly member	78.8%
Siblings capability to understand English	69.2%
Total – (N)	305

Regarding asset ownership, particularly related to dwellings, data indicates that almost a majority of students (98.5%) enrolled in cost private schools are likely to reside in concrete buildings and reported to have toilet provisions within the property (94.9%). With easy availability and lower costs, digital assets – including; items like television, DVD, smartphones and laptops seem to be available in a majority of households. 98% of the students reported having a television and 88.9%, said that they had smartphones in their homes. More than 2/5th of the students responded positively to the availability of DVD players and laptops in their homes. Core assets included like refrigerators (87.4%), air coolers (76.3%) and bicycles (56.6%) for commuting were available in more than half of the homes surveyed. A luxury asset like a car was reported only in 1/5th of the homes and fixed assets like house and shops were reported just in 26.8% of the households (ref table 55).

Table 72 - Real Estate and Asset ownership characteristics across by the type of school attended

Item	Low-cost private
Type of building	
Concrete building to live	98.5
Toilet provision near the property	94.9
Kitchen provision in the property	87.4
Core and ancillary asset ownership	
Refrigerator	87.4
Air cooler	76.3
Cycle	56.6
Car	21.2
House or shop	26.8
Digital asset ownership	
Television	98.0
Digital Video Disc (DVD) Player	46.0
Smart Phone	88.9
Laptop	44.4

Impact of demographic factors on diagnostic test scores

Family factors impacting test scores were assessed by a regression model, determining an overall fit and contribution of each of the predictors (independent variables) to the total variance in the dependent variable (diagnostic test scores). The following regression model was used to determine the impact of covariates on test scores.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_n X_n + \epsilon$$

Where, Y is the dependent variable, i.e. diagnostic test scores, and the eight independent variables are represented from X_1 to X_8 . β_0 represents the constant, and β_1 is the slope coefficient for X_1 , β_2 for X_2 so on and so forth, and ϵ represents the errors. Independent variables include X_1 – student age, X_2 – number of members in the family, X_3 – language at home, X_4 – siblings’ capability to read English, X_5 – employment status of father, X_6 – employment status of mother, X_7 – education level of father and X_8 – education level of the mother

The regression model is statistically significant to predict the test scores, $F(8, 211) = 4.46$, $p < .0005$. Variance in the data, as determined by R^2 was reported at 14% with an adjusted R^2 of 11%, indicating a moderate association between the variables. For determining the independence of the residuals, the Durbin Watson statistic (1.328) closer to 2, confirms that the residuals were independent of errors (ref table 27 and 28). The linearity of the relationship between the variables was assessed by a scatter plot as shown in the figure. (Ref figure 18)

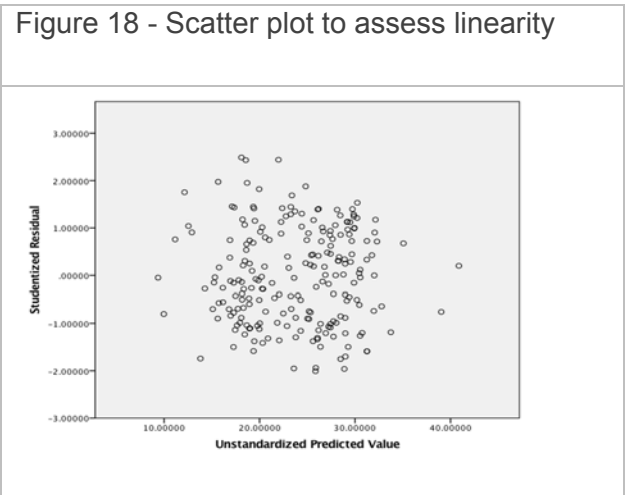


Table 73 – Regression model summary

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Durbin-Watson
1	.380a	0.144	0.112	7.495	1.328

Table 74 – Regression model summary

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1997.787	8	249.723	4.446	.000
Residual	11852.049	211	56.171		
Total	13849.836	219			

Table 75 - Summary of multiple regression analysis

Factors	B	SE _B	Beta	t	Sig.	Lower Bound	Upper Bound
Constant	25.625	4.262		6.012	0	17.223	34.027
Student Age	0.189	0.291	0.042	0.648	0.518	-0.385	0.762
Family members	-0.41	0.203	-0.133	-2.025	0.044**	-0.81	-0.011
Language at home	0.612	0.737	0.054	0.83	0.407	-0.842	2.066
Siblings capability to read English	-0.912	0.383	-0.153	-2.378	0.018**	-1.668	-0.156
Employment status of father	0.149	0.617	0.016	0.242	0.809	-1.066	1.365

