

National Meet on introducing 'Design and Innovation' in school curriculum

on behalf of 'participants'
of the above meet held at the
Industrial Design Centre (IDC),
Indian Institute of Technology Bombay
on Friday 6th and Saturday 7th of February 2009

February 2009

List of Contents on this proposal:

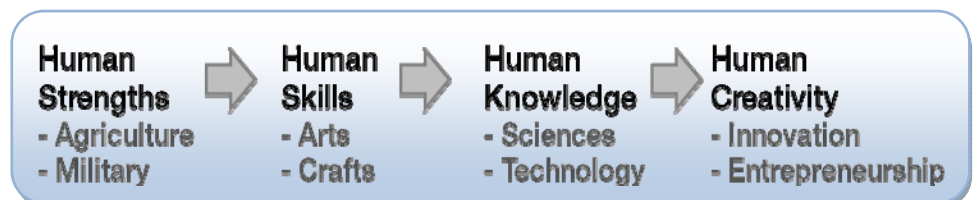
A.	Introduction	3
B.	Educational Meet	4
C.	Recommendations by Group 1 - Curriculum	5
D.	Recommendations by Group 2 - Methods of learning 'Design and Innovation' in Schools	8
E.	Recommendations by Group 3 - Implementing 'Design and Innovation' in Schools	11
F.	List of participants	16
G.	Annexure: Vision Statements by participants	19
H.	Annexure: Introducing 'Art, Design and Culture' in Schools	24
I.	IDEO's Ten Tips For Creating a 21st-Century Classroom Experience	26

Introduction:

'Design and Innovation' learning for India:

- Design in the context of a country like India can play a very significant role in finding appropriate solutions to its problems.
- Design by its own nature is creative, collaborative, multi-disciplinary and is inclusive of many other fields.
- The methodology of how design is learnt by hands on experience can make a difference to the process of learning different subjects in schools.
- Design process involves knowledge gathering, analysis, discovery, and conceptualisation resulting in a problem solving activity and this in turn leads to experiential learning.
- Design can bring sensitivity and awareness to Indian 'Arts, Crafts, Culture and Environment'.
- Design can help students develop values, attitudes, sensorial skills and critical thinking.
- Design can make the students realize their creative and innovative potentials.
- Design and Innovation can make a big difference to the expected growth of creative needs in our country.

India - mapping ahead:



Educational Meet:

A National Meet on introducing 'Design and Innovation' in school curriculum was held in Mumbai, India from 6th and 7th of February 2009, hosted by the Industrial Design Centre (IDC), at the Indian Institute of Technology (IIT) Bombay, Mumbai

This meet was meant to discuss and formulate guidelines for introducing 'Design and Innovation' as part of the school curriculum in the context of India.

Aim:

To come out with a set of recommendations with regard to curriculum, methods of learning design and modalities for implementing this proposal.

To prepare the groundwork for a white paper on this subject.

Output:

A set of recommendations to be presented to the Ministry of Human Resources and Development + to the various directorates of school education + to the knowledge commission.

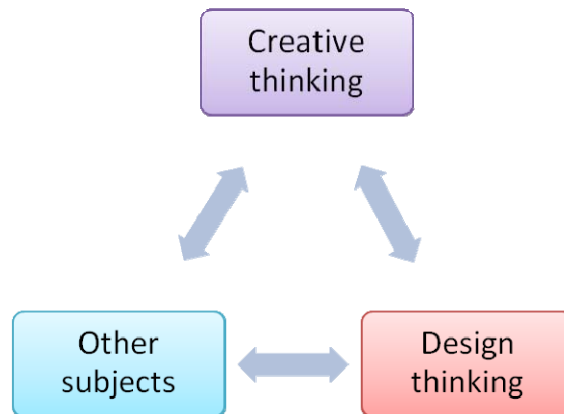
Participants:

Faculty members in charge of the academic programs from design related schools in India + decision makers in different school directorates + others working in the field of Children's learning environment.

Number of participants:41

Group 1 – Curriculum/Content:

Group 1 - Content



Philosophy

- Design thinking should be integrated into the school curriculum at different stages which enables students developing values, attitudes, sensorial skills and critical thinking. The intention is to offer avenues that are creative and innovative and integrate conventional fragmentation.
- At the earlier stages (class 1 to 5) design thinking could be integrated in all the curricular areas. This grows in intensity as the understanding of the students increases and the ability to solve complex problems increases (class 6 to 10).

Goals and Objectives (class 6 to 10)

Introduce basic design thinking and skills.

