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22, July, 2020

EVIDENCE BASED STRATEGIES

Part a : Specific and concrete examples of how I have used or am planning to use the SOAR strategy in my own domain areas and for the courses am teaching.

My area of teaching : Physics- Digital electronics, Basic electronics, Spectroscopy, Properties of Materials

Also : Science communication, STEM mentoring, Citizen science efforts

Example 1

Students created these videos based on my teaching & notes .Posted in my department youtube channel...(Bilingual...so anyone can use this) **part of our OUTREACH Activity**

Topic : Logic gates

Select : What you want to teach/ learn through this module/ class/ video from multiple choices of gates.

Here in the first video, we have restrained to basic logic gates- just three based on the fact, they are the building blocks for the rest. Also select to start teaching with two input gates, this idea can be extrapolated simply...

Organise : Organise based on functionality, complexity or compare-contrast...

While first video explains, basic gates, the second video goes to working of combination of such gates- NAND, NOR, EXOR, ExNOR.

Organise examples, charts, schematics, symbols as a flow

Associate : The third one to be posted tomorrow will go towards explaining the relationship between them- De Morgan's theorem. Fourth video to be posted will have how we can use NAND and NOR in the reverse way to obtain functions of Basic logic gates.

Students are allowed to form an association between these – in both the directions. That is building higher gates from basic gates as well reverse.

They are able to associate their working through real life examples

Regulate : Their learning is tested through lab usually. Even in this video, by making it look interactive, and allow students to think, the creator (my own student) slowly reveals the answer to the viewer. By using cues, by prompting, using the truth table and visual space effectively, a learner is allowed to recollect what they learnt.

As a teacher, who taught this in Jan, 2020, when my own students make these and give back to department as a part of outreach activity or citizen science movement,

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this is the way I regulate- where I mentor them, help them to be specific on video, check if they are using right technical language, visuals, vocabulary, modulation

<https://www.youtube.com/watch?v=C0HsQykDdKg>

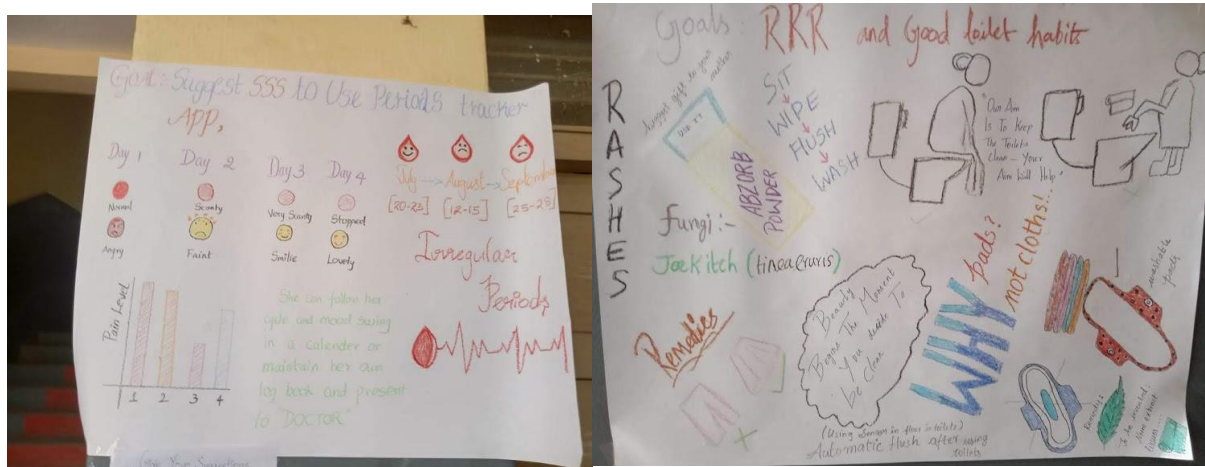
<https://www.youtube.com/watch?v=u6m4ll-qZ58>

Example 2 –

In one of my workshops for a ladies college, followed the RBPT techniques...guess that again helps you adopt SOAR practice, though I was not aware of this acronym then.

Outputs from students after the workshop will help one understand this-

On Mental health, creating complaint box that students can use boldly, keeping menstrual calendar to reschedule their learning pattern (avoiding tension during tests when their periods time coincides with tests/ exams), strengthening flora in their college campus



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SOAR to help Girl students in my class understand importance of eating healthy locally available, for better haemoglobin and good health

To initiate awareness about health, help them look for affordable food that keeps them healthy, To make them understand Life long learning.