Factors	B	SE_B	Beta	t	Sig.	Lower Bound	Upper Bound
Employment status of mother	-0.714	0.674	-0.069	-1.06	0.29	-2.042	0.614
Education level of father	0.751	0.515	0.107	1.459	0.146	-0.264	1.766
Education level of the Mother	1.607	0.491	0.238	3.274	0.001**	0.639	2.574

The regression model showed that large family sizes are likely to have a negative impact on the test scores, as parents and guardians cannot focus their attention in cases, where there are more than 2 or 3 children in a family. Moreover, in India, people still live in joint families, in which a single female or two, manage an entire household of 8 to 10 people. This restricts their time to assist their children with academic lessons.

Parental education has a positive impact on positive impact on student test scores. Mother's education in case of the research was, found to be statistically significant, with test scores.

Sibling's capability to read English language seems to have an adverse effect on student test scores, and there could be two possible reasons attributed to it. First, it is quite likely that parents tend to focus on the children who learn faster and better and hence neglecting the slow learning kid. Second, development of inferiority complex, wherein a child with slower learning capabilities may feel ashamed to develop one's capabilities. Other factors such as student age, language spoken at home, employment status of parents indicate a positive relation to the dependent variable, however, they are not significant.

Appendix 28 –Interview with school owner

Full transcript of interview School one. Name of the respondent has been withheld to protect their identity.

Gopal Iyer (GI) - Hi, good morning my name is Gopal, and I am from Newcastle University, researching on the phenomenon of school closure in the area. My colleague Ankit spoke highly about your school and it's finally good to meet you.

SS- Hey good to meet you as well. Tell me how I help you today.

GI- Thank you for your time and accepting to be interviewed. I shall be taking a few notes as we carry out the discussion. So, could you tell me how you started the schools and are you aware of the RTE Act that started in 2009?

SS – Sure, I belong to the northern state of Uttarakhand, and I struggled myself to get a quality education and hence, he decided to start a school in the slums of Delhi. I have a strong conviction that first generation learners are capable of learning and so I am happy when children coming from poor and impoverished backgrounds can speak English.

Yes, I am quite aware of the RTE norms and regulations set out by the government, and I have gone through them, albeit not very much in detail.

GI – Do you know if the provisions of the RTE apply to your school?

SS – Yes, I am aware of the provisions of the RTE, and I feel some of the provisions are helpful in academics. However, many of the regulations hinder academic growth and are quite administrative in nature. Also, many regulations are quite capital intensive in nature and forcing small educational entrepreneurs like us to devote our time and energy on trivial matters rather than the crucial ones.

GI - Have you applied or received Government recognition? If not, are you aware of the procedures to get Government recognition? Have you submitted the required forms to the District Education Officer? (Each state has outlined the procedures and requirements that you need to fulfil to get Government recognition)?

SS - Yes, our school applied for the recognition, and according to the criteria we would require around 4000 square yards of space. I started school in the year 2006 and had applied for recognition in 2007. I did not receive any notifications for closure till date, however the department of education had listed the school in the category of 'defaulters' as we had some delay in the renewal process, for no fault of ours. I fought for recognition and finally received the recognition in September 2015

GI - Can you let us know what hurdles do you face when you apply for recognition? What happens when you are not able to obtain the recognition from the local authorities?

SS – I think the regulations are quite skewed towards the administrative side rather than the academic ones. The RTE in my view sets out a complex set of regulations and expects small budget schools to follow them, even though the extent to which these regulations improve learning outcomes at elementary or secondary levels is quite questionable. I have undertaken massive capital investments to comply with the rules and regulations, and hence, our school received recognition in 2015. However, this was 'provisional' which means

that the school is required to renew the recognition certificate every year with the Department of Education.

GI - How many times have you received notices for non-compliance with the RTE norms and regulations?

SS – We haven't received notices for non-compliance however, our school was classified in the defaulter's list as there was a procedural delay from the education department's administrative end, while led to delays for our school in procuring the recognition.

GI - Do all students in your school get free education? (Y/N). If there is a fee for students, how many students pay the fee? How much is the fee?

SS- Given the cost of teachers' salaries, fixed capital and working capital costs we cannot afford to provide free education. We charge a monthly tuition fee of 500 Rs/- (approx. 5£) apart from the other fees. We do have separate charges for uniform, bags and books that we provide to children.

