R37-2016

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Identification and Mentoring Gifted Children

Age 3 - 15 Years

October 2015

National Institute of Advanced Studies
Bengaluru, India

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Age 3 - 15 years

(with special focus on Maths and Science)

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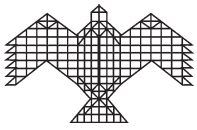

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Published by
National Institute of Advanced Studies
Indian Institute of Science Campus
Bengaluru - 560 012
Tel: 2218 5000, Fax: 2218 5028
E-mail: admin@nias.iisc.ernet.in

NIAS Report:

ISBN 978-93-83566-19-8

Typeset & Printed by
Aditi Enterprises
Magadi Road, Bengaluru - 23
aditiprints@gmail.com

Foreword

Gifted children are asset to the country and the world. It is well known that a few gifted persons can realize paradigm changes through their pursuits thus achieving happiness and quality of life on the planet for a large number of citizens. India needs to embrace a comprehensive and diverse Programme relating to gifted children education. The current programmes in India identifies talent known to over emphasize academic achievements and that too based on examinations which are poor reflection of intrinsic capability of a child. Thus the prevalent practice of identifying the talent excludes a large section of the gifted children who are most likely to be not comfortable with and adaptable to current mode of testing and evaluation.

Several countries are practicing gifted children education as part of their national agenda. We, at NIAS, are engaged in the efforts for the last five years or so to enrich this important domain of education. The current report presents research findings. We could pursue this work; thanks to the initiative by Dr. R Chidambaram, Principal Scientific Adviser to Government of India; to identify and mentor gifted children in India. The findings are based on the work conducted by the three collaborators in the Indian context. The report reflects complementary initiatives by different research teams; based on different models to identify gifted children in the Indian context. It is clear that good beginning has been made but a lot needs to be achieved.

The report argues for a national level policy for gifted children, who are of immense value and great human resource to India especially when India has high aspirations to be one among the leading countries of the world. It is my considered suggestion that we should bring other pursuits like social sciences, humanities, fine arts, etc under the umbrella of the national programme for the gifted children. I have always believed that the education and nurturing of our gifted children is a sensitive subject and thus a sublime responsibility. With the firm belief that gifted children are distributed, a national identification programme of the gifted must reach to the most remote areas and population of this country. One does not know where one shall find these children. We must use our imagination, sensitivity, develop India centric pedagogies, learn from the world and at the same time contribute to the knowledge of the world in this important research pursuit of high societal importance.

I am delighted that the government has recognized the need for such a programme and NIAS is pursuing the process of identifying and addressing the needs of gifted children in the Indian context. I join the Gifted Education Team in expressing the hope that researchers, academicians, educational policy makers and other stakeholders across the country shall come together with combined efforts to develop a national level comprehensive and useful gifted education programme and agenda.

Prof. Baldev Raj
Director, NIAS, Bangalore India

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Acknowledgements

In the context of scarce attention, expertise, and resources available for gifted education in India, it has been the valuable contribution made by many people and organisations in different forms that has allowed this project to move forward and achieve success. We express our sincere gratitude to each of them.

First and foremost, we would like to express our gratitude to Prof. V. S. Ramamurthy, former Director, National Institute of Advanced Studies (NIAS), Bangalore, under whose leadership this project was conceived and launched. He also importantly proposed the idea of profiling children identified as a means of bettering our understanding regarding giftedness and documenting their life histories through which valuable information has been generated regarding the developmental histories of those showing high potential.

We would also like to express our gratitude to the Principal Scientific Advisor's Office to the Government of India, Dr. R. Chidambaram, Dr. R. P. Gupta, and Dr. Ketaki Bapat who have recognized the importance and need for this project and supported us generously. Through their active association and participation they have played a key role in guiding the project forward.

Our sincere gratitude goes out to the Project Review and Monitoring Committee (PRMC), the PRMC have been very helpful in evaluating our work from their extensive experience and in providing diverse perspectives and new avenues during the course of the project. We express our gratitude to the members of the PRMC, whose guidance, suggestions, and insights have been useful in systematically planning and undertaking the project. The members of PRMC are as follows:

Prof. R. Chidambaram, Principal Scientific Advisor GOI, Vigyan Bhavan , New Delhi;
Prof. N. Mukunda, Editor of Publications, Indian Academy of Sciences, Bangalore;
Prof. K.Siddappa, Hon. Director, JSS Foundation for science and society, Bangalore;
Prof. Manoj K.Harbola, Department of Physics, IIT Kanpur;
Prof. H.P. Dikshit, Director-General, School of Good Governance and Policy Analysis, Bhopal;
Prof. Raghavendra Pratap Singh, Member, Associate Professor in Rural Development, School of Continuing Education, IGNOU, New Delhi.
Dr. Ketaki Bapat, Office of Principal Scientific Advisor, New Delhi;
Dr. Pratibha Jolly, Principal, Miranda House College, New Delhi;
and
Prof. V. Balakrishna, Emeritus Professor, Department of Physics, IIT Madras.

We would like to thank our collaborators /partners on the project:
At Delhi University – Prof. Jyoti Sharma and her research team; and
At Agastya Foundation – Mr. Ajit Basu, Mr. M. G. Subramanian, and Ms. Hamsa.

Our collaborators have also provided valuable support by exchanging resources, information, and ideas. We express our gratitude to them for their support in taking the project forward.

We extend our gratitude and regards to the Department of education, Govt. of Karnataka for their support. We would also like thank different regional B.O.Es for their support given for accessing schools for test administration.

We thank the members of our project team without whose support the project would have not move forward. We thank Ms. Amita Basu, Ms. Parvathy Jayan, Ms. Jinna Bordoloi and Dr. Rajeena for their support and contributions towards the progress of the project.

We express our gratitude to Prof. Baldev Raj, present director of NIAS for his support and encouragement. His advice and guidance were helpful for bringing out the project report.

We acknowledge and thank all the stakeholders, children covered in this project, their parents, families, schools, teachers, and mentors all of whom have been cooperative and supportive of our efforts. Without their help this project would not have been possible.

Finally, we thank the administrative staff at NIAS for their support in the smooth planning and conducting of various activities as part of the project work.

Executive Summary

India has made impressive strides in expanding the portals of formal education to all children through several policies, the most recent being the Right to Education Act 2009. Although the policies are claimed to be 'All-inclusive', they have failed to address the special educational needs of the gifted children.

Gifted children are generally defined as "those who have the possession and use of untrained and spontaneously expressed natural abilities in at least one domain to a degree that places the individual at least among the top 3 percent as compared to their age peers". They are a special group of children who demonstrate their 'gifts' very early in life and require to be mentored to reach the higher levels of learning and excellence. Unfortunately, there are few opportunities in India for this group of children. In the absence of a stimulating environment, their talent or gifts may diminish and in some cases completely disappear. As a result, many gifted children remain underachievers causing a colossal national loss. Evidently, the mindset of treating issues of equity and excellence as antagonistic and mutually exclusive has been detrimental not only to the rights of the gifted children but also to the progress of the nation.
In fact, there are very few studies in the Indian context that have examined issues of identification and mentoring of the gifted children. Moreover there is a conspicuous lack of policy on this issue. A few programmes of the Government of India, like the National Talent Search Examinations (NTSE), Kishor Vigyanik Protsahan Yojana(KVPY), Maths and Science Olympiads and the INSPIRE programme endeavor to identify talent in Math and Science at the national level for the high school students. However, their reach remains limited to the children from urban population and that too largely from the higher socioeconomic strata. As a result, many gifted children from less privileged backgrounds, especially from rural areas remain unidentified.

The Indian Initiative

Recognition of the gifted as an important human resource, and of gifted education as a crucial component of inclusive education, was galvanized in 2010 when the Office of the Principle Scientific Advisor (PSA) to Government of India under the leadership of Prof. R. Chidambaram commissioned India's first national project on gifted education: Development of Parameters and Tools for the Identification of Gifted Children Age 3-15 Years (With a Special Focus on Maths and Science).

The National Institute of Advanced Studies (NIAS) was the anchor of the project, in collaboration with Delhi University and Agastya International Foundation. The initial mandate was that NIAS will primarily focus on younger children 3-8 years old, which was later extended over the period to cover children in the age group of 3-15 years., Delhi University took the

initiative of identifying gifted children from the urban schools in and around the Delhi region age group 8 – 12 years and while Agastya focused their study on understanding the nature of gifted children in the age group 10-15 years from the rural areas of Karnataka.

The project was conceived as a truly participatory project where complete autonomy was given to all the collaborators to develop their independent model of identification. The premise of this autonomy was that India being a very diverse country may have to develop several models of identification of the gifted children that will be appropriate to the different population belonging to different socio economic backgrounds. The three collaborators worked with their respective population and developed independent models for identification. The periodic meetings of the Project Review and Monitoring Committee (PRMC) consisting of National experts provided feedback and suggestions that were crucial for the progress of the project.

At the end of 4 years, the project has delivered models for identification of the gifted children and the respective project teams are in the process of standardization of the different methodologies. Below is a brief description of each of these models

NIAS Model

The NIAS follows a three level model for identifying gifted children and the three levels are as follows.. Initially, at the first level potential children are nominated by the teachers, parents and individuals with the help of the Teacher Nomination Behavioral Rating Scale (TNBRS) and Parent Nomination Behavioral Rating Scale (PNBRS). These nomination forms were developed by the NIAS project team as part of the research agenda. At the second level of identification, nominated pools of potential children are asked to undergo psychometric screening tests where the children are screened on general mental ability and creative thinking. Once the nominated children are screened, case profiles of those selected children are developed. Case profiles provide in-depth and rich data of various developmental aspects of a gifted child. Apart from identification, the NIAS model also aims providing mentoring services for those gifted children who are identified as part of the project. While conducting teacher training workshops, organizing summer and winter workshops for children, conducting parent's workshops, writing articles in popular media are some of the other segments of the project initiated in order to bring awareness about gifted children among the general public.