What was the need? – More incidents of girls Fainting in the class, Unable to stand in Physics lab, Lack of concentration, Spurt of emotional outbursts, Irregular Periods, More girls found unsuitable to donate blood during blood camps compared to previous years

Organise:

Observe your lunch dabba daily for a week, Lead too sits with them – **no comments or suggestions**, respect **my food my way**, JUST OBSERVE- everyone observes each other's food, Observe the no.of items and quantity of each, Classify them to Carbs, protein, fat, roughage

Days	Food

Outcome of this observation : Lunch boxes *found to contain mainly* :
rice/dosa/idlies/rava upma mostly mixed rice- as tomato/lemon/tamarind rice, No attractive food/ colours/patterns/aroma,More mushy and overflowing or too little, More carbs , mostly only carbs, No roughage, very little dhal as sambhar, no fruits, has Mushy, dead veggies

Associate the probable causes and above effect : How?

Read, google and interact – Research, ; Learn about importance of balanced diet, bringing healthy food, keeping a tab on what we eat ;

Speak out the challenges involved : Financial constraint (??!), Preparation and packing healthy food needs more Time (??!), Write down these challenges

Debate- amongst others whether ARE these really challenges ? Every person reason out others' challenge and try to empathise with them

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Come out with probable solutions, time management ideas, To keep in mind family issues, siblings, travel time, economic status, food habits

THEN, Identify locally available nutritious food, Think of seasonal food, Traditional foods, Foods during festivals, death anniversaries , Talk to elders, look at food youtubers for easy healthy foods, Packing food, Identify Food items that stay longer

Reflect on your challenges NOW again : Re Organise and Re associate & REGULATE

Associate need for Protein punches and Roughages in daily food -Ways to add More dhal- different varieties; Chikki with different pulses, flavours; Paneer / soy tofu/ curd/ corn stubbs ; Millets (ragi), urad, sesame as chikki, kali, dosa/ roti, powdered with jaggery; OPOS cooking technique to retain colour and texture, reduce cooking time and fuel; Add greens- methi, salads

Associate Preparation time and food in lunch box & REGULATE

So Reduce time - Choose such veggies/ greens (methi), Grate carrot, cabbage – salads – with curd, Puffed rice or poha, Sprouts – boiled/ raw, Try different spices –flavour rich country ☺, Water with jaggery, lime, jeera,...; Nature has gifted us with best packaged food- FRUITS like bananas, oranges, dates...; Use time during evenings and weekends

RESULT after four months☺

- ▶ Lunch hour has become fun
- ▶ Dabbas turned objects of curiosity and scientific investigation
- ▶ More sprouts, fruits, jaggery water, chikkis, veggies
- ▶ Able to stand better in lab, and more alert in the class
- ▶ Checked haemoglobin and alerted
- ▶ Sharing of food made us happy and team building happened naturally
- ▶ Able to think of more SOLUTIONS
- ▶ Consciousness about food on our plate
- ▶ Aware of our menstrual health
- ▶ Feeling good and we take charge of our health ☺
- ▶ Moms are happier

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BEST Practices

- From various articles and blogs of mine published

Buliding Young ambassadors of tomorrow

I have always felt, as children are good observers, with a little motivation and sustained guidance, many of them can be trained. Teachers, science communicators, authors, story tellers and science enthusiasts can come forward to build such a strong force for a strong tomorrow. Through science story telling – oral and writing, we can make learning science interesting. *“Oh! All these years I never thought of Bordeaux mixture more than a chemical and byhearted the chemical formula. Now I understand it is a place in France, where they had so much of vineyards. And that being a big source of their income, I understand how many years they tried to solve this pest infestation on grapes. It was not just on a single day, answer was found. As well why they needed to solve it, spending a lot. Here comes their traditional knowledge of spraying mixture of slaked lime with coppersulphate”* commented a high school student that I addressed. He has an eye for history and geography. *“As well the scientific bent of mind of Millardet to understand, eliminate the cause by trial and error, more through logical reasoning. It makes lot of sense why we should learn geography, not omit history, understand biology and natural resources, while we pursue science. Looks all these are connected. A logical reasoning mind can connect these dots. Bingo!”* continued his classmate. *“I will share this with my little sister”* chirped a little boy there, celebrating tercentenary of their heritage school in Chennai, founded much before modern chemistry. What more do we need from these ambassadors?

