

CREATING NUDGES AT THE SCHOOL LEVEL TO RAISE LEARNING OUTCOMES



Internship project done by Bhavya Jain

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Summary

India's education system stands at a crossroads, facing both challenges and opportunities. As the world's largest education system, it has the potential to transform not only the lives of individuals but also the entire nation. Education is a fundamental right for all children aged 6-14 and despite a mandated reservation for economically disadvantaged families, low literacy levels persist, especially in rural areas, and there is a decline in achievement scores, particularly in mathematics.

When compared to other countries, India's global rankings are low in standardized assessments. China prioritizes discipline, rigorous academics, whereas the USA fosters an environment of innovation, creativity, and flexibility. The UK adopts a balanced approach, combining digital literacy with cultural preservation and rigorous examinations, emphasizing vocational training and practical skills.

India's education system is affected by cognitive biases such as students choosing career paths based on societal prototypes and resistance to change in curriculum and teaching methods. To address these challenges, India can implement nudges—small, deliberate interventions grounded in behavioral economics principles—to transform its education system such as personalized learning paths, gamified approach, interdisciplinary learning, higher community engagement, teacher development and attention to student well-being.

Methodology of approach

- a) Comparison and review of learning outcomes at Class 1, 3, 8 and 10 between India and other nations and analysing reasons for the shortfall if any in India.
- b) Deeper dive in dominant reasons related to the nature of activity set, rules, relationships and incentive structures in the eco-system that define education process. Analyse the socio cultural and regulatory context regulations, behavior of players.
- c) Summarize, relevant heuristics, biases and their relationship to the current activity set and rules to form the basis of creating the nudges.
- d) Propose a set of "nudges," to move outcome in the desired direction. Nudges at different class stages including related area e.g. keeping children in school.

Introduction

When considering the educational landscape across different developed and developing countries like India, China, USA, Germany etc. we can understand the factors that come into play. As Nelson Mandela once said ' Education is the most powerful weapon which you can use to change the world. Education comes at the core of a progressive society which gives it immense transformative power, not just for an individual, but for a nation. A nation that is well educated will promote a culture of creativity, critical thinking and problem solving which will lead to innovation and development, driving technological advancements and allowing individuals to contribute more to society. A well-educated society will also aim to develop an individual's personality and promote virtues like empathy which benefit societal development. Each country has a different educational system, and this paper will explore the differences and talk about potential nudges.

India's education system

India has the largest education system in the world with the most school-going children in the world. India has approximately 250 million children attending over 1.5 million schools, taught by over 9.2 million teachers (Centre Square Foundation 2020). Many Indian students gain international recognition for their remarkable achievements in maths and sciences. Some key aspects of the Indian education system include -

Inclusivity and diversity

Right to education act

The right to education act in 2009 marks a monumental moment in Indian education by making education a right for all children aged 6-14. Furthermore, the act mandates that primary schools have a 25% reservation for families that are economically disadvantaged.(Citation). As a result, the primary Gross enrolment rate reached 96.7% in 2018 (UNESCO, 2018).

Multilingual education

India famously adopts the three language formula, where students are required to learn Hindi, the national language of India. English, the international language and finally the language of their respective state or region. This develops national integration while also preserving values of their region and preparing them to be international students. Learning of languages fosters cultural appreciation and helps students become better communicators.

Social Inclusion

Many scholarship programs like the Pre-Matric scholarships for minorities aim at promoting social inclusion. These programs are for economically weaker sections of certain minorities which provides a chance for quality education for them.