- To enable development of abilities needed to deal with unconventional situations that require creative, unique and multiple concepts.
- Develop sensitivity to the natural and manmade product and communication environments and relate the learning to real life situations.
- To emphasize a certain playfulness within the learning framework.
- To foster intuition, empathy and emotional faculty in the students.

Contents

Class 1 to 5:

- Observation of the immediate environment: body, clothing, food, class, school, home, family and society etc. Interpretation of the above points in visual, verbal and performing forms.
- Exposure through workshops, demonstrations, and visits to traditional art forms and vocations.

Contents

Class 6 to 8:

- Observation and understanding elements of Nature and their interdependences.
- Visual and verbal narration and presentations using collages, story boards and other methods.
- Problem identification from immediate environment, experiencing and understanding the product and user relationships.
- How things are made: exposure to elementary concepts like parts of a products, components of a system etc.
- The complexity of this exposure will increase gradually as the students' progress from class 6 to class 8.
- Introducing the concept of object and form affordances.
- Creation based on environmental principles.

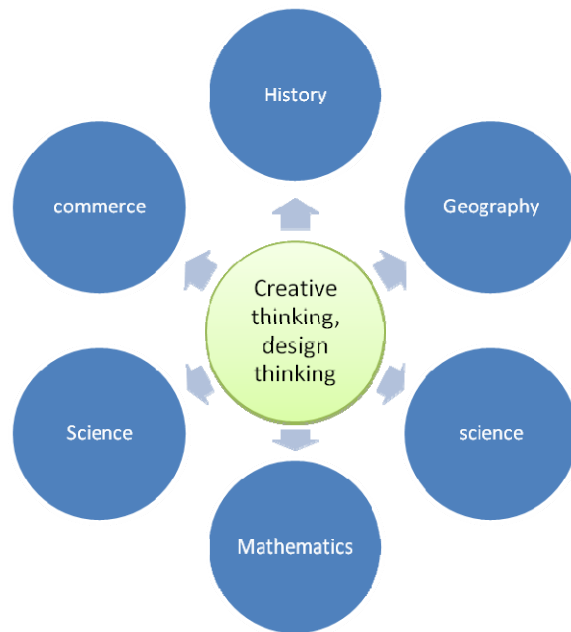
Contents

Class 9 to 10:

- Design Insight: Case studies, stories of innovators (Indian and foreign).
- History of design and industrialization.
- Landmark products and innovations.
- Design project.

Recommendations

- 20 to 25% time given to design in the current curriculum should be integrated with the core curriculum.
- Methods of teaching should improve: Remove the mental block of Art and Craft from Design thinking.
- Design and Creative thinking should be included in teacher education program.
- Creation of resource material for design teachers.



Group 2 – Methods of learning in schools:

Group 2 - Methods of learning design

Philosophy

Design as a method for teaching?

or

Teaching Design as a subject?

Design should be used as a medium to teach subjects.

Design and Innovation can be introduced as an alternate subject in 11th and 12th.

Learning Environment Set-up

1. Teaching
2. Teachers, staff, education inspectors
3. Learning Resources
4. Parents

What we envision

A Holistic teaching method

Teaching

Current scenario

- ▶ Text book lesson

- ▶ Subj. taught in isolation
- ▶ Rote learning
- ▶ School learning

We can make it better

- ▶ Projects
 - workout process of doing a project
- ▶ Hands-on method
- ▶ Do and learn - experiential method
 - VigyanAshram method

- ▶ Theme based learning
- ▶ Problem solving method
- ▶ Non-integrated approach

Teaching

Current scenario

- ▶ No teacher-child interaction
- ▶ No child-child interaction

We can make it better

- ▶ Child-teacher friendly interaction
- ▶ Collaborative group learning
- ▶ Games and Ice-breakers
- ▶ Trips and outings

How can we make it happen?

Current scenario

- ▶ Time table model

We can make it better

- ▶ Module model
- ▶ not teaching subjects in isolation club sessions
- ▶ can it be week long module ?