Integrate and achieve through science communication

Ours is a country with rich history, heritage, wisdom, traditional knowledge, practices, various art forms, we have lots of strength. Our country with its vast information technology resource, excellent scientific institutions, dedicated teaching community and young children as our asset can integrate these by innovative Science communication platforms. Where do we miss? Identifying the resources, as well the stake holders and the targets, Informing the them and integrating them is what is to be done. Blogs, worksheets, videos, small films on science can bring in creative people to our fold and give a new dimension to learning science. The minute it is done, we can expect some change to follow in next few decades. A platform that integrates and takes it to the common people is what is needed. A movement where ideas and information can be disseminated in various languages using technology to our diverse population is long awaited. Time has come to unleash the power of science communication, that is waiting to be unfolded. And this is the right time to do!

My website with Science history, (not fiction)

<http://uthradgvc.synthasite.com/science-is-for-everyone.php>

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Department website (Not part of our college website, unfortunately) I prefer to reach students, and public

<http://dgvcpphysics.yolasite.com/> with collection of information on scholarships, various research labs, summer internships...

Foldscope community

I am a part of active foldscope community, spreading the joy of frugal Science. We have an assembly video of foldscope in Tamil by my son and Tamil instruction set initiated by my group of studnets. My small team has trained 500 students in Chennai to use foldscope through various workshops.

Use Virtual science labs

As well many of my students have completed global science experiments of **Royal Society of Chemistry**. Getting a certificate with RSC logo, has pushed their confidence so much, they all are into online learning through **Desktop project of California University**. These cohorts, will spread joy of science even after they leave our college. This we have been doing for atleast for all Physics and allied physics students every year, for the past four- five years

Am proud to say, I have been able to create a small team every year with my students who have been doing science shows.

Translation works on Education Science, scientists

My translations- *My Magical School* by Dr.Abhay Bang (**Padma Shri** awardee of 2018), *The Animal School* of George H.Reavis calls for a change in our attitude towards education. My Tamil translation of *A new perspective in School Education*, an interview with David Horsburgh, an Educationist is well received by many teachers and parents. All my tamil translations are available as e-version at www.arvindguptatoys.com. Currently I am into translating **Free at last: The Sudbury Valley School, Daniel Greenberg** .

My tamil translations of *Energetiquement* and *Le petit Lezard qui apprit a voler* of Jean Pierre Petit have been uploaded at <http://www.savoir-sans-frontieres.com/> Am proud to have dubbed *I Wish to be a humming bird of Wanghari Maathai* into tamil. *Wangari's trees of Peace, Henri's scissors, My feet are the wheel chair, Mirette on the high wire* are few works that I could translate into Tamil and available in archives.org as well www.uthradgvc.synthasite.com - firing and helping young minds to believe in themselves.

Am also involved into translating Assimov's works through Project Kaleidoscope of IITM. As well mentor others and do reviewing for Tamil translation of Assimov's works

Dubbing of Science videos

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Me and my team of students have done dubbing of almost 300 science videos of Arvind Gupta into Tamil. These are copyright free resources used by teachers and students. By the way, this “my team” changes every year as students pass out of undergraduation and I need to **identify students** who can volunteer, Who have commitment, who are willing to give back, who have subject knowledge every year and mentor them, train and help them dub science videos.

Women Scientists and Indian Scientist- Shout out

My public lectures on Lilavati’s daughters, is something that I waqnt to give back to our society. I dream a day, where when we have a bunch of students, and we ask them to mention scientist names, they MUST say atleast ten scientists names of our country! 😊

Combine my classes along with history

For example, even in the video on logic gates on DeMorgans to be published tomorrow, you can see my student mention DeMorgan and India connect. When he would take up Boolean Algebra videos (in Aug month), he will talk about Boole, his wife, Everest and India connect! Without the right history and geography, Science looses charm.

When I take Photo electric equation, I ask students to understand, entire history, world war preparation, Manhattan project, political environment...

Blue of the sky lecture in my class will be accompanied with Sir CV Raman film by Vigyan Prasar <https://prasarbharati.gov.in/playvideo2.php?l=xWMei1IUG7E>

<https://www.youtube.com/watch?v=Mme5K68m28Q>

Sorry...if there are spelling mistakes...literally rushing to finish this assignment