Growth of higher education

The Indian higher education system is gaining global recognition for the Indian Institutes of technology(IITs) and the Indian Institutes of Management(IIMs) which consistently rank in the top 200 universities worldwide.(Citation)

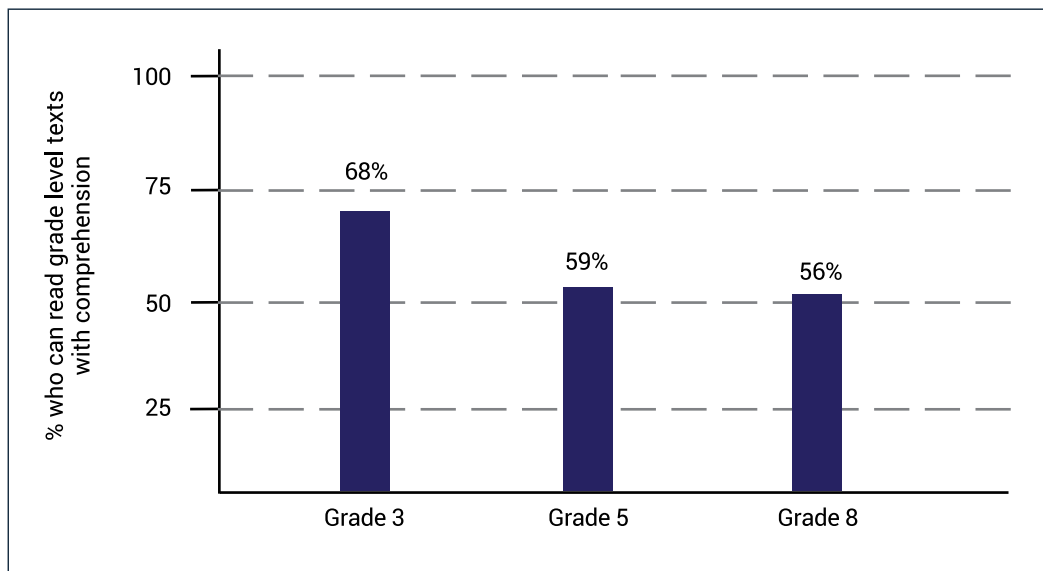
Research and innovation

As part of the IMPRINT(Impacting Research, Innovation, and Technology) initiative, funding over a 1000 crores has been provided to fund research projects in higher education institutes across India. The project primarily focuses on new and improvable industries like nanotechnology and renewable energy.

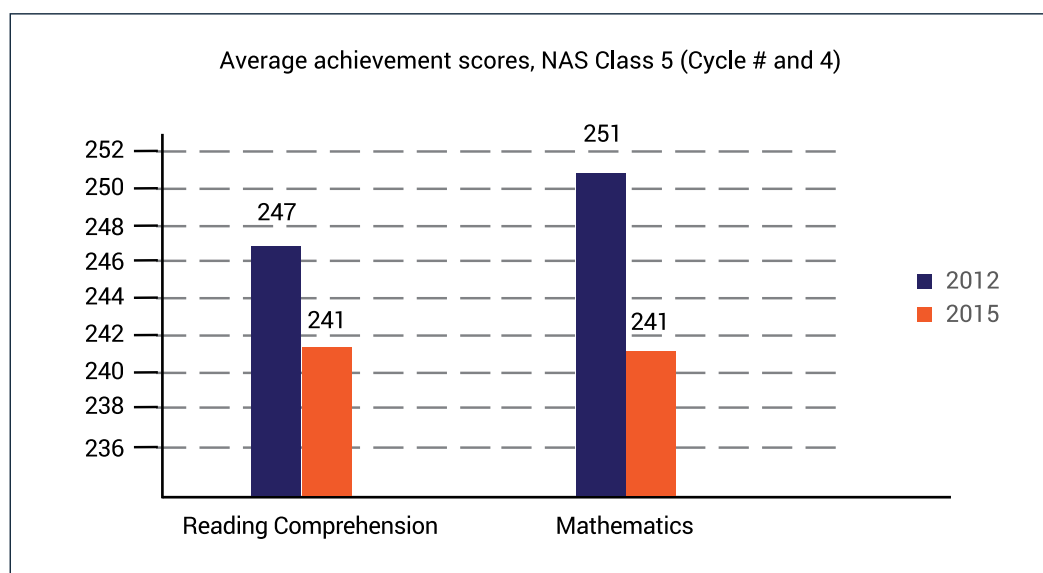
Emphasis on science and technology

Foundational development in computer science and engineering have led to India producing world-renowned IT professionals and engineers. India's software industry which is valued at more than \$194 billion owes a part of its success to strong skill development in schools. India's STEM investments have also been growing rapidly with many government initiatives like the promotion of University research and scientific excellence(PURSE) program which creates incentives for universities to undertake challenging research projects which lead to innovation and development.