Teachers, staff, education inspectors

Current scenario

- ▶ Teacher has no power
- ▶ Domestic/ Admin. staff
- ▶ Edu. inspectors role
- ▶ Teacher teaching alone

We can make it better

- ▶ Empowering teachers
 - preparing new teachers
 - training senior teachers
- ▶ Encourage interaction with subj. teachers
 - impart appropriate training
- ▶ Provide set of recommendation
- ▶ Art Student helping teachers
- ▶ Professionals giving sp. talks

Teaching, Staff

Current scenario

- ▶ No interaction between Teachers, Staff and other members of the institution

We can make it better

- ▶ Meetings/Seminars/Festivals/ Workshops
- ▶ Provide a meeting ground for interaction between various concerned people
- ▶ Balvididha / Shikshakvididha (State level, city level, village level)

Learning Resources

- ▶ Library
- ▶ Teaching aids
- ▶ Resource sharing facility
- ▶ Role of media
 - Documentation of methods used
 - Broadcasted & published
 - D & I Magazine to be published & circulated in all schools
 - e-learning and online resources to be developed
- ▶ Visits to museums etc.
- ▶ Collaboration between professionals, local crafts people etc.
 - competent local craft persons like Potters, Bamboo Weavers etc. to be declared by Govt. as visiting teachers to schools in the vicinity. This will open up a bank of craft resource to the schools in villages and semi-urban areas.

Parents

- ▶ Getting active involvement from parents in educational matters
- ▶ Orientation sessions for parents
- ▶ Child - parent interaction

Group 3 – Implementing ‘Design and Innovation’ in schools:

Group 3 - Implementing ‘Design and Innovation’ in schools

Concerns

With regard to implementation we have certain concerns.

Concern 1: What is the subject to be called? Terms used before may carry past baggage and defeat the aim.

Recommendation 1: Call it Design & Innovation or D & I. This links up with National Knowledge Commission's concern to enhance capacities for innovation.

Concern 2: Design is not widely understood to be an approach to learning. It is more commonly seen as a training in various techniques that make objects pleasing to the eye.

Recommendation 2: Through sustained advocacy, draw attention to the fact that design uses a methodology for learning through questioning and hands-on experience, which can be mapped onto all the subjects offered in the school.

When we suggest implementing a curriculum in design in schools, we are speaking about creating scope for children:

- . to think critically
- . to investigate and make connections
- . to innovate

Concern 3: There is enough of a burden of learning as it is, introducing one more subject may be perceived as adding to the difficulties of children and teachers and rejected.

Recommendation 3: We recommend integrating design within the various courses of the existing curriculum throughout school and offering it as a specific subject only in 10th, 11th and 12th stds.

Examples of such integration of design in the 1st to 9th stds:

- . In Art, students may do a design project of conceiving the sets and costumes for a play being studied in Literature.
- . the Geography class may call for making large maps on the ground and other exercises requiring thinking in three dimensional space.
- . students of Marathi language may bring out a school magazine, giving them experience in graphic design and print production

Concern 4: With such a crowded timetable, what are the slots we can enter in the higher grades ?

Recommendation 4: Apart from bringing design into the teaching of all subjects, it is possible to work through the slots of Work Experience (formerly SUPW) of 4 periods plus 2 periods of Drawing, totaling 3 hours a week all told. Thus D& I could be an integral part of the SUPW program, in vogue in all CBSE affiliated schools and other school systems.

An awareness program needs to be set in to prepare the ground and dispel the fear of an additional burden on students.

Allotting these to D & I would be in keeping with the two subjects themselves and result in better use of this time, which may be wasted in some schools for lack of adequate resources.

Concern 5: Design is not seen as part of education, but as an adjunct, used to make a dull textbook look happy or a drab school building more colourful. How can we change the status of design and designers within the field of education?

Recommendation 5: That good design be integrated into schooling and the classroom in every possible way. This will be the best form

of advocacy for design education, as the outcomes will be self-evident within the system.

The entire built environment of a school (labs, libraries, dining hall), the textbooks and objects they use, the plants and natural environment around the school, all should be perceived as design issues. More significantly, these should be seen as issues to be approached through iterations of a process of thinking that comes from the discipline of design.

Concern 6: How is the idea to be diffused into the system?

Recommendation 6: Advocacy has to be done at many levels. Some of the places identified:

- . CBSE and other boards such as ICSE, IGCSE etc. who do evaluation and certification.
- . state government directorates, SCERTs and state exam boards.
- authorities of networks of schools such as the Kendriya Vidyalaya Sangathan and Navodaya Vidyalaya Samiti, Delhi Public School, Dayanand Anglo-Vedic trust and others.
- . National Council for Teacher Education(NCTE) of Govt of India, who set norms for teacher education courses and recognition of teacher education institutions.
- . entry into in-service trainings of teachers in networks like KVS Teaching Learning Material (TLM) programme of SSA & DPEP are another place to dock on.

Concern 7: Are there models for inducting radically new approaches into a system, that have proved to be effective?

