Design Innovation 2

JIST:Jugaad Innovation Studio

a g rao

Recognising the potentials of natural trait like jugaad Innovation, there is a need to create support structures around school system, especially to tap the *creative potentials* of disadvantaged sections in the Society. A new concept JIST: Jugaad Innovation Studio is articulated in terms of its Arupa or unmanifested features.

People who want to adopt JIST framework can shape it, based on the 'context' and 'resources' at their disposal. *'Intent and commitment of the leadership' will be the key factor.*

It is felt that many JISTs are likely to take shape with the initiative of enthusiastic designers, engineers, scientists and others. Some who are already engaged in similar endeavour may adopt some of the ideas. A network platform to support all such efforts would be in order. In view of this JISS : Jugaad Innovation Support Structure also needs articulation in terms of its Arupa or unmanifested Character. It is dealt in a separate write up.

1.0 Back ground

Reflections on the strength of Jugaad Innovation(JI) in our culture and power of unschooled creativity lead to *some critical questions. If JI is a natural trait in a given Culture, why is it not seen in all unschooled people? A personality attribute invariably comes into picture. Family upbringing and conditioning which shape a personality seem to have a big say. Here we are looking at what happens outside the framework of school education.*

Some traits which are observed in a jugaad innovator.

- *Imagination*

  Some day- dreaming is a necessary trait for JI. Fascination with 'Magic' or 'mythical Characters' may be playing a role in JI.

- *Leadership or Courage to act without fear*

  JI seem to happen when practical problems are faced by Individual or group. Acting on the situation, without seeking an approval needs a fearless Personality. 'possible failure' may have some repercussions like punishment or loss of credibility.

  Obedience often appreciated in the Society may become a drawback.

  A leadership role is required to ACT.

- *Perseverance*

  JI is a trial and error process, where failures are often hidden or not talked about.

Continuing to act in spite of initial failures is a necessary trait.

- *Tinker toil ability*

Ability to manipulate physical things is another ingredient of Jugaad Innovation. Readiness to dirty one's hands and enjoying to play with materials and processes is an asset for JI.
Skills learnt in 'traditional mode' give knowledge inputs, but can constrain free thinking. For example, a person groomed as traditional carpenter may hesitate to think 'chisel as a screw driver' even in a 'crisis' situation. Freedom in learning skills is necessary for Innovation.

New frame works for 'skill learning' need to be innovated. Design Education deals with developing these traits in its own context. Possibility of new structures using the 'arupa' of Innovation in Design education' can shape JIST.

2.0 Conducive Conditions for Innovation

Jugaad Innovation has roots in real life situation. We have a challenge to simulate such conditions to nurture it.

2.1 Urgency to Act:

Challenge and expectation which brings urgency and pressure to do, are important ingredients in JI. This is a social process. Games, working in groups, even competitions seem to be 'conducive'.

Creative acts in Arts like 'painting' or 'sculpting' seem to be different in this context. In creative Art zone problems to be solved may not be there. Motivation in 'Art' is coming from an inner aspiration or desire. Self-expression may have a bigger say. Art creativity is often centred on operating without constraints. The constraints if any, are not related to problem one is addressing. In case of JI problem to be solved becomes a binding constraint. It is nearer to act of Design than Art.

2.2 Play and Humour:

An element of 'play', 'humour' and freedom to think and act without fear are necessary conditions. As we see JI happens outside the known or approved zones. Elder's presence itself can have an 'inhibiting role'.

Creating a 'playful atmosphere' is necessary. Establishing a friendship with facilitators in children's mind brings dividends.

2.3 Readily available 'Materials and Tools':

It is a great advantage to have materials and tools or small machines readily available to manipulate them. Small budgets to buy materials quickly to try out can be handy. Long drawn processes demand maturity and a deeper motivation. Nurturing them can only happen over longer periods.

3.0 JIST as Innovative Platform

Basic aim of JIST is to encourage creativity and Innovation to tap 'natural abilities' in the frame work of JI.

3.1 Developing Imagination:

Imaginations is a natural trait in children. As they grow up it gets curtailed due to the way knowledge is imparted. 'Fragmentation', a key factor in learning can curtail Imagination when learning happens in an *insecure zone of Interaction*. Activities like 'Storytelling, Poetry, free sketching, theatrical play, games, etc., can aid in developing Imagination*. Imagination is an Individual trait. Its operation in a social frame work needs to be nurtured for JI.*
Innovation harnesses the social dimension of Creativity.