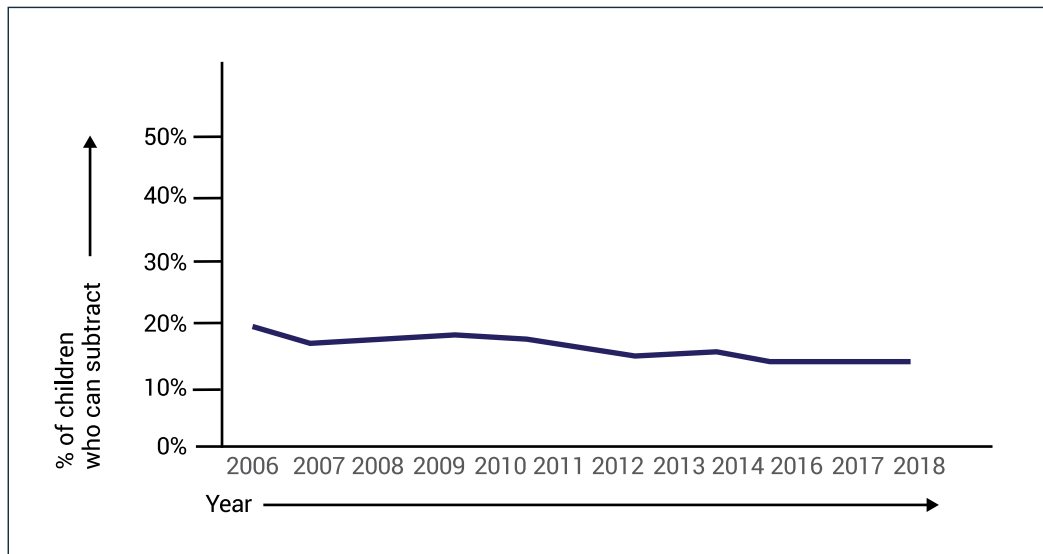
Despite many leaps in Indian education and several ambitious government and non-profit organisation projects, India still lacks behind foreign countries in many key indicators.



1. 44% of grade 8 students cannot read small universal grade level comprehension texts.
2. 57% of grade 8 students cannot solve universal grade level daily life problems using maths.
3. According to the annual status of education report (ASER) conducted in 2018, the statistics worsen greatly when we consider only rural areas, where
 - a. 73% of the students in grade 3 cannot read a basic grade 2 text.
 - b. 72% of the students in grade 3 cannot do subtraction
4. The cause of concern, furthermore, is that despite several government initiatives these indicators are worsening, the average achievement scores for mathematics from the National achievement survey(NAS) 2017 show that there has been a 4.15% decline in scores for class 5.



5. The percentage of students who can do simple subtraction has declined between 2007-2018 for all grades.



India's struggling educational system reflects in global rankings. According to a PISA assessment in 2015 which conducted standardised tests for 77 countries, India ranked 72nd. This shows a clear fault in India's foundational literacy and educational standards.

International context

Many other countries, like China that prioritise discipline, rigorous academic work and frequent assessments achieve excellence in stark contrast to India. Students from major Chinese cities like Beijing, Shanghai, Jiangsu and Zhejiang ranked first in reading, mathematics and science. According to the world bank, China invests 4% of its GDP annually on education, this shows China's commitment to maintaining its high educational standards. The United states approach to education is different, yet achieves equal success, it's based on fostering an environment on innovation, creativity and flexibility for students to make their own decisions. The U.S is known for its outstanding institutes for higher education like Sandford, Harvard and MIT that attract millions of foreign students. The United kingdom is known for its balanced approach, also being home to some the world's top universities like Oxford and Cambridge. It emphasises on a blend of digital literacy and preserving cultural values, rigorous and competitive examinations like GCSE's and A Levels ensure consistent and challenging academics. UK additionally emphasises on vocational training and ensuring that students learn essential practical skills along with theoretical academics, ranging from lab work in the sciences, to mandatory first-aid courses for high-school students. Having essential practical skills not only prepares them for real-work in their suited areas but also makes them better equipped with problem-solving and critical thinking skills which are valuable to employers. All three of these countries emphasise on meticulous teacher-training, ensuring mandatory workshops and qualifications for all teachers to ensure the highest standard of education.