Recommendation 7: Example of English Language Training (ELT) programme which emphasised communication and discarded traditional training in grammar, spelling and vocabulary, now successfully integrated into system. We could adopt it for practical reasons.

The ELT pattern was:

three months training for 100 master trainers

they train 3 resource persons each for 1 month, form teams.

teams of 3 of them train 50 teachers for 1 month in holidays.

teachers implement programme in classroom

next vacation, they meet again for 1 month , drawing on their classroom experiences to take the experience further.

Concern 8 : India is a diverse country. We would like to see an education that is more local, more relevant and contextual than what is obtained at present.

Recommendation 8: The design process approach, when internalised, may help to sustain localisation in education.

Some advantages:

schooling can be local, autonomous (not one type fits all)

it can be made relevant to the future lives of students

teachers feel empowered and can enjoy their role

parents and local people can enter as resource persons

Experiences show that schools structuring their own timetable for the first 9 years can successfully prepare for board exams in the 10th year. Such students have repeatedly shown that a year of work is sufficient to tackle the board exams.

Concern 9 : How do we create wider social recognition for Design & Innovation ?

Recommendation 9 : Encourage industry, philanthropic trusts as well as government organisations to institute awards for outstanding D & I projects, scholarships of students from disadvantaged groups.

These are the recommendations in summary form:

- Design & Innovation is a learning strategy where “learning to think and innovate ” is the focus
- It can be integrated into different subjects, already part of the school syllabus.
- We need to work out collaborations with a range of agencies to implement D& I.
- Set out to develop and test a training cycle with one collaborating school system to develop the process of implementing D & I.

Participants in different groups:

Group 1 - Content

Participants

Sudhakar nadkarni
Immanuel suresh
Chakradhar saswade
Jyotsna tiwari
R Sandesh
Yogesh kulkarni
Kris kumar
Raja Mohanaty
Sachin datt

Group 2 - Methods of learning design

Participants

A. G. Rao
Anand J.Dev
Madhuri Naik
Dolly Biswas
Vidya Joshi
Meenal Joshi
Santhosh Kshirsagar
Sherline Pimenta

Group 3 Implementing Design in Schools

Participants

Anirudh Natuu,
Chandita Mukherjee,
Neha Gautam,
Nina Sabnani,
Prasad P Bokil,
Priya Srinivasan,
Ravi Poovaiah,
V K Agarwal,

Participants list:

- 1 Prof. Santosh B Kshirsagar, Faculty, Sir J J School of Applied Art, Mumbai
- 2 Prof. Meenal Ajay Joshi, Faculty, Department of Art and Design Sophia Polytechnik, Mumbai
- 3 Prof. Vidya Ranjan Joshi, Faculty, Sir J J School of Applied Art, Mumbai
- 4 Prof. Madhuri M Naik, Principal, Department of Art and Design, Sophia, Mumbai
- 5 Dr. Vinod Vidwans, Faculty, Flame School of Communication, Pune
- 6 Prof. Anirudh Natuu, HOD-Product Design, Symbiosis, Pune
- 7 Prof. Anand James Dev, HOD-Communication Design, Symbiosis, Pune
- 8 Prof. Immanuel Suresh, Head, Communication Design, NID, Ahmedabad
- 9 Prof. Chakradhar Saswade, Chief Co-ordinator, Design Foundation Programme, NID, Ahmedabad
- 10 Dr. Ajanta Sen, Director, Solar Project, Mumbai
- 11 Prof. A G Rao, Faculty, IDC, IIT Bombay
- 12 Prof. Uday Athavankar, Faculty, IDC, IIT Bombay
- 13 Prof. G V Sreekumar, Faculty, IDC, IIT Bombay
- 14 Prof. Anirudha Joshi, Faculty, IDC, IIT Bombay
- 15 Prof. Chakravarti, Faculty, IDC, IIT Bombay
- 16 Prof. NINA Sabnani, Faculty, IDC, IIT Bombay
- 17 Prof. Raja Mohanty, Faculty, IDC, IIT Bombay
- 18 Prof. V.P. Bapat, Faculty, IDC, IIT Bombay
- 19 Prof. R. Sandesh, Faculty, IDC, IIT Bombay
- 20 Prof. Ravi Poovaia, Faculty, IDC, IIT Bombay
- 21 Sherline Pimenta, Ph D Student, IDC, IIT Bombay
- 22 Sachin Dutt, Ph D Student, IDC, IIT Bombay
- 21 Prasad P Bokil, Ph D Student, IDC, IIT Bombay
- 24 Chandita Mukherjee, Director, Comet Media Foundation, Mumbai
- 25 Prof. Chitra Natarajan, Faculty, Homi Bhabha Centre for Science Education, Mumbai