Delhi University Model:

The Delhi University evolved at a three tier model for identifying and mentoring gifted children. The three tier model is a multilayered model consisting of three phases to identify the gifted child. During the first stage, potential gifted children are nominated by the school teachers, it is known as the referral stage. In the second stage, nominated children are screened using a SMAT Test (Science and Mathematics Ability Tests), this is the selection stage of the three tier model, where highly potential gifted children are selected form the initial pool of nominations. During the Scaffolding stage, children who are identified as highly gifted are directed towards mentoring and other outreach programs.

Agastya Model:

The Agastya international foundation had taken up the initiative for identifying gifted children from the rural areas (Andhra Pradesh) in India. The Agastya made use of nominations from teachers, peers and community nominations to identify gifted children in the rural areas. Agastya team also considered selecting and screening potential children from various science fairs, Olympiads, CET Toppers etc. The initial pool of nominated children had an opportunity to visit the science lab in the Agastya campus. During the visit, the children were given exposure to various topics in science and mathematics; learning was mainly through hands on learning, while small group and individual projects were assigned to the children. Children were screened and assessed during this entire process. Agastya has also conducted various teachers training workshops and summer workshops for identified gifted children.

Deliverables: The four years of intensive work by the three teams yielded 3 sets of variable models that can be used for identification of the gifted children in India. In the process, the teams developed resource materials for parents, teachers and the gifted children; training modules for teachers and parents; created a website and registered a national level organization for gifted education.

Project title: Identification of Gifted Children in Maths and Science (3-15 years)
An Initiative of the Office of the Principal Scientific Advisor, Government of India

Introduction:

India has made impressive strides in expanding the portals of formal education to all children through several policies, the most recent being the Right to Education Act 2009. Although the policies are claimed to be 'All-inclusive', they have failed to address the special educational needs of the gifted children.

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Importance of a National Policy on Gifted Education

As the gifted constitute about 3% of the general population, a whopping 12.5 million Indian children between 3-18 years of age are likely to be gifted. In the absence of a comprehensive gifted education policy as also a wide net for harnessing the entire pool of gifted children, India is incurring a huge loss in terms of national intellectual property.

Many nations have strongly felt the importance of nurturing intellectual and creative abilities and the potential of gifted children in science, technology, humanities and languages. They have programmes for the identification of gifted children, training teachers in gifted education, and educating policymakers in the dangers of leaving gifted children to "fend for themselves." China has "Olympic Schools" for the gifted, and several countries like the USA, UK, Netherlands, Australia, Japan, Hong Kong and Singapore have similar initiatives. Their Governments have made special provisions for gifted children and their unique educational needs. All these countries are reaping the benefits of their initiatives in this field.

In contrast, very few studies in the Indian context have examined identification and mentoring of the gifted children. Moreover there is a conspicuous lack of policy on this issue. A few programmes of the Government of India, like the National Talent Search, Kishor Vigyanik Protsahan Yojana, Maths and Science Olympiads and the INSPIRE programme, endeavour to identify talent in Math and Science at the national level for the high school students. However, their reach remains limited to the children from urban population and that too from largely the higher socioeconomic strata. As a result, many gifted children from less privileged backgrounds, especially from rural areas remain unidentified.

The Indian Initiative

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Few studies in India have looked at identification of and programmes for gifted children. Recent studies in the fields of neuroscience and cognition have established the role of environment in early childhood in facilitating optimal neuronal connections and development. Hence, early identification of gifted children is essential.

Most countries in the west including the US, Europe and Australia have conducted large scale sequential research and have developed parallel program interventions at the National level for the gifted children. More recently, countries, like China, Singapore, Malaysia and others have recognized the importance of identification and nurturing the gifted children and have undertaken programmes at the National level. Being a developing country and the second largest populated country in the world, India has still not addressed the importance of designing a National level program for gifted education in the country.

India like the USA faces a challenge in identifying the gifted children due the diversity of their population. For India, the target children belong to a wide range of socio-economic and cultural

backgrounds. The commonly used tools for identification like the intelligence tests, academic tests have been challenged due to its western origin and tests related issues. Thus, it is strongly argued that a country as diverse as India through grounded research must develop multiple tools for identification of the gifted children using a mix of quantitative and qualitative techniques. Standardization of the identification process is as important as reflecting the cultural and regional specificities of India. So the present project was conceptualized with the following objectives.

- To develop parameters and tools for identification of the gifted children in India (3- 15 years).
- To develop a framework for the nurturance and education of gifted children in India.

It is in this context, the project purports to develop tools for identification of the gifted children that will combine aspects of traditional Indian education that emphasized the 'minds on' and inductive logic along with the aspects of the western modern education that underscore 'hands on' and deductive logic.

NIAS Chapter

The **NATIONAL INSTIUTE OF ADVANCED STUDIES** (NIAS) Gifted Children's Programme, supported by the Principal Scientific Advisor's Office (PSA) to Government of India, is the first collaborative attempt in India to draw together a research base to address the issue of equitable educational opportunities for the gifted and develop talent through appropriate nurturance. The project was developed through a series of consultation meetings starting in January 2010 with the Indian National Science Academy's (INSA) INDO-US Forum. Through meetings and collaborations with experts from across India and abroad, four important strategies for India were identified:

A). to initiate inter- disciplinary research in the area of giftedness in order to develop suitable definitions in context;
B). to design appropriate tools for identification, focusing on early identification;
C). to develop appropriate programmes for mentoring and nurturing of the gifted; and
D). to develop international collaborations and consultations to take forward the research agenda.

With these aims, three organisations – Delhi University (headed by Dr. Jyoti Sharma), Agastya International Foundation, and the National Institute of Advanced Studies under the leadership of Dr. Anitha Kurup came together to undertake collaborative research in different areas of the programme.

Delhi University undertook the responsibility of developing an identification measure and an advanced screening matrix for children in maths and science. The focus of the Delhi study was the urban population aged 8-12 years. The plan was to conduct a pilot study in and around Delhi covering different types of government and private schools, including the Jawahar Navodaya Vidyalayas, Rajkiya Pratibha Vikas Vidyalayas, and other schools, using a combination of tools such as IQ tests, non-verbal tests, teacher, peer, and parent nominations, and behavioural observations.

Agastya Foundation focused its efforts on the identification of gifted children in rural areas between the ages of 10-15 years. The plan was to identify a set of 15-20 gifted children after two levels of screening based on exposure to scientific experiments, resources, and games. Agastya planned to start with an initial exposure for about 2,00,000 children, from which a group of 5,000 potential children would be identified, and further screened down to 15-20 children based on multiple levels of screening of children's interests and abilities via interactions with resource persons.

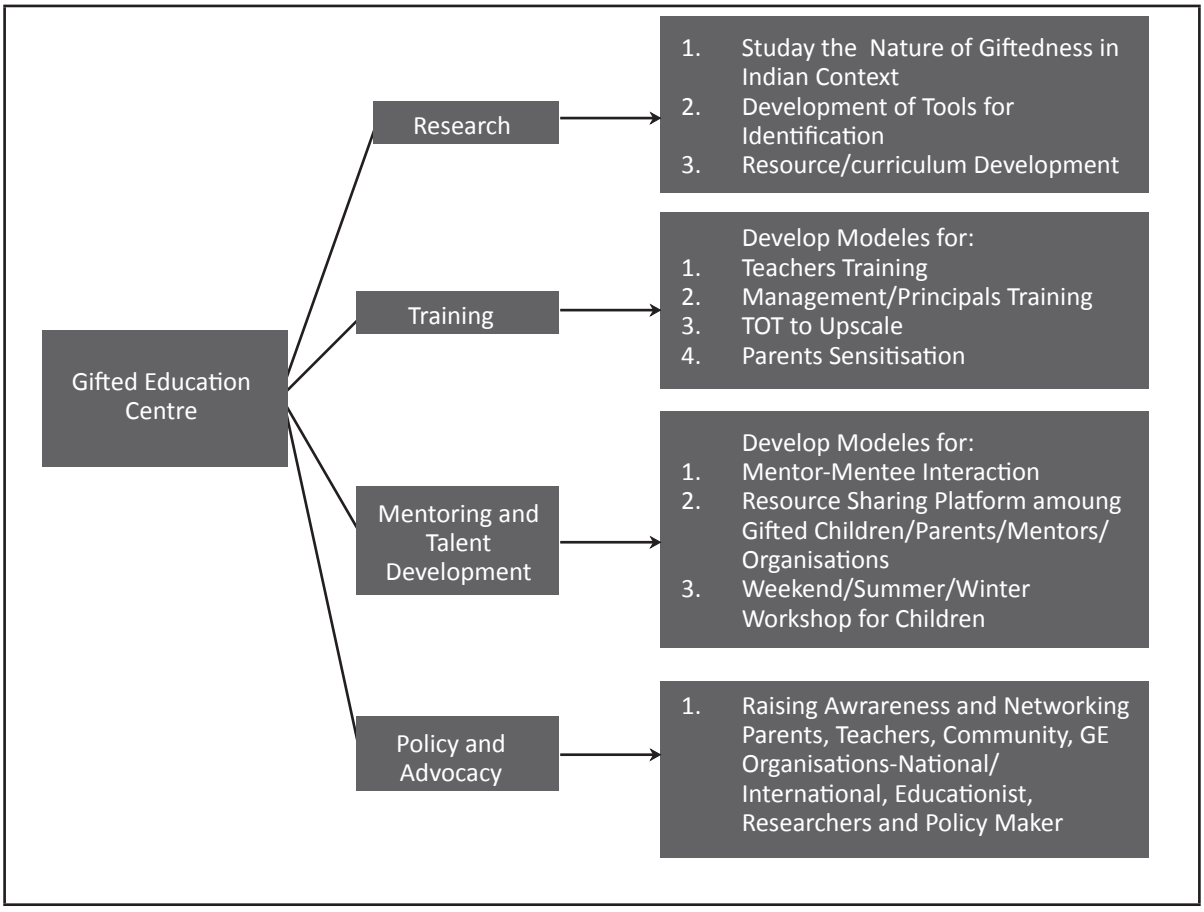
The NIAS component of the programme involved a multi-pronged approach with a focus on early identification between the ages of 3-8 years from urban backgrounds. Three important areas were identified for the project. The first was a detailed, in-depth set of classroom observations in order to generate rich data on traits and classroom behaviours that could facilitate identification. Through the observations, it was also planned to generate a set of activities that could be used to facilitate the