Dominant Reasons for India's shortfall

Accessibility to education in India's rural regions is scarce. Considering, that approximately 2/3rds of India's population lives in rural areas, this presents a significant problem. Around 20% of all rural schools do not meet pupil-teacher ratio, furthermore, many surveys have found out that many schools in rural India are functioning without access to basic facilities like water, sanitation, electricity and toilets. Other than buildings, the lack of funds or inefficient allocation of funds lead to lack of textbooks and stationary for students which directly impact their ability to learn. This hampers the learning environment and reduces productivity for students. If students aren't given the right environment and equipment, they are also disadvantaged in

international competition. Furthermore, the Covid-19 pandemic represented a major problem for learning in these areas, the outbreak of covid meant that lessons had to be online however most teachers and students cannot afford electronic devices, or are not given proper training on how to operate them. Many studies also showed that most teachers in rural areas are untrained and haven't finished 14 years of learning themselves.

Outdated curriculum and examination system, while the educational landscape has changed significantly in the last many years with major cities like Mumbai, Delhi and Ahmedabad adopting international curriculums. Many states, however, who still use their own curriculum have many clear flaws in their system.

1. Rote learning and examination focus

For many states, the current education system emphasizes rote memorization instead of thinking and problem-solving skills. A study by the British council in 2014, 56% of Indian employers themselves stated that the current education system emphasizes rote learning over development of skills. The lack of these skills affects their performance on standardised aptitude tests where memorisation can't help. Countless studies also show that strict textbook memorisation stifles creativity.

2. Rigid schedule and lack of choice for students

The curriculum for students in India limits their freedom in exploring their field of interest. In the Indian curriculum, students only get to go into 3 fields of study, 'commerce'; 'science' and 'arts' with arts being significantly unpopular. The lack of flexibility doesn't allow students to strengthen their skillset in their field of interest.

3. Failure to adapt to technological developments

The world of today is developing rapidly, with digital technology being at the centre of this development. India's curriculum, however, fails to incorporate digital tools and methods in its teachings, which puts it at a disadvantage to foreign countries like China that fully utilise technology to monitor and enhance each student's progress.

4. Regional disparities

While the adoption of the three language system and each state having a unique curriculum is good for diversity, it furthers the inconsistencies in opportunity for different students. Countries like the UK and US that have a centralised form of curriculum delivery find it easier to analyse data in the form of assessments and understand where they lack.

Inequality and discrimination in access to education

Many strides are being made in closing the gap in inequality but it's still a problem in India. Girls will find it harder to access education due to the prevalent beliefs that girls should focus on house-work from a young age. In many areas, there are also safety issues for girls that arise which makes family cautious in sending girls to school. Lack of sanitation facilities for girls also adds to this problem. The quality of education is also directly linked to economic status, with factors like infrastructure, rigor of academics and quality of teachers varying hugely. Teacher training in dealing with special needs kids is almost non-existent and kids that do require a different method of teaching often have to drop out of school or repeat several grades.

Cultural differences and student and teacher absenteeism

Regulatory framework

India's education system has a complex set of regulations that surround it. These regulations are ambitious and have noble intentions such as nation-wide access to quality education, improved literacy rates and social equality. However, many practicalities fail to be considered, bureaucracy and conflicting policies forestall the effectiveness of the system with unintended consequences.