- 26 Kitayun Rustom, Centre for Environmental Research and Education, Mumbai
- 27 Deepa Balasavar, Writer, illustrator, designer, Mumbai
- 28 Jyoti Francis, Managing Executive, Navnirmiti, Mumbai
- 29 K. P. Vijay Kumar Director- Engineering, Texol, Pune + on Board, Vigyan Ashram, Pabal
- 30 Yogesh Kulkarni, Director, Vigyan Ashram, Pabal
- 31 Prof S Nadkarni, Sr. Design Faculty member, Mumbai
- 32 Dr. Pascal Chazot, Principal, Mahatma Gandhi School, Ahmedabad
- 33 Priya Srinivasan, Pomegranate workshops, Mumbai
- 34 Narayan Parasuram, Creative Director, Karadi Tales, Mumbai
- 35 Miss Dolly Biswas, HOD, Commercial Arts, B.D. Somani Institute of Art and Fashion Technology< Mumbai
- 36 Dr. Jyotsna Tiwari, Incharge - arts curriculum, NCERT, N Delhi
- 37 Prof. K L Kumar, Head, Faculty, University of Botswana, Botswana
- 38 Neha Gautam, Faculty, Pearl Academy, N Delhi
- 39 Bakul Ayanji, Managing Executive, Navnirmiti, Mumbai
- 40 Purushottam Tripathi, Program Co-ordinator, Navnirmiti, Mumbai
- 41 Dr. V. K. Agrawal, Director, Zonal Institute of Education and Training, Kendriya Vidyalaya Sangathan, Mumbai

Annexure - Vision Statements:

The following are excerpts from vision statements made by the participants concerning introduction of 'Design and Innovation' in school curriculum:

1. Bakul (Navnirmati Mumbai)

- How to motivate children to learn (if student is not interested, he does not want to learn)
- We need to teach on project basis, contextualized to education. Eg doing the study of traffic light as a project.

2. Perushottam Tripathi (Navnirmati, Mumbai)

- Talked about the problems they are facing while implementing the teaching aids.
- Large no. of children.
- Problem of space. Hands on experience.
- Teachers and administrators have mental block.
- Helping them adapt to new methods.
- Teaching aids need to be user friendly.
Giving numerical problems in words is a problem.

3. Chandita (Comet Media Foundation, Mumbai)

- We need to understand why children fail? Should be 'Think and learn' refer John Holt
- Birds fly, human think and learn.
- We are trying to figure out how the world works. Thinking and acquiring knowledge.
- Save the child from school.

4. Yogesh Kulkarni (Vigyan Ashram, Pabal)

- Learning by doing.
- Work centric curriculum. Have work culture in schools. Work should become their language.
- Applying Mahatma Gandhi's philosophy called "Nai Talim"
- Children are trained to be entrepreneurs.
- Provide service to the community.

5. Vijay Kumar (Vigyan Ashram, Pabal)

- Students given skills to design and innovate creatively
- Work with hand
- Living by doing work

6. Dr. Agarwal (Zonal Institute of Education and Training, K V Sangathan, Mumbai)

- how to address the problem of children not in schools
- Text book has become the bible
- constructive approach of teaching
- problem of examination system

7. Santosh Shirsagar (Sir JJ school of Applied Art, Mumbai)

- Focus attention on implementers
- Are we curious about them? What children are ? What they think?
- Two type of teachers. Those who work. Those with Job and do partime teaching.
- What type of teachers are we looking for?
- Implementation is more important than curriculum