GI - How many of your students belong to SC/ST (schedule caste/schedule tribe) and OBC (other backward caste) categories? Do you have students from Below Poverty Level (BPL) families?

SS- We have a total strength of 700 students and close to 63% of the entire school population were from SC and OBC backgrounds. We do not have children from the ST backgrounds.

GI - What is the curriculum does your school follow? Do you follow CBSE/ICSE/State syllabi? If not, are you confident that the school curriculum meets the prescribed RTE norms?

SS – AT the school we follow the CBSE curriculum, as he mentioned that the curriculum did not help children to improve their learning levels.

GI - Does the school offer scholarships or financial incentives to the enrolled students?

SS – We do provide rebates in school tuition fees for those coming from extremely impoverished backgrounds and lowest economic strata of the society. However, we cannot afford to fully wave school fees.

GI - Did your teachers receive any kind of training in the recent past? If yes, what training did they receive and who trained these teachers?

SS – In our school, we did not have any specific trainings related to the RTE, however refresher training's for teachers are held on an ad-hoc basis by calling external experts. We have expert teachers from DPS and Sanskriti who provide training to our teachers on the fourth Saturday of every month".

GI - How many working days does your school have every year for Primary Classes? What is that number for Upper Primary Classes? What are the school hours daily?

SS- In our school teachers work for 220 working days and 1320 instructional hours for teachers. I believe this is far more than the requirement of the RTE norms.

GI - Does your school meet the requirements as stated in the RTE schedule of the Act? Please consider the below aspects of the RTE and confirm if they comply with the below standards?

SS – Sure, can you show me the table and I will help you to do the checks.

Item	Norms & Standards		Mark (✓) if applicable
No. of Teachers		Number of teachers/days/ hours	
For classes 1 to 5	Up to 60 students	2	✓
	Between 61 to 90	3	
	Between 91 to 120	4	
	Between 121 to 200	5	
Teaching-learning equipment	Provided to all the classrooms as required		✓
Building	All-weather building consisting of :		✓
	At least one classroom for every teacher and a multipurpose office-store;		✓
	Barrier-free access		X
	Separate toilets for boys and girls.		✓
	Safe and adequate drinking water facility to all children		✓
	A kitchen where midday meal is cooked in the school		X
	Playground		✓
	Arrangements for securing the school building by boundary wall or fencing		✓
Minimum number of working days/ instructional hours in an academic year	For class 1 to 5	200	✓
	For class 6 to 8	220	✓
	For class 1 to 5 (Instructions hours)	800	✓
	For class 6 to 8 (Instruction)	1000	✓
Minimum number of working hours per week for the teacher (Including preparatory)	Forty-five teaching including preparation hours	45	✓
Library	Library in each school providing newspaper, magazines and books on all subjects, including story-		✓
Play material, games and sports equipment	Shall be provided to each class as required		✓

Our school followed almost all the provisions of the RTE Act except we did not have any barrier-free access for handicapped children, as we have not enrolled any disabled children in the schools.

GI - Did any school inspector visit the school in the recent past? If yes, when was the last visit? How often do they visit? Was there any communication concerning the RTE?

SS – Yes, school inspectors from the education department visited the school twice, and the last visit was on 2nd May 2016. The inspectors indicated that there was no scientific laboratory for children, as well as the library. Hence the school had invested in the laboratory and library.

GI - What do school inspectors do when they find the school non-compliant with RTE? How do you usually cope up with the inspection visit?

SS- Usually the communication is quite straight forward; however, one can sense as to what they are hinting towards. Most inspectors would ask me to meet in private and discuss the bribe related matters during the private meeting.

GI - What happens to the teachers, who are associated with the school in the advent of school closure?

SS - I am afraid that the teachers would be unemployed. Some experienced teachers may find jobs, but most of them would be jobless. Moreover, it would also impact the children as they would either drop out from the education system entirely and join the manual labour stream or enrol themselves in the overcrowded government schools. I see that there is a huge problem from the government in terms of capacity building. If the government provided good quality education, may be small players like us would have never existed. But thankfully that's not the case. I think that the government does not understand the concept of quality education.

GI - Is there any other additional information present in the RTE provisions, which you like to share, apart from the ones not covered in the questionnaire?

SS- I think that's it, I have covered most of the issues about the RTE.

GI – Thank you for your time and it was great chatting with you, also I appreciate the school tour.

SS-You are welcome and all the best for your future endeavours.