demonstration of gifted behaviours within the classroom. Second, a series of teachers' workshops was planned and conducted. These workshops acted as a platform to collaborate with teachers, to develop insights into issues concerning gifted students, to increase sensitivity and awareness about giftedness, and equip teachers in identifying gifted children, with the help of experts at the national and international level.

Specific Objectives (set by NIAS): As the project progressed towards achieving the set objectives, few other objectives were added on to the objectives lists. Following are the specific objectives set by the NIAS component of the project.

A. To develop parameters and tools to identify gifted children in the age group of 3 - 8 years (extended to 15 years) in the Indian context.
B. To develop case profiles of identified gifted children, as a data base to further our understanding of the gifted children.
C. To Develop A Mentors Network For the Identified Gifted Children
D. To sensitize Parents about the nature and needs of the gifted children
E. To Create Awareness in the public among parents and people About Gifted Education

FLOW CHART REPRESENTING THE DIFFERENT COMPONENTS OF THE NIAS GIFTED CHILDREN'S PROJECT



Major Components of the NIAS Project:

I. **Classroom Observations:**

With the inception of the project, it was envisaged that it was important to understand the nature and concept of gifted children within the Indian context. , Schools were identified as the initial site where a vast majority of children could be observed. Although we were aware that India is yet to provide formal education to all children in the age group 3-15 years, it still is a fact that a large majority of the children are going to schools. Thus classroom observations formed an important methodology to collect data about the nature of giftedness within the frame work of the project.

Observation methodology facilitates to collect data when researchers intend to observe subjects in their natural settings and when conducting lab-based studies is improbable in reality. Thus naturalistic classroom observation methodology was used as a key mechanism through which data was collected within the project's purview. School going children from the age group of 3- 12 years were observed in the school environment. Classroom observations were conducted in different schools representing diverse learning environment across Bangalore.

Classroom observations were conducted with the following objectives

A. To focus on the nature of giftedness in the Indian classrooms
B. To understand the relationship between the context and expression of the gifted behavior in a classroom.

Classroom observations were conducted from November 2010 to June 2012, across 12 different schools in and around Bangalore. Five different syllabus types (ICSE, CBSE, SSLC, I-CSE, Montessori) were covered under the classroom observations. A total of 669 hours of qualitative classrooms observations and a total of 1,437 children were observed during a period of 14 months. Classroom observations mainly focused on understanding the dynamics between the classroom context (activities and other external factors) and the gifted behaviour expressed by the children. In order words, the study wanted to analyze how the classroom or the school context influences or provides space for the expression of gifted behavior. The data obtained through the classroom observations were subjected to qualitative analysis in order to generate a model of gifted behavior traits.

The table below gives the specific details of the classroom observations that were conducted as part of the project.

SCHOOL NAMES	AGE GROUP	STUDENTS OBSERVED	HOURS OBSERVED	AVERAGE HOURS OBSERVED
Poorna (I-GCSE)	4-11	41	72	18
Hymanshu (State)	3-9	235	80	20
Vidya Niketan (ICSE)	7-9	108	72	6
AMC (CBSE)	5-9	75	56	14
Siksha (Montessori)	3-7	60	20	N/A
Vidyanjali (Montessori)	3-8	75	60	20
GEAR (ICSE)	3- 10	170	65	16.25
DPS (ICSE)	3-10	180	75	15
Discover (Montessori)	2.5- 7	58	20	N/A
JSSPS (ICSE)	3-10	200	75	15
Adwika (Montessori)	3-7	21	20	N/A
The East west school (state)	3-10	215	54	7.5
Total 12	3-7	1437	669	N/A

II. **The model of traits:**

Based on the qualitative analysis of the compiled data from the classroom observations, a model of gifted behavior traits was developed. The model of traits represents the most frequently observable gifted traits in the classroom context.

Sl. No	Traits	Sub traits/ underlying characteristics
1	Learning traits	Grasping power, vicarious learning, Independent learning, domains of interests, attention, concentration
2	Memory	Information-processing, deep-level processing, meta-memory
3	Attention and Concentration	Longer span of attention
4	Task persistence and interest	Task persistence, goal orientation and Interest
5	Emotional Intelligence	Empathy, intrapersonal intelligence, Inter-personal sensitivity
6	Social skills and Leadership	Socials skills and leadership
7	Moral development	Moral intelligence and moral competence
8	Curiosity and Exploratory behavior	Curiosity, observation skills, exploratory Behavior
10	Language skills	Avid reading, large vocabulary, linguistic Precocity
11	Self regulation	Self regulation

III. **Teachers Nominations Behavioral Rating Scale (TNBRS):**

Since the primary objective of the project was to develop parameters and tools to identify gifted children in India, the data obtained from the classroom observations were analyzed to develop

an instrument to identify gifted children. The project visualized that such an instrument will be very handy, especially for school teachers who can use it as an effective tool to identify gifted children in their school. The role of the teachers as partners in the gifted education project was integral to the NIAS identification model. Thus, based on the model of traits, the Teachers Nominations Behavioral Rating Scale (TNBRS) was developed through expert consultations, teacher training workshops, discussions and following standardized procedures of tool development. The TNBRS is used during the initial phase for identifying gifted children. This tool can be used to nominate gifted children from both the younger (3-6 years) and older age group (7-12 years). Detailed discussions with experts and practicing teachers through consultative meetings and workshops revealed that the same tool can be used for children up to the age of 15 years.

a. Rationale for developing the teacher nomination forms:

The teacher nomination forms were conceptualized as an important tool in identifying gifted children. Given the vast number of schools and the number of gifted children to be identified, it was practically impossible to reach each and every gifted child in the country. Thus, teachers acted as important sources of data points. Teachers are in an excellent position to provide data on the gifted children, since they interact with hundreds of children across their service years. Thus, they can through comparison identify markers of high ability.

b. Process of developing the TNBRS:

Based on the model of traits, the project team developed an identification protocol/ nomination tool. This protocol contained 52 statements, which would effectively represent the characteristics of gifted children. The protocol also acted as a frame of reference to identify gifted children in a given school environment. These 52 items equally represented all the traits mentioned in the model of gifted traits, each of the traits was represented by at least 2 or 3 statements. These statements were randomly ordered across the protocol. The statements were marked against the three point scale (often, sometimes and rarely).

Two expert workshops were held to discuss about the initial pool of statements. The experts were drawn from various fields of expertise like gifted education, psychometry, education, school teachers, school administrators and market research. During the first expert consultation workshop, after several rounds of discussions the experts arrived at a consensus and opined that these 52 statements were representing the characteristics of gifted children. Thus, it was concluded that the tool was handy enough for teachers to use it for identifying gifted children in a school scenario.

During the teacher training workshop, the tool developed containing 52 items was introduced. The teachers expressed practical constraints of using a tool that was so lengthy.

Subsequently, the pool of experts, during the expert consultation meeting revised the tool such that it contained only 30 items. In addition, the meeting also drew reference to the theoretical model of Renzulli and suggested to include items in relation to creativity and task commitment. Given the fact that most Indian classrooms are geared towards the average learner, the long hours of observation did not reveal specific characteristics in relation to creativity and task commitment.

Research studies show that gifted behaviour is a composition of 3 clusters namely above average intelligence, task commitment and creativity. Thus the 30 item tool had equal weightages allotted for these 3 clusters of gifted behavior.

Another significant development based on expert comments was the need of separate tools for younger and older children. The experts were of the opinion that there were clear differences in the development of behavioral characteristics among the two age groups. So the teacher's nomination form was made available in two versions, namely TNBRS for younger children (3-6 years) and TNBRS for elder children (7- 15 years).

c. Standardization and validation of the TNBRS: Since the primary objective of the project was to design a robust identification mechanism, standardizing and validating the teacher's nomination form was very crucial. Based on the experts comments from expert test constructors, the teacher nomination form underwent further revision. A list of 81 items/ statements was initially listed out based on the review of literature and inputs obtained from the classroom observation data. These 81 statements were then translated into Kannada (local language). The tool was distributed among teachers from different schools. A random selection of teachers was madeand these teachers were given a brief orientation of the concept of giftedness. The teachers were instructed on

i) Indicating whether each of the statement represented the characteristic of giftedness and

ii) To assign to which of the given category of traits a particular statement belonged to.