The right to education act(RTE) in 2009 was the first major policy, the aim was to develop a framework which could ultimately lead to free and compulsory education for all children between the ages of 6-14. The policy has had clear success in expanding access which enrolment rates in the primary education sector reaching 96.7% in 2019 according to the world bank. However many mandatory standards set by the act like classroom size and mandatory facilities has led to many low-budget private schools being shut down which has affected the education of more than one million children. This is because the market equilibrium for facilities and teacher quality in India is especially low, the introduction of mandatory standards that are above these levels disrupts the markets and leaves many teachers out of jobs, and forces schools to shut down. Not to mention that some kind of education even if not up to the standards will be better than no education whatsoever. Furthermore, the RTE made the approval procedure for grants and research projects given to students and institutes of higher learning more cumbersome by involving several steps of bureaucracy in between. This stifles innovation and hampers India's ability to effectively respond to market needs especially when we consider International competition, the act limits the ability of Indian universities to adopt the best global practices.

The absence of a centralised body governing India's education adds to the problem. Multiple states having various different policies and styles of education creates unnecessary separation. This leads to un-fair policy development which benefits only certain states, many issues in coordinating, waste of resources on duplication of efforts and the lack of a clear direction to where India wants to head in its educational landscape.

These challenges were acknowledged by the **Indian government and led to the development of the National Education Policy(NEP) in 2020**. Learning from previous shortcomings, the education policy aimed to reform the Indian education landscape. It focuses on a more holistic approach to education rather than a strict examination focus approach. The policy also focuses on more flexibility and research focus adopting many international practices. The success of this policy is yet to be seen due to its recency. The aims of this policy are made clear by the Indian government on their website, "Education thus, must move towards less content, and more towards learning about how to think critically and solve problems, how to be creative and multidisciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields."

Players and their behaviours

Each stakeholder or player in the education system of India has a unique role. Understanding the actions of these players can offer valuable understanding into the challenges of Indian education.

Governing bodies

Various governing bodies that are involved include the Ministry of education, state education departments, and various regulatory bodies like UGC(university grant commission) and the AICTE(All India council for technical education). The role of these players is to form policies, maintain regulation, quality and decide where funds go. Different challenges these bodies face is avoiding bureaucratic inefficiencies, managing conflicting policies across different states in India, and dealing with political pressures. Each state having separate heads or panchayats that control the education can cause difficulties as communication between the key governing bodies like the ministry of education and the smaller state or town heads will be scarce. Nation-wide policies that are implemented will seldom reach small rural towns.

Educational Institutions

Educational institutes are the players responsible for providing education. Public institutes that are funded by the government usually are instrumental to the RTE act and being able to provide free education countrywide. They are heavily reliant on the government and challenges arise when funding comes with strict regulations on its usage which hampers creativity and innovation for these institutes. Private schools on the contrary, bring diversity and innovation as they have the freedom to educate their own way. Both these are essential, as private institutes have been at the forefront of innovation and global competitiveness. While public institutes have been crucial to providing education for the less economically fortunate.

Teachers and educators

Teachers' qualifications and skills determine the quality of education. In rural areas of India, the teachers faces critique for lack of training. Under the RTE, certain formal qualifications are required for teachers, however, these qualifications are outdated and do not require the current market and industry needs for education. The behaviour of teachers is shaped heavily by external regulations and state board requirements and slightly by internal motivations. Initiatives to enhance skill development in teachers are needed alongside regular monitoring of teaching quality.

Students and parents

Students and parents are the players being directly affected by the Indian education system. As India has been rapidly growing its economy, the rising middle class has fuelled the demand for education. Wealthier parents also understand the importance of education and spend tons of money on private tuitions for their kids. This competitiveness for education has led to increased quality and innovation in the field of education. However, it has also created a stressful environment for students, creating a culture of rote learning to get the highest possible marks on examinations. Needless to say, some students have an unfair advantage compared to others which leads to many students' true talent never coming out.

Industry employers

The education system needs to match the ever changing needs of the labour market. The collaboration between industry and universities is growing rapidly however at the school level, students still aren't taught industry specific vocational skills that are valuable to employers.