3.1 Spirit of '*Jodo Thodo'(make and break)*:
Making, breaking, re-making, manipulating materials with hands or tools and machines freely with-out fear for fun or purpose need to be practiced in JIST. It will be a platform to experiment without inhibitions in physical and digital domains. Looking at Internet will not be a taboo, but participants will be challenged to bring ideas and concepts into reality physically not ending up as drawings or dummy mock-ups.
Working models or solutions will be key factor in JIST.

3.2 Entrepreneurship element in choosing problems and finding solutions need attention. A business mind of 'seeing implicit financial value' in an act of Innovation need to be cultivated through dialogues and case studies.

3.3 Frameworks to meet Innovators, creative persons, thought provokers will be hall mark of JIST..

3.4 Independent thinking and questioning to learn need to be given prime importance.

3.5 Challenges to perform need to be posed through workshops from time to time.

3.6 Individual projects initiated by participants need to be supported.

3.7 Evolving a methodology to combine
Skills of making or handling materials,
Skills of creating financial value,
Skills of bringing ideas from other frameworks and
Skills of leadership
Can be main goal of JIST!

4.0 Implication of 'expertise and role of Learning' in Innovation

JI harnesses natural abilities to Innovate or create. If we want to nurture such ability over a period, there is a need to develop abilities to use 'knowledge base' at different levels as well.

Research suggests that development of expertise needs extended period of learning. Such expertise is needed for 'significant Innovation' to happen in Science or Art.

In conventional education as the knowledge base increases there is tendency that the 'Innovative ability' reduces. This brings us to questions of ways of learning and skill acquisition. Tacit knowledge articulated by Michael Polanyi gives us a frame work to

incorporate skill acquisition as a basis for Innovation. JIST can have modest role of encouraging Innovation with medium expertise.
Knowledge required for innovation in specialised fields like nuclear energy or sophisticated electronic engineering *are not the aims of JIST*. But a mind trained at young age will have a higher potential to play an 'innovative role' when such sophisticated knowledge is acquired. Opportunity of working with hands which is missing in current school education and making things with different materials and understanding them with a 'feel' will be major gains in JIST.

5.0 Learning 'skills of making' in a framework of Innovation

Making with hands has not been getting enough importance in general. In craft communities, children have been learning traditional skills from parents. On one hand this practice is on decline, on the other hand it offers a 'limited frame of imagination'. It is time to look at 'skill learning' with fresh outlook. *The power of 'Tacit learning' embedded in skill learning needs to be brought out for 'Creativity and Innovation'*. Here comes the importance of learnings from pedagogy of *'Foundation programmes in Design Schools'*. Contributions of Bauhaus, HFG Ulm, NID and IDC, IITB, can be tapped to draw the essence of skill learning by JIST. JIST and JISS can become a nodal agency to promote 'learning skills in a creative way'.
Tacit knowledge can be woven with imaginative skills to enter into 'new zones of metaphoric mapping' which will be key for Innovation.

Materials, Tools, Small machines and Workshop facilities required can be visualised according
to the vision and commitment of the Initiator/s. Based on the budgetary capacity and Action plan a suitable strategy can be worked out contextually.
Nature of materials and related tools/facilities are elaborated further.

5.1. Materials

5.1.1 Core Materials like Bamboo, Wood and Natural Fibres

need to be procured and stocked as they are not available in general stores.
Bamboo as a material has great advantage. It is inexpensive, eco-friendly and can be used with different level of skills.
Wood: Good wood is expensive. But it is possible to collect discarded furniture, etc. Cut out pieces discarded in wood depots, can also be procured and kept.
Natural Fibres like jute, Banana, pine, etc., are available in specific places which can be procured.

5.1.2 Materials generally available

Many materials available in local hardware/other stores, can be purchased and stocked in small quantities. It is a good strategy to buy them in bigger quantities when required for a specific work shop session. The left overs add to the rich resource of JIST.

5.1.2.1 Metal sheets, rod and Wire:

Steel, Aluminium, Copper Wire

Wire mesh in various grades

5.1.2.2 Paper, card board

Various kinds, corrugated boards

5.1.2.3 Plastics and rubber: sheets, rods, blocks, powder of Polythene, PP, Polystyrene, PVC, Acrylic can be procured from shops or junkyards. Rubber, acrylic monomer and silicon are available in liquid form.