The form of 81 items was distributed to a random sample of teachers from both Kannada and English medium schools. In addition, the same tool was sent out to experts and their responses were also taken into consideration while validating the tool.

Based on the statistical analysis of the obtained responses from the teachers and experts, it was ascertained

a) That there was no need for separate nomination forms for younger and elder age group and

b) The TNBRS tool had 21 statements as a final set of statements after the analysis and validation process.

Thus the final standardized version the TNBRS tool has 21 statements which can be effectively used by teachers, parents and educators for identifying a gifted child.

IV. Case profiles:

Case profiles acts as an important qualitative measure, in contrast with the available quantitative measures of identifying gifted children. Case profiles are in depth interviews conducted with the child, parents, siblings, and teachers. They account for an important source of data in absence of adequate research in the area of gifted children especially in the Indian context.

Case profiles provide a longitudinal, developmental view of the complex construct of giftedness, and more importantly how gifted children develop during different stages of development.. They help us in having in-depth understanding of individual factors such as intellectual and cognitive abilities, personality factors, socio-emotional factors, school and environmental factors that influence particular outcomes for the individual child. The historical data helps us trace how individual endowments interact with environmental factors and affect the manifestation of giftedness.

The project from its inception has developed detailed case profiles of more than 60 gifted children. These detailed profiles of the gifted children act as an initial set of readings for those individuals who seek to have a basic understanding about the nature of gifted children. We hope that a detailed analysis of the individual profiles of the gifted children will reveal important patterns and departures that will further add to the understanding of gifted children in India.

Glimpses of NIAS project work:

Children performing on the test during the Standardization of the tool

Teacher Training workshops

Mentor –mentee interaction meet at NIAS.

Ishaan vikaas programme at NIAS.

NIAS MODEL FOR IDENTIFIYING GIFTED CHILDREN.

NIAS developed a three stage screening process for identifying the gifted children.. The Three stages are:

1. **Teacher Nomination Behaviour Rating Scale (TNBRS):** In normal course, teacher's workshops are organised for a period of 2-3 days (residential or non- residential) for a selected group of teachers drawn from different schools. During the workshop, the teachers are introduced to the concepts of gifted children and gifted education. The workshop provides ample opportunity to build on the experiences of teachers and lead them to what are the specific characteristics of gifted children. Myths with regard to gifted children are also discussed to create a premise for the introduction of the TNBRS in the workshop. Using the knowledge of a gifted child that a teacher knows, the tool is used in the workshop to mark that child. Through group work and discussion, the teachers clarify the use of the tool in their respective schools. Thus, the workshop provides a broad base of a pool of gifted children identified by the teachers.

Being aware of the biases that teachers may have, NIAS has developed a Parent's Nomination Behavioural Rating Scale (PNBRS) which is available on the PRODIGY(Promoting the Development of India's Gifted Young) www.prodigy.net.in

Teachers and parents can make use of the e- nomination forms to nominate gifted children. Once the nominations reach the NIAS gifted education project team, the nominations are scrutinized and the children are selected from the initial pool for the next level of screening.

2. **Standard Psychometric Tests to Assess General Mental Ability & Creativity:** Raven's progressive matrices (RPM) a non verbal test of general intelligence is used to screen the children at the second level. Then the Torrance Test of Creative Thinking (TTCT) is administered to test the creative component of the child's potential. The project team has developed Indian norms for the TTCT[1]. General intelligence and creativity are the two important components found in gifted children, so screening and assessing children on these two areas is very crucial in the process of identification.

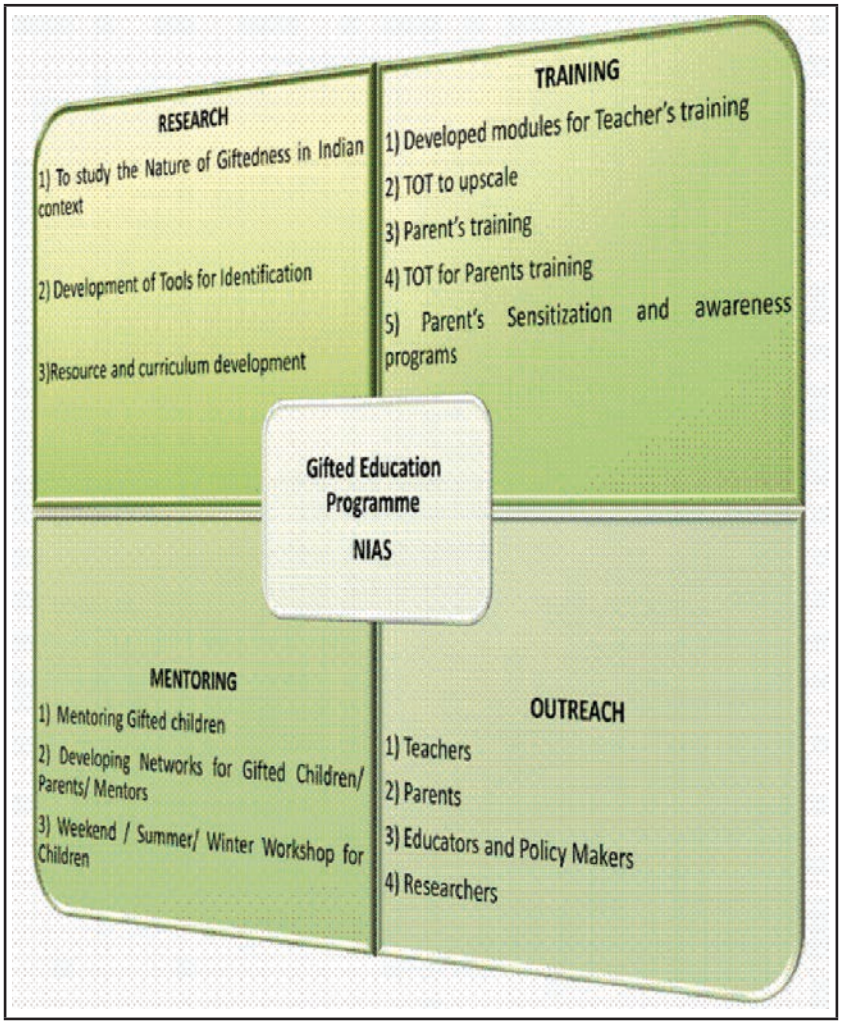
3. **Case Profile** – Case profiles of the identified gifted children are obtained as part of qualitative data to be used along with the quantitative measures. Children, who are, usually identified or nominated by teacher or parents for demonstrated abilities or potentials of giftedness, are brought to our notice. Till date, the project has been able to record case profiles of around 70 plus potentially gifted children.

[1] NIAS team is in the process of seeking permission of translation and developing norms in Indian languages.

However, case profiles are time-consuming since they involve repeated interactions with the individual child, parents, teachers, peers and siblings, and significant others. Unlike certain group tests of intelligence that can be mass-administered to several children at one time, case profiles have to be conducted individually through extensive interactions. Therefore, case profiles must logically follow initial screening with tools that are less time-intensive and are easily administered to groups. This reduces the number of children who need to be profiled.
The project has used the three stage model not in a rigid sequence but the order of the 2nd and 3rd stage can be interchanged. Hence, we propose a floating model depending on the needs and scale of specific situations.

Case profiling of the nominated children using technology was used and it acted as a screening mechanism to handle the huge numbers of nominations and to narrow down and arrive at the children who are really gifted.

AN OUTLINE OF VARIOUS COMPONENTS OF THE NIAS GIFTED EDUCATION PROGRAM



ACHIEVEMENTS OF THE PROJECT:

1) Designed and standardized tools for identifying gifted children
a) Teacher Nomination Behavioral Rating Scale (TNBRS)
b) Parent Nomination Behavioral Rating Scale (PNBRS)
2) Developed Norms For The Torrance Test of Creative Thinking (TTCT): The norms for the Torrance Test of Creative Thinking (TTCT) was developed and adapted as part of the national level project titled "Identification of gifted Children Age 3-15 years (with a special focus on Math's and Science)" The project was commissioned in 2010 by the office of the Principal Scientific Advisor (PSA) to the Government of India.

