The MindCrafters

Crafting/Enabling Minds for the 21st Century
# The Requirements

## The Seven Cs – 21st Century Lifelong Skills

<table>
<thead>
<tr>
<th>Seven Cs</th>
<th>Component Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking-and-Doing</td>
<td>Problem-solving, Research, Analysis, Project Management, etc.</td>
</tr>
<tr>
<td>Creativity</td>
<td>New Knowledge Creation, &quot;Best Fit&quot; Design Solutions, Artful Storytelling, etc.</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Cooperation, Compromise, Consensus, Community-building, etc.</td>
</tr>
<tr>
<td>Cross-cultural Understanding</td>
<td>Across Diverse Ethnic, Knowledge and Organizational Cultures</td>
</tr>
<tr>
<td>Communication</td>
<td>Crafting Messages and Using Media Effectively</td>
</tr>
<tr>
<td>Computing</td>
<td>Effective Use of Electronic Information and Knowledge Tools</td>
</tr>
<tr>
<td>Career &amp; Learning Self-reliance</td>
<td>Managing Change, Lifelong Learning and Career Redefinition</td>
</tr>
</tbody>
</table>
The Requirements

Top 10 skills

**in 2020**
1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

**in 2015**
1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

Source: Future of Jobs Report, World Economic Forum
The requirements

UNESCO Delors Report 1996
Does this Help
Or This

Mitch Resnick: Lifelong Kindergarten
Or the NGSS
The Importance of Integration

- We always had subjects didn’t we?
- Also schools have periods for Science Maths and SST every Day. So what’s New?
- Why is Integration needed and what is it?
- The knowledge explosion
- Interdisciplinary fields which beggar description
- The learner gets an experience which tells her that what she learns is connected and contextual
# The Schooling Journey

<table>
<thead>
<tr>
<th>Stage</th>
<th>Early Childhood</th>
<th>Primary</th>
<th>Middle</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range</td>
<td>3 – 8 years</td>
<td>8 – 10 years</td>
<td>11- 13 years</td>
<td>13 -18 years</td>
</tr>
<tr>
<td>Grades</td>
<td>Pre Nursery, Nursery, KG, 1,2</td>
<td>3,4,5</td>
<td>6,7,8</td>
<td>9,10,11,12</td>
</tr>
<tr>
<td>Numbers 2014-15</td>
<td>13,05,01,000</td>
<td>6,18,02,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning styles and methods</td>
<td>Sensory perceptions, deriving connections to flight, friend, food and linguistic expression</td>
<td>Making connections, Constructing Knowledge, acquiring psycho motor skills and cognitive stages</td>
<td>Constructing and developing models of knowledge, thinking critically, sensing Bias, Acquiring technology and other skills</td>
<td>Construct, create and evaluate. Form views and opinions, demand and construct proofs, evaluate and understand bias</td>
</tr>
</tbody>
</table>
Pitfalls and lookouts

- DIY movement: False sense of “knowing” it all
- Sustained Engagement for post middle school students is difficult unless the period is short or the experimentation shows expected results – Culture of being right all the time
- Group or Community Think
- Breadth vs Depth of learning
- Economic status: What does she want from the education being given? Should “extras” like STEAM or Design Thinking be chosen or not even if they are fun or because they are fun – The Meerut Village school boy Ashraf
- Tech exposure and a false sense of “Knowing”
A STEM Framework

- Framework based on practice and percept

STEM framework
Learning through Projects

- Experimental science – An approximation of the scientific method including keeping a diary
- Logical Thinking
- Overcoming hurdles
- Working in teams
- Learning to present

Examples follow
Project examples

- Ants Nest / Clouds in bottle
Project examples

- The Why of Foot Structure
Project examples

- Career for the visually challenged
Project examples

- Extinction of Dinosaurs/ Computation
Integrated STEM Classes

- Integrating Science, Social studies, Maths
- Activity/Story/Game based
- An example
- STEM Master LP  July-Aug, Grade 4.docx
Directions

- National Curriculum Frame work
- NCERT Position Papers on Maths Science and SST
- National Education Policy 2019
- LO,LO,LI (Learning Objectives, learning Outcomes and Learning Indicators) : Defined by CBSE and add more
- Technology exposure: Arduino, ESP32, Rpi, 3D Design and printing, AI, AR/VR
IUCEE with K12

- EPICS
- Engineers without Borders
- Engineering Institutions to run STEAM Programs in Schools
- Working with disadvantaged schools and children
The MindCrafters

Thank You