5.1.2.4 Ropes, strings, cloth.

5.1.2.5 Glues like Fevicol, Rubber solution, m seal, fevi-quick (super glue)

5.1.3 Unusual materials:

Many locally available natural materials can be collected from time to time. Tamarind Seeds, coconut shells, sea shells, walnut shells, glass beads, buttons, rusted nuts, bolts, used cans, bottles, milk bags, rubber- bands, used cycle tubes, etc.

5.2 Tools

5.2.1 Tools for bamboo

Special tools are available for bamboo. The UNDP Project on tools and small technologies for bamboo undertaken at IDC, brought in a Toolkit and Mini tool kit. Undp report on my website gives large amount of related information.

5.2.1.1.Mini Tool kit

A mini tool kit made by AGBS(AG Bambu Style.pvt.ltd) can be procured.

Mini tool kit manual can be seen at
http://www.agrao.in/images/BambooCraft/minitoolkitmanual.pdf

5.2.1.2 Tool kit

A video on use of tools in Toolkit developed under UNDP project can be seen at

http://www.agrao.in/bamboo-craft/14-bamboo-craft/56-toolkit-video

Tool kit is not manufactured currently. A good strategy for JIST would be to procure Mini tool kit and purchase other tools in the Tool kit like Hack saw, drill, hammer, etc, from general stores.

5.2.2 Carpentry Tools

Essential Carpentry Tools can be easily procured from local Hardware stores or online. Lot of information is readily available on web.

5.2.3 Jewellery Tools

Readily available jewellery tools can be handy to make fine components in bamboo, cane, copper, tin etc.

5.3 Small Machines

- It is handy to procure some portable power operated machines like electric drill.
- Width Sizer for bamboo is a useful item. Can be procured from Prashant Bamboo, Nagpur (tel. no.+91 7449482513). A video of width sizer developed at IDC can be seen in https://youtu.be/FAKReHYgnc
- A Roller seen below, used in jewellery is quite useful for bamboo ,copper, aluminium,… to roll strips uniformly.

5.4 support equipment

Some general facilities in any normal small workshop would make a good beginning. One or two work tables, wood Vices, Table top vices, blow torch, vessels to boil and a gas stove with a cylinder.

5.5 Help of a trained craft-person or a mechanic/carpenter would be required in planned workshops.

6.0 JIST: Jugaad Innovation Studio

Conceptually it can be shaped depending on the vision and context.
A possible physical ‘rupa(shape)’ will be a work space with a roof and workshop facilities like tools, workbenches and small machines with a Normal Household Power

supply. It would have an administrative mechanism linked to a 'School' or 'Public organisation'. Commercial viability of running needs to be kept in mind. But JIST is not envisaged as a profit making venture. A higher goal of enhancing *Innovation consciousness* is in the Public Interest.

Arupa or (un-manifested) form JIST in terms of its possible attributes are of discussed further.

6.1 Administrative structure

Any venture needs an administrative structure. But it is important to create an administrative structure free from bureaucratic entanglements.

- JIST can be under the overall administrative structure of a school. A representative from a support organisation and school Head can form a committee. One more voluntary professional, senior citizen with open mind can be opted into the committee.
- Private Schools may have no difficulty to link with JIST.
- If State Govts, and Central Govt can pass a resolution in allowing Govt and Municipal Schools to participate in such venture, it would pave the way for Govt and Municipal schools as well as Aided schools to form a committee to operate.

- *Alternatively, JIST can be created as an independent entity where parents may play a helping role and school encourages its children to participate. No administrative link with the school will be needed in such a case.*

6.2 Financial support

Possible Sources

- CSR(Corporate Social Responsibility)
- Established educational Trusts
- Govt grants from existing schemes
- Govt grants under New schemes
- Individuals- Professionals, etc.

6.3 Intellectual Support

It will be possible to draw support from

Practicing Designers, Artists, Engineers, Teachers with creative bend of mind,

Craft persons, Individuals with skills in different materials.,

Faculty of institutions, teaching or researching in these disciplines in the vicinity.

Alumni of Design Institutes like IDC, IITs, NID, etc., and Schools of Art, Architecture.

6.4 Work Space requirement

A work shop space where things can be made, temporary loud sounds are acceptable, things like boiling, spraying are possible. With open space and open air.