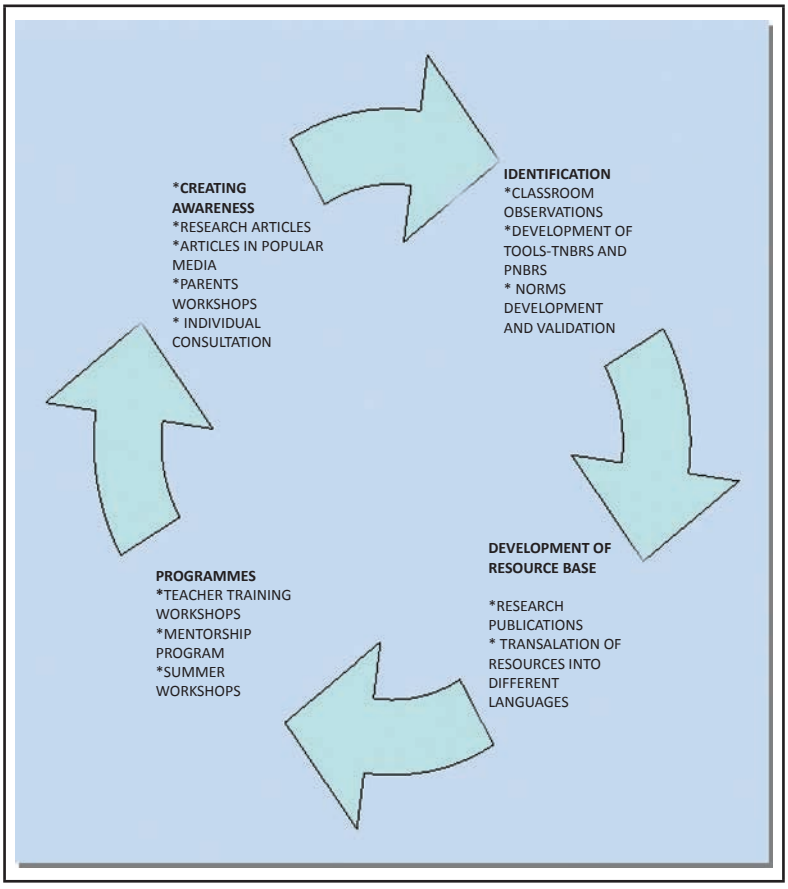
3) For the purpose of developing Indian norms, the TTCT verbal form A and Non verbal form B were translated into Kannada. The purpose was to make the instructions more comprehensible and to obtain more valid responses from the children across Karnataka. The TTCT test was translated and back translated by experts from psychology and literature domain. This procedure of translation was followed in order to cross check the common usage of terminologies and the differences were rectified before the administration of the test. The TTCT test (both original and translated version of the TTCT) was administered over a sample of 2,221 children across six different districts of Karnataka; the sample covered varied in terms of language, medium of instruction, rural and urban areas, school types, syllabus etc. Thus, the translated version of the TTCT helped to control all these variables and obtain more valid responses from the children. Even the instructions were given in Kannada for children from Kannada background, which was used by the research team to help children to understand the task and accurately respond on the test. Standardized administration and scoring procedure were followed. The data was used to develop norms using standard statistical procedures..

4) First Interactive Meeting Of Gifted children, Parents and Mentors Was held At NIAS: As part of the project's agenda, a one day meeting was scheduled at NIAS. The purpose of the meeting was to create a single platform where identified children, parents of the children and mentors interacted addressing some of the important issues related to gifted children. Two important outcomes of the interactive meeting were
   - A Mentor-Mentee Network was established – A link between identified gifted children and potential mentors was formed.
   - A Parent Support Group for Addressing Different Issues of Gifted Children was also formed during this meeting.

   The importance of mentoring: Mentoring acts as a bond between the child and a mentor. The mentors basically help the children to pursue their interests and broaden their understanding in a given domain. This interaction between the mentor and mentee basically provides opportunities for the children to interact with the mentors, ask questions, queries, get to know

more about their areas of interests and gradually get introduced to broader perspectives in their domains of interest. The mentor's network forms a core group wherein the children get an advantage to attend and learn more about areas/domains that are outside the regular school curriculum.

FIGURAL REPRESENTATION OF THE ACHIEVEMENTS MADE THROUGHOUT THE NIAS GIFTED EDUCATION PROGRAMME



Summer Workshop For Gifted Children Selected From Classroom Observation Was held At NIAS Campus : A one day children's workshop with activities in Mathematics was conducted for children identified as high ability learners and potentially gifted, aged between 8 to 12 years. The workshop comprised of eight activities aimed at providing hands- on exposure to different concepts in Mathematics, and also were aimed towards:

a. Initiating a resource base of activities that could be used for classroom enrichment, particularly for high ability learners or potentially gifted students

b. Observing children's problem solving strategies through the activities as a possible screening method for identifying giftedness in Mathematics

The activities were designed such that different concepts within the Mathematics curriculum could be incorporated into challenging activities that could enrich the classroom experience of the potentially gifted learner. To design these activities, different sources of information and consultation with persons in related fields were carried out to make the activities as well structured and interesting as possible.

5) Summer course- work in collaboration with the silver oaks school was conducted for the children identified at Silver oaks schools.

6) NIAS In-house publications :
- An introductory reading on giftedness in India
- Teacher training module (available in Kannada and English)
- Case profiles.
- A Handbook On Parenting The Gifted Is Under Review

7) 9 teacher training workshops were conducted across 3 States (Karnataka, Kerala, Andhra Pradesh) 70 Schools Participated and 630 Teachers are Trained

8) Research publications, newspaper and a number of articles are published in efforts to create awareness among the general public. Some the topics published through articles are as follows
- Definition of Giftedness (Deccan Herald)
- Help Gifted Children Excel (Deccan Herald, 12 Sep, 2012)
- Can You Tell A Gifted Child Apart (Deccan Herald, 11 Oct, 2012)
- NIAS Team Developed Instrument to Identify Gifted Students (The Hindu,13 Sept, 2012)
- NIAS Projects Aims to spot Gifted Kids (DNA, 14 Sept, 2012)
- Gifted Children Need Teachers Who Set Intellectual Challenges (Deccan Herald, 21 Feb, 2013)
- Gifted Education sans Prejudices (Deccan Herald, 29 August, 2013).
- Parenting your gifted child (Parent circle, June 2014)

9) A Series of 10 Articles for Parent-edge magazine has also been initiated in order to bring awareness among the parents. 9 out of 10 articles have already been published in the magazine.

10) At the national level, the NIAS gifted education project has made collaborations with different schools and institutes like NIMHANS, Indian Montessori Centre (IMC), Amritha group of schools (Mangalore),the Silver oak schools (Bangalore and Hyderabad), Rishi valley and the APL Global school. The NIAS team has also made collaborations with organizations like Indian Institute of Science (IISc), Lions Club and NGOs like Life -long learning (Kochi), Swanand foundation (Pune).

11) Internationally, NIAS has been able to establish collaborations with The Duke University, university of western Connecticut, The Hong Kong academy for gifted education and Southern Methodist University.

Work forward:

1) To standardize the RPM tool and obtain new norms for the Indian population. The tool was standardized during the early 90's, so developing updated norms is set out to be the next important step.

2) To develop a new test of creativity or to further standardize the already existing /available Indian creativity tests.

3) To establish a national level gifted education center at NIAS.

4) Advocate for the rights of the gifted children and address their needs through inclusive education.

5) To Further Validate and check the practicality of the TNBRS/ PNBRS across India.

6) To test the NIAS model of identification of the gifted children in different states, navodayas etc., in urban and rural areas.

7) And also to extend the NIAS model of identification for children above the age group of 15 years.

8) To further develop a model for mentoring gifted children in India

9) To develop sustainable parents, teachers and gifted children's networks.

Delhi Chapter

The Delhi Group under the project Identification and Mentoring Potentially Gifted Children in Science and Mathematics, commissioned by the Office of the Principal Scientific Advisor to the Government of India, worked on multifaceted process of identification and Mentoring of Potentially Gifted Children in Science and Mathematics.

There is considerable concern at the highest level in the government to enhance general education and in particular advocating the support for the most able students. These children, if nurtured properly can be the crucial contributors to the development of any country. Children with high potentials need not only right opportunities; they also need right mentors who can guide them.

"Catch them young", is the essence of research on Giftedness (children with high/exceptional potential) which further suggest that though these children are genetically endowed with intellectual gifts but they require intellectually challenging and stimulating environment to prosper and grow. Giftedness is developmental so the educational setting must provide opportunities to allow gifted children to discover and develop their full potential. These children need outside enrichment opportunities to expand their minds and potentials or otherwise they may lose their zest for excellence and may become underachievers. These promising minds can develop as exceptional thinkers, only when put among the community of like-minded Mentors who can guide them, nurture them and facilitate them. These children need long term sustained and committed Mentoring Program that can respect their individuality, multiply their potentials and acknowledge their talent.

India is a pluralistic, multicultural and multilingual society. Cultural differences within India make it impossible to adopt a common approach to the identification of potentially gifted children. We need a program that is locally driven, culturally appropriate and last long enough to make real difference in the future life of young able so that our so called neglected best can transform into culturally excellent achievers.

There is a clear recognition of diversity among individuals who have capacity to achieve excellence. It is equally true that such children exist in every part of Indian society, be it urban or rural. We have tremendous responsibility to open the channels to shape their potentials.

In present scenario, when Government is initiating to raise the standards of education to all, it becomes important not to lose sigh to four extraordinary gifted children who are generally treated with a policy of benign neglect.

Methodology:

The Delhi phase of the project, Identification and Mentoring of Potentially Gifted Children in Science and Mathematics started with following understanding:

- There is no single profile of a gifted learner, and no single criterion can be used to identify giftedness.

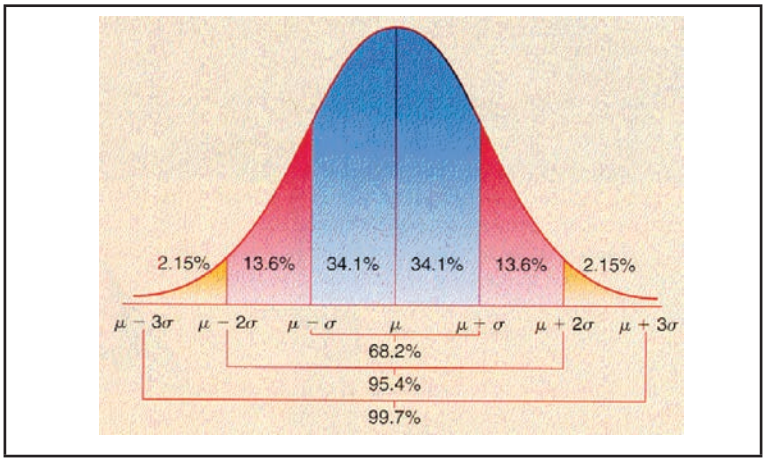
- Students with gifts have potentials to perform or show high levels of accomplishment in one or more areas when compared to others of the same age, experience, or environment. These areas include leadership in specific academic fields as well as intellectual, creative and/or artistic domains.