8. **Vidya Joshi (Sir J J School of Applied Art, Mumbai)**
 - Develop 5 senses of the child by making use of it - Does our curriculum address it.
 - knowledge of observation, perception, experimentation, etc.
 - break rules - come up with ideas-explore medium
 - Learning through experimentation
 - Project based learning
 - Develop crafts, creativity, conceptual thinking
 - -Development of interdisciplinary skills & presentation skills
9. **Prof S Nadkarni (exhead IDC, IIT Bombay and DoD, IIT Guwahati)**
 - Students should know the 'Process of thinking and the logic of problem solving'
 - Design thinking is critical
 - Children are repeatedly made to memorize unnecessary facts and figures
 - Design can lead to innovation
10. **Kris Kumar (University of Botswana)**
 - Which school level are we targeting?
 - 'Design and Technology' has been introduced in schools in UK, Australia and many other countries as core subject in school education.
 - Look from perspective of student.
 - Students will be asking why this kind of education was not given to us before.
11. **Deepa Balsavar (Making learning content for Municipal schools)**
 - Design, Art, Music, Theatre needs to be made integral part of children's learning
 - Looking at ways to observe schooling conditions
 - Government has had many meetings since 1986, 1999, 2006
 - The main problem is that is implementation.
 - Shortage of teachers
 - Textbooks are a deterrent. They are badly designed. Content of textbook looks forced fit. Designers are not part of the content team right from the beginning.
 - There is no research on how illustrations in textbook should be given?
12. **Katy Rustam (Centre for Environmental Research and Education, Mumbai)**
 - Giving message of environment in school.
 - When crises hits, we bring that to the curriculum, adding to the content.
 - Just opening a textbook is not enough.
 - Design should not be taught like other subjects with a textbook. No need to teach design. Teacher should just be a facilitator. Or a class could be without a teacher.
 - Do exercises to introduce environmental awareness at a practical level.
 - Using available waste material to do art and craft activity. Children use waste to make something out of it.
 - Do not introduce design as a new subject. Integrate it in the current curriculum.
13. **Priya Srinivasan (Pomegranate Workshops, Mumbai)**
 - Design is a unifier of disciplines
 - Design has ability to integrate.
 - Design should be used to facilitate math and science learning in better ways.
 - How we use math to design?
 - How we use science to design?
14. **Chitra Natrajan (Homi Bhabha Centre for Science Education, Mumbai)**
 - Opposing view on design and designing (ability to design)
 - Design is learnt after long apprenticeship
 - Designing is like language, that everyone posses inherently.

- Design leads to creation of new things
- Students develop constructive way of thinking.
- Design and Technology is a social endeavor.
- Over 30 nations have D&T curriculum in schools, D&T in England, US, China, Taiwan etc.
- Going away from Technical, Craft and Vocational education.
- Design has to do with Cognition, Language, Knowledge, Skills
- They evaluate design through projects instead of through written examinations.
- It's a domain of human capability and human experience
- Design has concern for function, utility and purpose.
- Multimodal curriculum. Can be done in a collaborative manner.
- D&T also implemented in India schools.
- Seek synergy between people of all disciplines

15. Anirudh Natuu(Symbiosis Institute of Design, Pune)

- What are the kind of students we want. What kinds of schools we want?
- Lets them think out of the box.
- List of abilities, skills, aptitudes required to enter a design institute.

16. Dr. Jyotsna Tiwari (NCERT, N Delhi)

- Different strategies need to be worked out for implanting this.
- Design can lead to innovative methods of learning especially in lower classes
- Creating patterns, textures, tactility can be done creatively
- Should have a different approach than how art is being taught presently in schools.
- Should look at design in terms of a social context
- Graphic Design, Fashion Design and Heritage Design have been introduced in 11th and 12th

17. Chakradhar Saswade (NID, Ahmedabad)

- Art, Design and Innovation should be introduced as core subject at 9, 10 onwards
- Aesthetics (Visual order, etc) should be introduced from class 7th and 8th onwards
- Help in introducing student to college
- Introduce aesthetics as part of value education.
- Have an empathetic approach.
- Introduce elements of perception.
- Notion of coexistence of components.

18. Meenal Joshi (Sophia polytechnic, Mumbai)

- Drawing in development of thinking.
- Social and Language skills in expressing emotions, ideas.
- Art subject is treated as a hobby, not as a vocation - mainly because of parents.
- Lack of encouragement makes them stop drawing. So talent is lost.
- Innovation comes afterwards.
- Introduction of drawing and have design competitions.

19. Madhuri Naik (Sophia polytechnic, Mumbai)

- Know more about icons and images, myths, stories. Knowing meaning of symbolism.
- The way art is taught is wrong. Creative expression should be explored in any medium.
- Visual Aids are missing.
- Design should bring in aspects of culture and tradition.
- Can't craftsperson's be teachers of students at school.
- People don't know the value of Design.
- Children should know about past.

20. Dolly Biswas (B D Somani, Mumbai) (done)

- Parents have fear of not having a job after doing design.
- Traditional artisans and craftsmen should be an essential part of the teaching staff. This will be a step in keeping this art alive.
- The basics of these arts and crafts have simplification and utilization of local materials - exactly what we are recommending for sustainable practices.
- Design can lead to practical knowledge
- ATDM is a qualification.
- People good at the job not wanting to be teacher.
- Language be part of design education (especially, Local Languages)
- Art not as hobby idea, but Vocation. Should become the mainstream.