- Area: 400 to 500 sq.ft can be a good, manageable area to start with. It can be a single shed or in couple of rooms. 1500sq.ft would be ideal. A possible expansion can be kept in mind.
- Workshop facilities like tools, workbenches with vices and small machine with a Normal Household Power supply (15A supply where possible), a lockable storage for tools and portable power tools are some basic requirements.
- The work space requirement above can also be met as a part of an existing workshop, school or extension of a house, as it will be required only in the week ends to start with. As the idea grows a separate facility can take shape.

7.0 Initial Preparations

Initiators will be the key to shape or give a 'Contextual Rupa' to JIST.

7.1 An initial talk can be given with a ppt to Teachers, Parents and other interested elders(professionals), local educationists, etc., on native strength of 'Jugaad Innovation' and the need to harness it. *See DI1 Creativity of Unschooled in my website from which one can borrow examples and pictures*.

Importance of 'self-learning and developing individual talents in addition to school learning to *solve local problems, to find 'entrepreneurship opportunities' to get better employment, has to be brought to their attention. Limitation of present schools to solve 'all problems' and need for* support systems outside the school system need to be discussed.
Gathering local support will be key for success of JIST in the long run.

7.2 It should be made clear from the beginning that JIST is not some kind of 'Coaching class' to pass entrance exams though it will improve the personality of a child in many ways.

7.3 It will be a good idea for the Initiators to look at local trades, craft skills, natural resources to give a strategic direction for JIST. A coastal town or village will have resources like shells, tamarind seeds, etc. Some areas are known for traditional puppets... and so on.

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8.0 Operational time frames

8.1 Semester long week end engagement

8.1.1 Registered group of 15 to 20 with a continuous engagement by resource-persons over weekends. This model is good for age group in the 7th to 10th class.

8.1.2. Small groups of 4 to 5 can be formed with 'physical and intellectual' compatibility. Their commitment to spend weekends for a semester will be productive.

8.1.3 Time engagement can be a month or two, if it is full-time attendance during vacations. Creative sessions will be necessary to open up as well as for working in groups.

8.1.3 Youth of 10++ can be registered based on their motivation or individual initiative (not pushed by parents). Forming small groups of 2to3 can be considered. If large numbers want to attend they can be selected based on a write up or past work. Individual discussions can be done on what they want to do. Some may have fancy solutions already which need to be shaped on realistic grounds. This can include people of higher age who have life experience, in small business or making.

An experienced Tailor can come and innovate stuffed dolls along with youngsters.
A poultry owner can work on innovative egg package.

9.0 JIST as a nodal support for short engagements

Shorter engagements of 1 to 4 sessions are easier to organise as several resource persons can be tapped. These will keep JIST energetic and visible as it would be reaching to elders and general public more often. Creative sessions like theatre, singing, dancing, drawing, story making can be combined in these short sessions,
but it is important to keep 'doing with hands' as focus.
Some of the workshops we have done are reported in detail on my website under Aaduko maduko(see Annexture C). In workshops where working facilities were available, handling raw materials and making objects were done by children. Help of skilled craft-person or mechanic was available.
In workshops, where support for making was meagre and time was constrained, prepared raw materials like bamboo sticks or strips and corrugated sheet elements, were used. 'Corru-fun-do' kit developed initially for a children-workshop, became handy for many workshops as ready resource material. Bamboo has been used as key material.

9.1 See Annexture A.0 for details of workshops in which children made objects in Bamboo. Effort is required to build a working culture which is given low priority in Indian Schools.

9.2 Workshops with Pre-prepared components: See Annexture B

10.0 IDC experience in the context of JIST

Two engagements we had, one at IDC and the other outside with IDC support for preparatory sessions are given in brief with some useful inferences.

10.1. DOL: Doors of Learning

DOL was a yearlong engagement.

Innovation element 'surfaced prominently' in a specific instance when children did a bamboo workshop in their vacation at Babu studio at IDC.

- We had 20 children of 7th class, from 2 aided schools and Campus School at IITB which caters to low income groups
- Every Saturday afternoon sessions were conducted at Campus school premises. An art teacher was engaged to help logistics. Children were given a snack (Vada Pav, a popular snack in Mumbai))
- Each session was designed with themes connected to class topics in Maths, Science and craft. Other subjects were dealt occasionally. 3 to 4 facilitators with design background participated. Video documentation of each session was done. A video 'Avishkar' (can be in the website) made for some other purpose gives a glimpse of DOL.
- Children were engaged continuously for 2 weeks during vacation with an open format. When Children made a bamboo whistle, a dummy purchaser was engaged to come and give order for 20 whistles to be given as gifts. Rs.20 was offered for each piece. Children got very excited as they could earn some money and took initiative to request master craftsman Rudrapaul to come on weekend holiday to help them to make them. Sony, a Mdes student helped them in design.