NGOs

Many NGOs play a supplementary role in supporting government efforts. These NGOs focus on helping marginalised groups and the less fortunate which is important for increasing accessibility. Many notable NGOs like Pratham and centre square foundation have made strides in school-level education with new research and policy intervention for state governments.

Socio Cultural context

Education in India is hugely affected by many cultural factors. A 2010 study by Thorat and Newman found out that children from marginalized communities face discrimination and unequal opportunities. Students from lower castes have significant lower literacy rates. Surveys found out that that students from these castes often get bullied and excluded in social settings inside school, these affects the mindset of students and hinders their ability to learn. The study also found out that these students have lesser knowledge and access to scholarships, grants and employment opportunities which creates a vicious generational cycle of poverty where the lower castes are unable to get a proper education and break the cycle. In many rural areas of India, old-school beliefs are still prevalent. These include the belief that girls should not be educated and boys' education should be prioritised. Which explains why the literacy rates for girl is much lower. Furthermore, many parents are still oblivious to the benefits of education and refuse to send their kids to school, they have the belief that working from a very young age is more productive as kids can immediately contribute to the household income.

Understanding behavioural economics

Behavioural economics is the combination of psychology and economics to try and understand how individuals make certain decisions. Contrary to classical economics, this field of study acknowledges that people will often act irrationally and are effected by emotions and biases. The learnings from this field of study can be applied to education to make more effective policies and interventions. Specifically, we can use behavioural economics can explore how different key players(students, teachers, parents and policymakers) all make choices. Understanding the thought process and incentives for these players can help the government or non-profit and social oraniations to design interventions and policies that 'nudge' individuals to make decisions that lead to better learning outcomes.

Identifying key biases in the Indian education system

Representative Heuristic

The representative heuristic is when students judge the probability of success based on the in-built prototype already available in the system. In India's education field most students will aspire to be either doctors or engineers as those fields represent success in the community as such a large proportion of the Indian upper-middle class are doctors and engineers. Students may choose these paths due to pressure from family and society instead of paths they are interested in. Social norms can also be a bias in our thinking as students conform to what they think is acceptable in society rather than what they have aptitude for.

Status quo Bias

Humans by nature are adverse to change. This bias represents our preference for things as they are. Throughout India, many state governments especially in rural areas will resist change to existing systems and curriculums. When in an ever evolving world, the industry needs are constantly changing and education needs to reflect that. Specifically, the integration of technology is necessary to advance learnings but small towns and certain states will not be open to change due to this bias. Resistance to change also affects India's international competitiveness as India is unable to learn and adopt the best practices from other nations.

Stereotype Bias

Expectations from different groups can vary can affect the student's learnings. Old-fashion thinking in rural areas leads to lesser educational accessibility for girls and certain social minorities. A study by Agarwal and Dhanraj, shows how teachers can have biases against students from lower socio-economic backgrounds. This has a direct impact on maintain the chain of poverty and the test scores for these children.

Nudges that can be used

Nudges in curriculum and learning

The notion of creating personalized learning paths is backed by a growing understanding of the unique needs and abilities of students. Traditional "one-size-fits-all" models are gradually giving way to adaptive learning platforms that harness data analytics to tailor instruction to individual learners. In India, this represents a radical departure from rote-learning approaches and emphasizes the importance of fostering conceptual understanding and critical thinking. By nudging students toward optimal learning sequences, educators can balance challenges and successes to maintain engagement. Pilot projects like Mindspark have shown promising results in using adaptive learning to enhance student performance in mathematics (Muralidharan et al., 2017).

Nudges in curriculum

Personalized learning paths

Like many European countries personalized learning paths can be used to cater to each student's individual needs. For example, if a particular student is not as competent in maths but makes up for that in reading then the student should focus on reading. This can be done only in the higher grades as it is essential for students to get a holistic education in the earlier grades. Further research into technology is essential for this to work. Another way to personalise learning experiences without disrupting the curriculum is for teachers to give students additional project work in areas where they show aptitude to boost their confidence.