21. Ajanta Sen (Solar Project, Mumbai)

- Truly excelled people were helped by other people (Parents)
- Inspired by a physicist who is a Noble prize winner.
- Lecture about grand Unification theory explained in a very simple way can create interest.
- Parents role in giving freedom to children.
- Abdul Kalam's daughter's example.
- Example of Mathland. Kids be dropped into a system and they learn with computers.
- By creating a co-operative, collaborative environment can lead to play and learn.

22. Nina Sabnani (IDC, IIT Bombay) (done)

- A participatory approach recommended when designing the curriculum that would include school teachers and students; for whom it is being designed.
- Localization important in text books to provide recognizable/identifiable markers for students. An example of a child's perception of a jungle in the little Rann of Kutchh showed that even words are interpreted differently in different situations.
- While investment is made in developing courses it also needs to be made towards getting the teachers and providing them with relevant training. This could include design training as well.
- Design needs to get reflected in the classrooms and the school environment, whether it is the furniture and its arrangement, the dynamics of seating of the teacher and students etc.

23. A.G.Rao (IDC, IIT Bombay)

- Can we find teaching process which integrates imagination in solving real life problems.
- Recognise craftsman as teachers at a system level.
- What are we doing for the teacher?
- Learning from form and play
- Link design to other fields and disciplines
- Science and maths integrated with design
- We also need to create a forum for exchange of information

24. Pascal (Mahatma Gandhi International School, Ahmedabad)

- Learning theories of Piaget and Papert
- Learning is not just 5 senses.
- The active part of learning. Looking into outside world. Give meaning to it and recreate it (Constructivism)
- We cut out a reality and give meaning to it.
- Design of finding a solution to a situation.
- Methodology of learning.
- Assimilation & accommodation
- Difference between Process/Procedure
- Interdisciplinary approach to learning
- Project based approach.

- Material (Any kind of learning resource)
- Need diversity in classroom. Children from different class of society.
- Design is the interdisciplinary missing link in education.

25. Emanuel (NID, Ahmedabad)

- Body of practical knowledge. Inquisitiveness
- How do we bring back the idea of doing and making?

26. C.P. Narayanan (Karadi Tales, Mumbai)

- A picture can speak a thousand words. A song can speak a thousand pictures.
- Innovation does not come from breaking rules. It comes by following tradition.
- In pursuit of finding new solution, we may be debunking some wonderful existing systems of learning.

27. Prof. Vidwans (Flame Academy, Pune)

- Realistic about recommendations. Ecology of design & innovation. Involve factor of design education.
- Recommendations must cater to all type of learning styles.
- There should be a quest for novelty.
- Quest for innovation
- Design literacy ad awareness program.

28. Prof. Ravi Poovaiah (IDC, IIT Bombay)

- How do we integrate 'Design and Innovation' into the present education system in schools
- Children need a more innovative way of learning that is based on doing, experimenting, explorations, experiences, stories, etc.
- Creating a play and learn environment should be a must in the early years
- Learning by doing group projects involves sharing, working together, collaboration, etc.
- Design from a child's point of view

Annexure - Introduction of 'Art, Design and Culture' at school level:

This is the outcome of recommendations of the working group during the National Graphic Design Education Meet at IDC, IIT Bombay during the 'Icograda Design Week in India' during February 2007.

The group stated that School education is a vast field to cover; making the school children aware and interested in design field is a wholesome task. Just adding another subject to their syllabus is not a solution. Student's interests should be kept alive with their complete involvement in projects and visits. Teachers should play an important role in developing a poor student to bright student. They should see the capability of the student and nurture that ability to develop or enrich his/her literacy.

- Sensitivity, awareness and observation in children should be preserved
- Instead of they being told what to do, experiential learning will help them construct their own solutions and develop sensitivity towards the subject.
- Up till the 7th class, a new curriculum has been introduced already.
- 8th std. becomes the bottle-neck

Introduction

This group deliberated on the above subject and came up with the following three faced approach:-

- For the policymakers
 - For the learning environment
 - For the facilitators (teachers/parent)

Proposed Objectives

- Human centric education methods
- A conscious effort to orient students towards art and culture
- Art, Design & culture to be introduced as another career option for + 2 courses

Policy makers Level wise deliberations

1. Nursery Pre-primary & Primary

- It is observed that some newer (informal) schools who follows inter-disciplinary method of teaching.
- Whereas majority of the schools are following conventional approach of teaching.
- Therefore it is strongly recommended that the conventional school should change their approach to a newer dimension.