Same enthusiasm over spilled when they made Diwali lamps with instructions from Abhijit Dattaram Chari, another M Des student.

10.1.2 DOL Conclusions for JIST

- Support systems and knowing the children over a period was crucial.
- Creating a real life simulation brought out the entrepreneurial instinct.

10.2.1 YIDI: Youth Initiative for Design Innovation

YIDI was planned in collaboration with Pomagranate Workshop, as orgainisers. 80 students in 4 groups were expected to participate for 3 months.

A plan and preparations were made accordingly.

A G Rao(Me), Priya Srinivasan, Avinash Shinde were to steer.

Milouni Kapoor, Divya, Sarang and Ulemba and a RA, all had Mdes background.

Advaita Mane,Apeksha (educational trainers from PW for field and office support)

- Some preparatory sessions with resource people were done at IDC to articulate 4 themes and a theatre session in Dadar, conducted by a London Team, was arranged by Priya.

  Major hiccup came when only 12 students took part instead of 80. The plan was reduced to 2goups. Sarang and Ulemba dropped out.
- General creativity session with a talk by prof. A G Rao was held for all.

  Each group had specific creative session based on their theme. They also made field visits, organised by Advaita and Apeksha, *to identify problems for Innovation which turned out to be rich, productive experience.*
- Design/Innovation process was followed with idea generation, sketching and mock up Models. Prototypes were made in nearby private workshops. Pomagranate workshop Office and 2 class rooms made available by Xavier Institute which is situated nearby, were used as work-spaces.
- Final Solutions were presented to a large gathering of Parents and Public, as a part of bigger event organised by PW team led by Priya Srinivasan.

10.2.2 Inferences for JIST.

- Students of 10th were smart and used net search for ideas.
- They were poor in their physical skills even to handle card board, soft wire and cloth for making mock-up models.
- They had other school programmes which interfered with YIDI from time to time.

  It became one more school project.
- Though some useful learning different from 'school learning' took place, it was not commensurate with the Resource persons' 'inputs'.
- Public events created in the end brought in 'motivation' as a long term measure.
- *It became clear to me that 'A longer dialogue process' with each student is necessary to trigger the 'inner self motivation'. 'Knowing the student' by the facilitator is essential for any 'significant change' to occur in the learning format of the student.*
- Process of selection of participants will be a crucial factor for JIST.

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ANNEXURES

Annexture A. Workshops in which children made objects mentioned in bamboo

A.1 Expe-Bamboo (pictures in web site)

Small woven mat, Bamboo whistle, Jitter bug in bamboo, Joker, Paper lamp with bamboo mat.

A.2 DOL at IDC

Bamboo whistle as gift, Diwali lamps

A.3 INNOMATH- Teacher's workshop

Pop up fan, Linked Snake.

A.4 Workshop with Suryanagar kids

Puppets, Small mats, Fraction game with bamboo thick strips.

A.5 Students at IDC have made many bamboo innovative products as part of CCPM (Craft Creativity and Postmodernism) course and as design projects

Some Observations: All the above workshops were done at Bambu Studio, IDC. Skilled craft-persons were guiding children.
A bamboo craft person and workshop facilities and mini bamboo toolkit was available in Kerala and at Bambarde, Lonawala in 'Bamboo se Ganith' workshop.

Annexure B

Most of workshops done outside IDC were with prepared components designed to fit into workshop plan. Bamboo sticks and rubber bands have been convenient resource. 'Corru Fun Do' kit was designed and developed with Corrugated Poly propylene elements which can be joined with 3mm dia machined bamboo sticks, which was used with several themes in different workshops
. In Golden spiral workshop, bendable bamboo sticks and corrugated sheets were used (see website). A team was supporting for preparation as well as conducting these workshops.
Dome (and other geometric structures) making with bamboo sticks and full bamboo was done at DJ and other colleges as part of design courses.

Annexuture C

http://www.agrao.in/images/AadukoMaduko/GoldenProportionPart-1-1002.pdf
http://www.agrao.in/images/AadukoMaduko/GoldenProportion%20part2-1001.pdf
http://www.agrao.in/images/AadukoMaduko/ExpeBambooReport.pdf
http://www.agrao.in/images/AadukoMaduko/KeralaWorkshop.pdf
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