Gifted children are blessed with superior inherent traits such as:

- curiosity
- objectivity
- intuition
- attentiveness
- keen observant
- compassion
- closeness to nature
- creative energy
- divergent thinking

Gifted children demonstrate these traits during varied contextual situations. These traits are indicators of their potentials and inherent gifts.

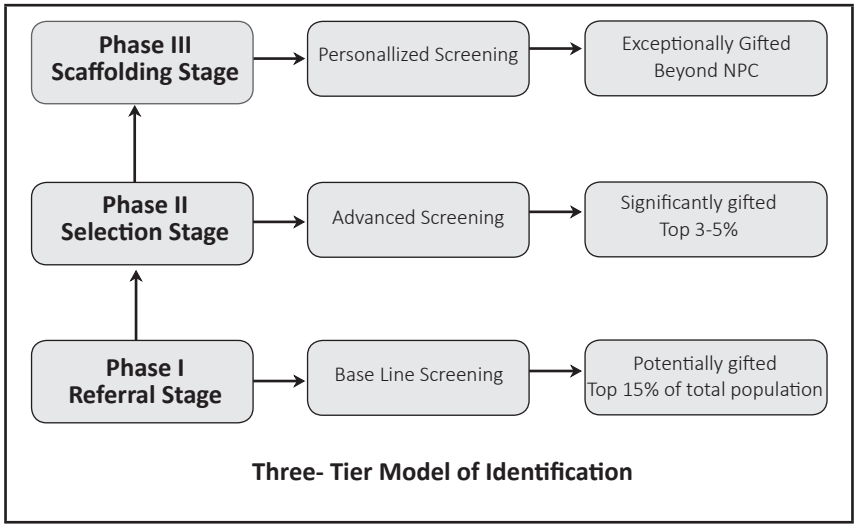
The field of human psychology also promotes the idea of normal distribution of human abilities, potentials and traits. The Normal Probability Curve in the figure below highlights the distribution of human intelligence.



Interpretation of NPC graph with reference to percentage of gifted children in a relatively large sample can be estimated as below:

- Potentially gifted children (Talent Pool) 13- 15%
- Significantly Gifted Children 3-5 %
- Exceptionally Gifted Children 0.1-1%

After reviewing the existing research literature and existing practices in the field of gifted education, following Three-Tier model was developed to plan extensive identification methodology.



Three- Tier Model of Identification

The project aimed to achieve following objectives:

- To evolve a comprehensive National level Scheme to identify Potentially Gifted Children.
- To provide long term sustained mentoring support to the identified group of students to nurture their potentials to the maximum.

Methodology

Grounded in the Three Tier Model of Identification and Mentoring Gifted Children in India and supported by thorough review of research practices and identification theories, a comprehensive outlay was developed that served as the scheme of identification.

Sample:

Since the project was limited to Delhi, only Delhi schools were approached. Different categories of schools were chosen to have wide cross-section of children with diverse socio-cultural background. Special attention was given to schools from rural set up and first generation learners.

Planned methodology was tried out on a sample of 31,800 in two cycles:

a) The Children enrolled informal school system and presently studying in grade 4(9+yrs) to grade 8(13+yrs) were chosen as sample for the project as:
   - These children were cognitively prepared to comprehend language.
   - They were curious and observant to scientific phenomenon around them and able to understand and appreciate scientific view of their immediate environment.
   - They were better equipped with language to raise the ircuriosity and argue their point of view.

Identification Methodology:

Identification process was based on detailed methodology based on both test and non-test criteria. It acknowledged students who scored high on traditional achievement tests but always included students who could intelligently connect them with science and mathematics.

The detailed Identification methodology was child-centered.

The process to identify Potentially Gifted Students consisted of multi-layered procedure engaged in three phases. Each phase was thoughtfully planned and was synchronized with the Three-tier Identification Model. Phase I was mainly the nomination phase where child was nominated by the teachers, peer and self-nomination.

A detailed and composite battery of Nomination instruments was developed which included following nomination scales:

a. Gifted Behavior Nomination Scale for Teachers
b. Gifted Behavior Nomination Scale for Peer
c. Self-Nomination

Teachers were thoroughly oriented before asking them to nominate the students. Research team also spent three –five days in each participative school to do observation.

So, an in-depth observation schedule was developed for the research team. Research team observed students in within class situations and outside classroom situations. They also observed children for their learning behaviors, inter-personal behaviors and creative behaviors.

Referral Stage: 10-15%
Selection Stage: 3-5%
Scaffolding Stage: 0.1-1%
Evolving Stage: Beyond Normal

The process to identify Potentially Gifted Students cosisted of multi-layers procedure engaged in three Phases:		
Phase	**Methodology**	**Outcome**
Referral Stage	Observations and Nominations	Talent Pool of Potential Students
Selection Stage	Science and Mathematics Ability Test	Group of Significantly Promising Students
Scaffolding Stage	Mentoring and Guidance	Highly Gifted Students

Three phase process during 1st cycle of identification led to the following sample of children who were identified as gifted:

1st Cycle of Identification:

Total Sample: 20,132

Phase	Methodology	Outcome	Number of students
Referral Stage	Observations and Nomination Scale*	Talent Pool of Potential students	1556
Selection Stage	Science and Mathematics Ability Test	Group of Significantly Promising students	262
Scaffold Stage	Mentoring Modules	Highly Gifted students	26

The identified group of 26 students has demonstrated lots of promise and out of box thinking in their responses through Science and Mathematics Ability Test. These students were further invited for more rigors and stimulating academic engagement through University Outreach Mentoring Program.

University Outreach Mentoring Program: The vision of knowledge society can be achieved by dissolving boundaries between University Education System and School Education System. Supporting the same sentiments, Cluster Innovation Center at University of Delhi whole heartedly supported the vision of the project and extended academic and infrastructure support to mentor the identified group of students.

These students were invited at Cluster Innovation Center every Saturday for day long mentoring sessions. Each session was specifically designed by the experienced faculty at CIC where students were allowed to construct and explore mathematical concepts, to experiment and investigate scientific phenomenon and evolve problem solving. They were encouraged to question, discuss and create arguments. They were encouraged to play with out of box and divergent ideas. The continuous interaction and scaffolding by the mentors created ample of space for creative thinking among students. It also allowed mentors to take a closer look in the learning capacities of these

students. Team of mentors has strongly recommended 3-4 students who could be graduated for next level of Mentoring.

Second Cycle of Identification:

The second cycle of identification was carried out after reviewing the process of identification at first cycle. The reviewed methodology was more robust and replicable. It was therefore decided to extend the sample outside Delhi. Eleven Kendriya Vidyalayas from Kanpur were chosen as sample apart from extending the Delhi sample.

2nd Cycle of Identification

Total Sample:11668

Phase	Methodology	Outcome	% of Students
Referral Stage	Observations and Nominations	Talent Pool of Potential Students	3871 (33%)
Selection Stage	Science and Mathematics Ability Test- Assessment (SMART)	Group of Significantly Promising Students	373 (3.1%)

Group of top 60 students were called for mentoring at Cluster Innovation Centre under University Outreach Mentoring Program.

Extending the project beyond the pre-defined age range:

Initially it was decided to limit the age range only from 9+ yrs to 13+yrs but it was further decided to look into inherent gifted traits among children as young as 3years old. Hence, it was decided to develop identification criteria based on cognitive milestones and principles of human psychology.

Development years between 3yrs to 7 yrs are the most fundamental years in the entire span of cognitive development. Around 3 yrs child enters in the phase of pre-operational stage and moves towards concrete operational stage.

Therefore, these years are crucial for achievement of important milestones in cognitive development. A comprehensive Activity Kit was developed based on the Cognitive Milestones during 3-7yrs of age range.

Activity kit was administered on a sample of 52 children of different ages between the age group: 3-7 yrs.

Outcome of the project:

- Nomination Scale
- Word Bank- Dictionary of more than 900 terms related to Giftedness
- Dossier – Information Directory of popular psychological instruments used in the field of Gifted Education
- Mentoring Modules (Both in Mathematics and Science)
- Professional Development Course in Gifted Education (Basic level & Advanced Level)
- Activity Tool Kit for Early childhood -Pre-primary
- Suggestive draft for National level Policy on Gifted Education

Agastya Chapter

Agastya International Foundation has deployed a practical and replicable process to identify over 2,00,000 children from schools of rural India, with traits of Giftedness and Talentedness. Agastya collaborated with National Institute of Advanced Studies (NIAS) in the effort. The exercise has resulted in a short-list of 26 children with traits of Giftedness and Talentedness.

Students at Flightrix learning flight simulation, Bangalore

The pages that follow describe the experience of Agastya International Foundation in an effort to identify gifted children, largely in rural of Karnataka and in some parts of Andhra Pradesh, during 2010-2013.

The structure followed is:

1. Origin of the exercise
2. Strategies evolved
3. Implementation
4. Results
5. conclusion

1. Origin of the exercise.

A project with the title, 'Identification of gifted children in math and science in India with reference to the age group 3-15 years', was sanctioned and funded by the Department of Science and Technology on September 2010.