2. Secondary

The VIII, IX & X standards must include 'Art, Design & Culture' as a subject along with other main subject

3. Higher Secondary (11 & 12)

Like existing streams of Art, Commerce & Science a new stream namely 'Art, Design & Culture' should be introduced with effect that the student becomes more eligible for all Art & Design disciplines.

Environment

- Physical Infrastructure: This should be thought about in the context of the above suggestions
- Psychological Environment: Stimulating observation, exploration, experience, expression, articulation and contextualization.
- Learning Environment: Educational aids, Books, relevant reference materials etc.

Teachers/ facilitators and parents

- Include subjects like Design sensibilities and sensitivities and Indian aesthetics within the B Ed. & M. Ed syllabi.
- Teachers should be minimum Bachelor or Diploma in Art & Design for qualify as a teacher for 'Art, Design & culture'

Annexure - IDEO's Ten Tips For Creating a 21st-Century Classroom Experience:

Posted February 18, 2009

<http://www.metropolismag.com/story/20090218/ideos-ten-tips-for-creating-a-21st-century-classroom-experience>

In recent years, IDEO has spent a lot of time and effort thinking about education. The firm's work with Ormondale Elementary School, in Portola Valley, California, helped pioneer a special "investigative-learning" curriculum that inspires students to be seekers of knowledge. Metropolismagazine.com spoke to Sandy Speicher, who heads the Design for Learning efforts at IDEO. Her insights provide powerful lessons for architects and designers creating the schools of tomorrow:

1. Pull, don't push.

Create an environment that raises a lot of questions from each of your students, and help them translate that into insight and understanding. Education is too often seen as the transmission of knowledge. Real learning happens when the student feels the need to reconcile a question he or she is facing—and can't help but seek out an answer.

2. Create from relevance.

Engage kids in ways that have relevance to them, and you'll capture their attention and imagination. Allow them to experience the concepts you're teaching firsthand, and then discuss them (or, better yet, work to address them!) instead of relying on explanation alone.

3. Stop calling them “soft” skills.

Talents such as creativity, collaboration, communication, empathy, and adaptability are not just nice to have; they’re the core capabilities of a 21st-century global economy facing complex challenges.

4. Allow for variation.

Evolve past a one-size-fits-all mentality and permit mass customization, both in the system and the classroom. Too often, equality in education is treated as sameness. The truth is that everyone is starting from a different place and going to a different place.

5. No more sage onstage.

Engaged learning can’t always happen in neat rows. People need to get their hands dirty. They need to feel, experience, and build. In this interactive environment, the role of the teacher is transformed from the expert telling people the answer to an enabler of learning. Step away from the front of the room and find a place to engage with your learners as the “guide on the side.”

6. Teachers are designers.

Let them create. Build an environment where your teachers are actively engaged in learning by doing. Shift the conversation from prescriptive rules to permissive guidance. Even though the resulting environment may be more complicated to manage, the teachers will produce amazing results.

7. Build a learning community.

Learning doesn’t happen in the child’s mind alone. It happens through the social interactions with other kids and teachers, parents, the community, and the world at large.

It really does take a village. Schools should find new ways to engage parents and build local and national partnerships. This doesn’t just benefit the child—it brings new resources and knowledge to your institution.

8. Be an anthropologist, not an archaeologist.

An archaeologist seeks to understand the past by investigating its relics and digging for the truth of what was. An anthropologist studies people to understand their values, needs, and desires. If you want to design new solutions for the future, you have to understand what people care about and design for that. Don't dig for the answer—connect.

9. Incubate the future.

What if our K-12 schools took on the big challenges that we're facing today? Allow children to see their role in creating this world by studying and creating for topics like global warming, transportation, waste management, health care, poverty, and even education. It's not about finding the right answer. It's about being in a place where we learn ambition, involvement, responsibility, not to mention science, math, and literature.

10. Change the discourse.

If you want to drive new behavior, you have to measure new things. Skills such as creativity and collaboration can't be measured on a bubble chart. We need to create new assessments that help us understand and talk about the developmental progress of 21st-century skills. This is not just about measuring outcomes, but also measuring process. We need formative assessments that are just as important as numeric ones. And here's the trick: we can't just have the measures. We actually have to value them..



Thank You:

Please make your comment/suggestions/remarks/recommendations and send to:

Contact Details:

Ravi Poovaiah
Professor and Head
Industrial Design Centre
Indian Institute of Technology Bombay
Powai
Mumbai
400076

022-25767801
office@idc.iitb.ac.in or ravi@iitb.ac.in