Gamified approach

A gamified approach would include employing game elements in learning, these can include point system with a leaderboard, badges for different accomplishments or challenges with some sort of small reward. Some educational tools like BYJU'S and Toppr which have gained popularity in urban areas of India already incorporate this however schools do not use these tools in classes. Schools can adopt this approach by incorporating regular quizzes or competitions where students can earn points which will affect a sort of daily leaderboard. The top 2-3 students at the end of the month can be awarded with certificates or badges. This will foster an environment of competition and make learning more engaging. This can also be combined with the previous point of personalized learning development, teachers can give personalised challenges for each students which stimulate levels of a game, this will allow each student to move at their own pace and still feel constantly challenged. To incorporate it, the government or state heads will need to partner with large technology companies like BYJU's to bring this into classrooms.

Interdisciplinary learning

India's education has very often been criticized for its emphasis on rote learning and lack of flexibility. Nudges towards interdisciplinary learning will be greatly beneficial in creating a more contextual understanding of real-world issues. This would include more project-based learning rather than textbook learning. These projects would be designed around themes like environmental sustainability, that draw from different disciplines like biology, geography and economics which makes the students draw on their understanding from all these fields which will foster the development of skills like critical thinking.

Nudges to boost community engagement

Parent-Teacher collaboration

Online tools can be used to regularly update parents about their children's performance. This can be done in the form of monthly calls or even weekly texts. If parents understand what their kids are doing at school, they will be more confident about keeping them in school which will

help reduce drop-out rates especially in rural areas. A study by Henderson and Mapp(2002) shows positive correlations between parents engagement and student achievement as well which means it could potentially have an impact on test scores.

Community service projects

Encouraging students to participate in different local community service project can boost skills like empathy. Astin and Sax(1998) found that community service enhances students' academic development. Students can be nudged towards community service through a reward scheme for every hour of community service they do. Small class trips to local beach clean-ups can also be a fun way to encourage students to help the community.

Nudges for teacher development

Peer observation and coaching

Asking teachers to sit in on each other's classes can encourage teachers to be more interactive in class. A study by Joyce and Shower (1982) showed that this improved development of teaching skills. Teachers can also give feedback to each other and adopt practices from other teachers, this creates a positive feedback loop where teachers can learn and improve themselves from each.

Nudges for well-being

Encouraging students to have school meals

Skipping school meals is very common especially in secondary schools, either to revise or slack off with friends. Teachers can nudge students to attend these meals by advocating the benefits and provide entertainment for students during meals, either through verbal games or changing the seating such that student can interact with a greater group of their peers.

Mindfulness and meditation

Allowing small breaks of 2-5 minutes to integrate mindfulness exercises can help reduce stress and increase focus, Wisner et al.(2010). These exercises can be simple and straightforward as asking students to close their eyes and imagine something peaceful or with appropriate training, the teachers can explore different exercises like Yoga to try with students.

Nudging in education is rare but not undocumented. The first steps have already been documented in a review by Damgaard and Nielsen in 2009. They successfully increased the frequency of literary activities conducted by students at home by sending the parents automated text messages three times a week. Clark et al. (2019) asked students to set different task-specific goals for a course, this in turn led students to take more practice exams as they wanted to meet their targets. Lin-Siegler et al. (2016) provided students with information about real-life struggles of well-known scientists, the idea being that students will gain more confidence about their own ability knowing well-known figures of success have often failed. This led to improved grades for the students. Kraft and Rogers(2015) managed to reduce student dropout rates by asking teachers to send weekly short messages(usually one line) about the student's performance to parents. This gave parents more confidence as they had a better idea of what their kids were doing in school. Page et al. (2020) sent informational reminders about the application process for different aids and grants to parents and teachers, this increased successful application for federal aid by 3.3 percent. These studies show that nudges can be very effective if correctly implemented. In India's situation where the different states are so dis-connected that policy implementation will become difficult, key players like the government, NGOs and state governments will all have to work together to make this a possibility and revolutionize the Indian education landscape.

Annexure:

Mentor bio

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