The project was primarily administered by the National Institute of Advanced Studies, IISC Campus, Bengaluru, with Dr. B K Anitha Kurup, Associate Professor, NIAS, as principal investigator and the co-investigators were Dr. Jyoti Sharma, Associate Professor, Shyama Prasad Mukherji College, New Delhi, and Mr.Ajith Basu, Chief Programme Executive, Agastya International Foundation, Bengaluru. The study by Agastya in Karnataka and part of Andhra Pradesh was carried out in the field by Ms Hamsa Suresh and Shri Ganapathi Subramaniam, of the Agastya's Bengaluru Office , with the help of instructors and Agastya staff of Karnataka and at the Kuppam. AP centre.
It was planned that NIAS would study children in the age group 3-8 yrs in urban Bengaluru, the age group 8-12 years would be studied in Delhi by Dr. Jyothi Sharma's group (urban region) and the age group 10-15 yrs, in rural regions of India (rural Karnataka, Andhra), would be undertaken by Agastya International Foundation, using its resources of trained personnel and the well equipped science centre at Kuppam, in Andhra Pradesh. The study was to take a year's time and the three groups were to evolve their own methodology.

The terms of reference for Agastya International Foundation(1) to identify 100 gifted children, during 2010-11, from a pool of over 2,00,000 rural children, from ruraland semi-urban Government schools, reached by Agastya International Foundationin Southern AP and Karnataka; and (2) to support the evolution a methodology, which can be scaled up nationally, for replication.
The program was kicked of by an early meeting in Delhi. First year, during the progress of the study, to set the direction, NIAS organized a workshop to provide initial support for the teams by inviting Dr. Marcia Delcourt, as a key resource person, Western Connecticut State University, Danbury, CT. The workshop was held for two days and provided great insight on giftedness program.

2. Strategies / action evolved.

Initially, based on this mandate, Agastya took up the task of chalking out the course of action. Senior management, office and field staff, resource persons, consultants, conducted a series of meetings and brainstorming sessions, and, with the collective experience of all, and also in consultation with NIAS, it was decided to proceed as below:

- Listing out the criteria for identifying gifted children
- Identifying the resources and personnel (internal, national and international) that Agastya could make use of
- Deciding the method short listing children
- To take Karnataka as the 'sand-box' for the study, which was a 'pilot' study.

- To nominate a field team, which would coordinate the field centres, Government authorities and school managements in Karnataka
- To take the help of NIAS to test a sample of children finally selected by Agastya, as a measure of validation

Based on this outline of action, the Agastya team listed out the criteria/methods for identification of gifted children as :

1. Using information from and the assessment of teachers, parents, fellow students or the community
2. Apparent high level of inquisitiveness and curiosity, questioning and perseverance.
3. Analytical ability: seeking depth, consequential thinking and problem solving.
4. Interdisciplinary thinking, consequential behaviour.
5. Pattern recognition – creativity connected to patterns.
6. Exhibiting above normal capacity of memory, network memory and then retrieval.
7. Exhibiting divergent thinking, lateral thinking and extension thinking.

Further, Agastya followed a course of action outlined by DSTand NIAS:

i. Identified and trained a team of Agastya teachers as'agents' to spot exceptional talents in Science and Mathematics among students.
ii. Screened 2,02,195 children across rural areas of Karnataka and Chittoor Dist. (AP) to short list 5,437 children who show exceptional abilities, in science and mathematics.
iii. the team of trained resource persons of Agastya visited the locations of the 5,437 children and use different methods to create a short-list of 500 children.
iv. Further the Agastya team made frequent visits and conducted final evaluations to arrive at a list of 26 children who were the most exceptional/gifted of the lot.

3. Implementation

The Agastya team identified a large pool of children through the medium of teachers in the schools (who came into daily contact with the children). The team then used its experience, in communicating science to large numbers of children, to identify specific behaviour forms and responses, in children, which reflected the above criteria and then devised a scheme of training teachers to themselves understand the elements of creativity, so that they could be sensitive to giftedness in children.

1. The pool of schools in the area covered by the study was addressed, first, to identify the teachers who would be involved. A series of thirteen workshops was then held between April 2011and Nov 2011, covering 214teachers from 150 schools for equipping the teachers with a uniform set of tools to identify the kind of children that the study was seeking. The workshops were conducted by the Agastya staff themselves and took the form of informal and interactive sessions where the concepts of what was to be looked for were explained. Questions on simple concepts in science were thrown

at the teachers and the quality of the answers given by the teachers was discussed with the teachers themselves, to enable teachers to experience the nature of a creative answer. In this way, during the workshops, teachers were made to appreciate what was meant by a response to a question, or a situation, which revealed the faculty being looked for, as opposed to a routine response.

A 'nomination form', in which teachers would record specific behaviour forms and achievement, to enable objective assessment of children, was devised and distributed, to get feedback from teachers of their observation of the children. Agastya resource persons, who visited the schools during the course of the study for review and collecting completed nomination forms, interacted with children, teachers and school management during their visits.

And in this way, over 7 months, 214teachers were first equipped to identify in a reasonably uniform manner, the elements of giftedness, and then guided and supported, so that a first cut short-list could emerge from the large population of over 2,00,000 children

2. Apart from teacher nomination, references from other sources, like newspapers, TV or even parents were important sources of information about precocity or giftedness of children. Children brought to the notice of the Agastya International Foundation team in this way were then evaluated, through similar tools of observation, for inclusion in the short-list.

3. Another source of information about giftedness, which may have escaped the notice of the teacher, was the feedback of fellow students.Whenever Agastya Instructors were in the classroom, the children were encouraged to nominate the best child in the class. Sometimes students took the names of students who were scoring well in the exams, class leader etc. The Agastya instructor then had to explain the students what kind of a child they were being asked to try and identify. The Agastya team also came up with a simple form which helped children do this objectively. This exercise of peer nomination was useful and often gave fruitful results

4. A further source was the science fairs innovative science fairs and competitions where children exhibit their projects/experiments/models etc., which is one of the activities that Agastya regularly organises at schools. Children who showed exceptional curiosity or ability could be identified at these events, for further evaluation.
All these operations, covering over 1436 schools and 214 teachers involved careful organisation and coordination and took 36 months to accomplish. But at the end of the exercise, a total of 2,02,195 children were screened and 5,437 nominations were received, with another 7 cases identified from the media references that were received.

Screening
Having arrived at the first short-list of 5,437 children, the second level of screening was conducted at the Agastya Science Centres and through summer camps and different activities.

- **Walkthroughs** Agastya has Science Centers, equipped with large pavilions ranged with innovative models and displays which bring out aspects of basic science and act as an enriched environment where children are provoked to wonder and think. The 5,437 short-listed children were brought, in batches, to these centres and simply allowed to spend time watching and interacting with the models and displays. While children were thus engaged, Agastya instructors observed their behaviour modes (curiosity, motivation level, being excited by patterns or oddities etc.) and recorded what they saw. The children's behaviour was an eloquent announcement of their motivation and capacity to respond to the stimuli presented. The observers were then easily able to identify the truly gifted out of this group of children already selected for their superior ability.

  Apart from what was revealed by the behaviour of children in the enriched environment of the science models and displays, children were also given written tests, like some questions on math, which were not routine, but imaginative and challenging, which could reveal elements of exceptional ability.

- **Making models** –Another activity to reveal children's ability was the making of models Children were invited to create models of different common things which can move, like car with rudimentary materials. For example, children were given paper, straw, rubber band, hardboard and asked to create a model, of a vehicle or a fan or an animal, which moves on its own. Success was not important, but ideas, originality and the approach, were revealing.

- **Games** -They were invited to solve puzzles like Sudoku, set game, Kakuro, and their approach often revealed original thinking.

- **Observation of learning behavior (attention, quality of questions, quality of immediate recall, quality of explanation to other children)**– some of the children, after observing Agastya experiments or demonstration sessions and listening to the instructor, immediately started interacting by asking questions and some gathered their peers and starteddiscussions or explanations. The quality of this behavior helped evaluate ability

- **Use of summer camps to pick bright children**- Students were also shortlisted through summer camps that Agastya conducts. Camp leaders picked children who exhibited ability to observe, to reason and to ask questions.

- **Formal tests** – students were tested by Agastya at different levels. Simple questions picked from different CET question papers are put together and students are encouraged to solve them. New concepts are taught to students and they are encouraged to solve questions based on those concepts. They are encouraged to solve asset questions etc .when they are solving the starting and the ending time of each student was noted. Evaluation was based both on the number of correct answers and also who completed the test in the shortest time. Students Children with exceptional performance in the tests were shortlisted.

In this way, the 5,437 children who had been nominated were screened and 379 children were short-listed, as the most promising. To get teachers to take a new and purposeful look at their students, to identify any of, them who showed higher talents, and to fill out the nomination form to show that this had been done objectively, had already been a difficult task. Now to arrange for over 5,437 children to be spared by schools and parents, and then to ferry them to resource centres, keep them motivated and cheerful, conduct the observation sessions, and then ferry them back had now to be managed by the Agastya staff themselves. Apart from the school management and parents, the State Government had also to be dealt with. It was unquestionably a challenge, but with dedication and commitment, Agastya staff was able to complete assessment of all 5,437 children over a period of 36 months from the start of the exercise. The result of the exercise was that of the 5,437 children observed, the Agastya team identified 379 as the most impressive.

Results

Having extracted, from the large number, of over 2 lakh children, a core group of 379 children, as the most gifted, the evaluation tools employed by NIAS in their exercise with urban children in a younger age group were used for the final selection. The tests used by NIAS were the RPM and the Torrance tests, which evaluate children based on criteria creativity, and then the IQ test.

Before the tools were employed with all 379 children the tools were first tried out with a sample group of 14 of the children that had been considered the most gifted. The testing was conducted at NIAS campus. Agastya had to convince parents of selected children to come to Bangalore for Validation at NIAS, arrange travel and accommodation, take permissions from school authorities etc. The tests were administered by NIAS team and the results are shown in the table below:

		TORRANCE CREATIVITY TESTS			IQ TYPE TEST	COMMENTS
		Fluency	*Flexibility*	*Originality*	*RSPM TEST %ile*	
SNO	NAME	(Number of relevant responses)	(Variety among the responses)	(Originality of responses)		
1	Supreetha	36	13	13	99	Urban/Non Metro
2	Bhoomika	59	26	6	98	Urban/Non Metro
3	Rahul M	36	8	3	95	Urban/Non Metro
4	Anusha	23	12	5	92	RURAL/POOR
5	CN Nishanth	54	18	4	90	RURAL/POOR
6	Induja	28	13	5	88	RURAL/POOR
7	Aneesh	49	25	20	87	URBAN/Non Metro
8	Venkatesh	80	31	20	82	RURAL
9	Rahul D Patil	42	16	1	80	URBAN
10	Santhosh K	65	13	1	75	RURAL/POOR
11	Adarsh	Written content was less, as child had writing difficulty			55	RURAL/SMALL TOWN
12	Yogananda	64	26	10	50	ANVESHANA
13	Santhosh	56	27	31	41	IRIS
14	Manoj	75	22	6	12	ANVESHANA

When these results were reviewed, it was noted that criteria of fluency, flexibility and originality, in the Torrance test, which were language and culture specific and designed for children in western countries, would not be relevant to evaluate Indian children from a rural background. These scores are hence ignored but it was seen that the IQ scores agreed with Agastya assessment in most of the cases. It should be noted that the IQ scores are expressed as percentiles, with 99% representing an IQ of 135. It can be seen that five of the fourteen are above 90 and the next five are above 76. This result indicated that the methodology developed by Agastya International Foundation was not off the mark in evaluation, even of IQ, although more criteria than intelligence alone had been

considered by the Agastya team. The IQtests alone were hence considered a suitable instrument to make the final selection.

As administering IQ tests does not require elaborate arrangements, the final phase of selection did not call for mobilising the remaining children to NIAS or the science centres. The tests were conducted where the children were, by Agastya resource persons, who travelled to the villages involved and coordinated with parents, school authorities and the local administration to complete this phase of assessment. And as a result of the IQ tests, 26 out of the 279 children were adjudged as the most gifted, and this was the final list.

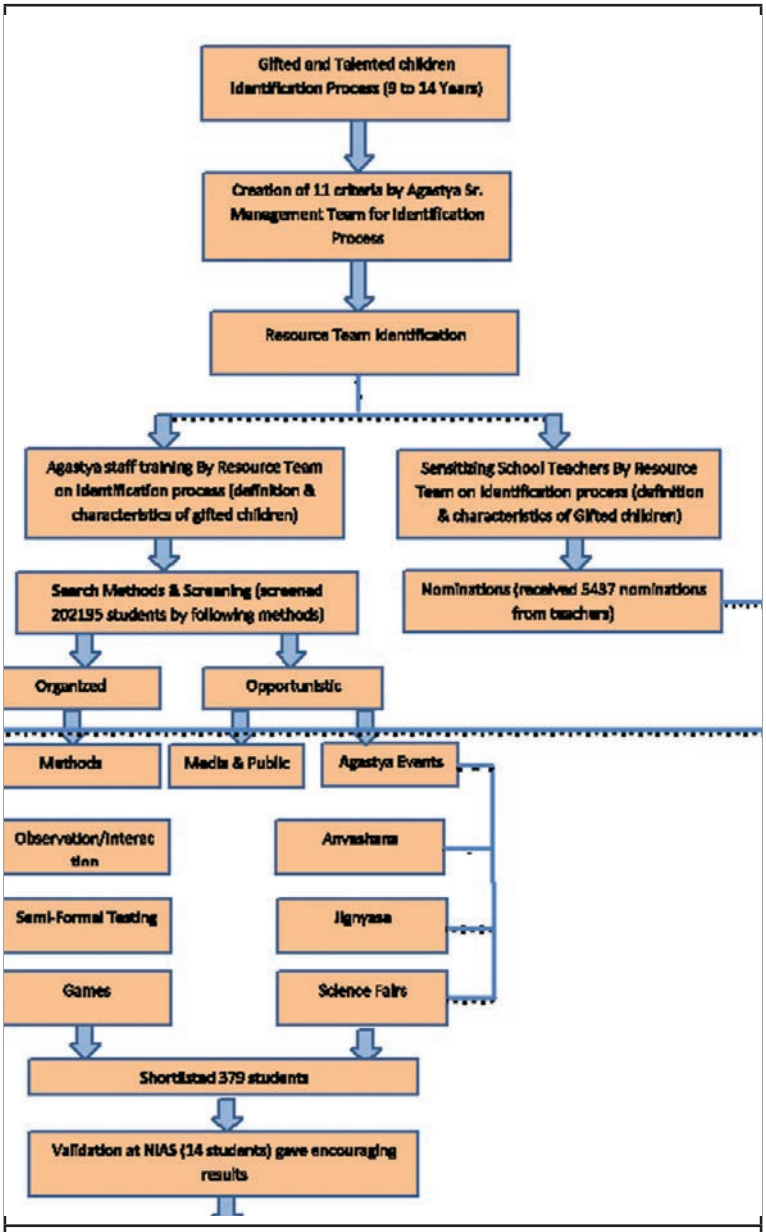


Figure 1: A Flow chart displaying the whole process is as above:

At this stage it is worth mentioning that the abilities of the 26 children selected by Agastya International Foundation are truly astonishing. Rahul, age 7 years at the time of testing, has a collection of 47 Rubic's cubes, all of which he solved easily when he got them and can now solve blindfolded! Supreetha, age 8 years at the time of testing, knew the entire periodic table and could do astonishing mathematical feats like reciting any of the multiplication tables upto 1000, backwards! She also challenged and college teachers in her grasp of Chemistry. Venkatesh, age 11at the time of testing, displays mature thinking and approach to problems that are difficult to find in adults. This is also true of Bhoomika, age 11 at the time of testing. Both Venkatesh and Bhoomika are also good at maths. Santosh, age9 at the time of testing, shows exceptional ability to express his defence of a stand he has taken.

All the 26 selected children display exceptional ability, despite some of them being from the most backward places in AP and Karnataka.

Conclusion

The methodology of evaluation by observation, using the media of teachers in the field, monitored by a committed team hence appears to be validated by the results – viz – identification of 26 truly exceptional children, whose talents and ability are resources that the society can and should train and polish for great public benefit. The methodology for identification of the resource is simple and easily replicated and may be followed in all districts/states in India.

Follow up

Having identified these 26 exceptional children, Agastya felt the work had only just started and followed up with mentoring sessions for these selected children. Agastya hence approached NIAS with a proposal to conduct Mentorship program. While awaiting response from them Agastya took the initiative with a ten-day Enrichment/Mentorship program for 22 students at the Agastya Science Center in Kuppam. The objective was to initiate the children into a 'self-learning' mode where they develop capabilities to explore, research, discover, apply and reflect on learned concepts.

The children were exposed to different learning environments, like being in a flight simulator, visiting the nontechnology lab and other labs at IISc campus, and a visit to a planetarium. Challenges and problem solving activity sessions made children to open up and think in different ways to find solutions. The activity increased their team spirit and encouraged working in groups. They also learnt that a problem can have multiple solutions.

Dr. Maulishree Agrahari, Professor& KRP, PESIT, Bangalore and adjunct Professor - Dept. of Physiology & Pharmacology, Faculty of Medicine, University of Calgary,Mr. SRS Rao,, External Faculty- PCRA and Educational Services with long experience in copper and cement Industries for nearly 30 years

and Dr Harish Bhat, Research Scientist, Centre for Ecological Sciences, IISc, Bangalore, were the external experts who helped conduct the camp.

The experts recommended follow up with

- A 3 day session for the selected children to determine their Strength\Weakness needs to be done to thoroughly understand their potential. It should also act as a remediation for the areas that children find difficult in learning.
- Interest identification and training
- Science skills enrichment programme to be integrative in approach
- Post camp evaluation – how have the children benefited? What measurable change?

Recommendation

While Agastya has developed and proved a process for identifying giftedness in remote and backward schools in rural settings, a process that can and should be replicated all over India, Agastya strongly feels that the exercise would be futile if it is not followed up with action to support and nurture these bright minds to grow to their potential.

In the view of Agastya, this could be best done by allowing the children to remain in their existing surroundings, but exposing them to accelerated and enriched learning in sessions of two to four weeks once or twice in a year. In these sessions, the children would, for one, be in the company of bright minds like themselves and for another, receive inputs that would sustain their interest in gaining more from the regular curriculum when they return to their schools.

The following are the recommendations:

- Design an integrated identification cum multi-year enrichment program that can work for children from the lower socioeconomic background.
- Identify a 'gifted' pool at the beginning of Grade 5- through teacher nomination
- Fortnightly/monthly "enrichment classes" aimed at socialisation, improvement
- Screen for long term nurturing at the end of Grade 5: select 1 out of 3
- Nurture through Grade 6-8
- Pilot the above in Government schools/ low fee private schools before scaling up for
- state-wide implementation followed by nationwide implementation

It is also the experience of Agastya that the parents of children selected in this process need to be counselled to deal with the gifted child with regard for his or her talent, but without excitement or vanity, which may divert the immature mind of the child.

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