



Knowledge hub

Collection of best practices

Summary of the best practice

1. Title of the best practice (e.g. name of policy, programme, project, etc.) *

Let's Code, a curriculum initiative by PiJam Foundation, UNICEF India, J&K Samagra Siksha and Diksha

2. Country or countries where the practice is implemented *

India

3. Please select the **most relevant** Action Track(s) the best practice applies to *

- Action Track 1. Inclusive, equitable, safe, and healthy schools
- Action Track 2. Learning and skills for life, work, and sustainable development
- Action Track 3. Teachers, teaching and the teaching profession
- Action Track 4. Digital learning and transformation
- Action Track 5. Financing of education

4. Implementation lead/partner organization(s) *

Pi Jam Foundation, UNICEF India, Jammu & Kashmir Samagra Siksha & Diksha digital platform for knowledge sharing

5. Key words (5-15 words): Please add key descriptive words around aims, modalities, target groups etc. *

Minority girls, Under-represented communities, Computer Science Education, Digital-divide, Computational thinking, Digital Citizenship, Problem solving, Design thinking, programming, coding, socio-emotional learning, critical thinking, gendered digital-divide, culturally responsive computing curriculum, equity and inclusion

6. What makes it a best practice? *

The Let's Code curriculum is a contextualized culturally responsive and inclusive computer science curriculum for the K-12 students, with a special intention of broadening participation among minority girls and under-represented students in India.

Description of the best practice

7. Introduction (350-400 words)

This section should ideally provide the context of, and justification for, the practice and address the following issues:

- i) Which population was affected?
- ii) What was the problem that needed to be addressed?
- iii) Which approach was taken and what objectives were achieved? *

In 2022, our team at Pi Jam Foundation, with support from UNICEF India, Samagra Shiksha, JKKN and Diksha set out on a mission to create a contextualized curriculum, Let's Code to help students in Jammu & Kashmir, India, learn computer science. Kashmiri students remain one of the most marginalized and under-represented people in the world. 'Digital divide' or access to technology was not the only barrier in this context. Kashmiri students are shy, sensitive and soft-spoken. But the other day, these students' faces lit as they were trying to express their love of the Kashmir valley — apples, mountains and snow. The lack of access wasn't deterring these students from dreaming big. They wanted to solve their communities' biggest challenges like access to school, unprecedented weather etc, through technology. Reading between the lines, the wounds from their past history and culture was also evident. Even the act of showing up to school was huge and overwhelming for them. These historically excluded students, especially girls and women deserve much more than a small introduction to CS. We cannot let them slip through the cracks.

We were posed with a serious problem. How do we educate these girls? How do we create a course which is more inclusive and broaden participation among under-represented students, especially young girls and minorities?

We realized that having a video-based instruction would be the most favourable mode of learning as students could take classes digitally and for free from the comfort of their homes. The curriculum aims to break the gender stereotypes around CS and STEM. Several best practices have been infused into the curriculum to truly include the marginalized students and girls. Some of them include showing girls role models in STEAM and computing from their own community, making problem-solving meaningful, teaching complex concepts using examples from the local context, by building on familiarity to teach future skills, story-telling etc and above all through spreading waves of kindness and compassion.

Our curriculum is not only about learning the foundations of computer science, the impact is far-reaching. From building 21st-century skills to preparing to be 22nd-century innovators, our students work on their confidence, creativity, problem-solving skills, computational thinking skills and socio-emotional quotient.

8. Implementation (350-450 words)

Please describe the implementation modalities or processes, where possible in relation to:

- i) What are the main activities carried out?
- ii) When and where the activities were carried out (including the start date and whether it is ongoing)?
- iii) Who were the key implementation actors and collaborators? (civil society organizations, private sector, foundations, coalitions, networks etc.)?
- iv) What were the resources needed (budget and sources) for the implementation? *

The curriculum was created by Pi Jam foundation for Jammu & Kashmir, India, with support from UNICEF India, Samagra Shiksha, JKKN and Diksha (<https://diksha.gov.in/jk/>) government platform where students and teachers currently register to enroll or conduct the course. The first batch started in May 2022 and is currently ongoing.

The implementation of the course involved extensive research on the best practices of developing an inclusive, equitable and culturally responsive computing curriculum for Jammu & Kashmir. This includes meeting with students from Kashmiri schools to include student voice and choice in the curriculum and including examples from the local context that made learning challenging concepts more meaningful and relevant.

Besides showing familiar names in the field (poets, navy generals and lawyers, who also excelled in computer science and STEM), we included young role models from their own community to let students feel they belong in computing and STEM. Some of them are Ayesha Aziz, a young pilot, who got her flying license at 16 years and Mawya Sudan, the 12th Indian fighter pilot in the Indian air force. We even took a riveting step ahead and introduced a fictional, humanoid android co-instructor to help with the course and named her A.I.S.H.A (Artificial Intelligence She/Her Humanoid Android). AISHA being an AI herself, learnt alongside and progressed throughout the course.

In CS curriculum, problem solving is an area often envisioned to be deserving complexity and hence lesson plans focus on the 'challenge' or 'logic' factor, instead of assessing how 'meaningful' or relevant it is to students. Research suggests that students especially girls, feel more confident about a problem, if it makes them feel a sense of purpose with their own community. design thinking approach to create projects as simple as a 'paper boat that doesn't sink' to creating something as complex as a 'wild edibles library to help improve malnutrition in India'. The key is to empathize, contemplate and question if the problem is meaningful to the student (even if it's miniature) before dwelling deep.

We use semantic waves in a culturally responsive way to teach complex concepts computational thinking skills such as 'algorithms' using a simple yet familiar example from the local context – creating a wild edibles library of Kashmir.

We use storytelling to help students reclaim the joy of learning computer science as students learn better by making content personally relevant.

Above all, we teach students to spread waves of kindness and compassion as they learn how to code using core-computer science concepts. We teach students how to navigate their emotions as they code for emotions as 'variables', catch their thoughts using 'conditions' and contemplate about self-regulation as they code. Integrating socio-emotional learning in CS can guide students to be a good human besides being a good coder.

9. Results – outputs and outcomes (250-350 words)

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To the extent possible, please reply to the questions below:

- i) How was the practice identified as transformative? (e.g., impact on policies, impact on management processes, impact on delivery arrangements or education monitoring, impact on teachers, learners and beneficiary communities etc.);
- ii) What were the concrete results achieved with regard to outputs and outcomes?
- iii) Has an assessment of the practice been carried out? If yes, what were the results? *

The course is currently ongoing. We are awaiting for data and results on assessments which will be available in next few months. However, based on teacher testimonials and sharing sessions like 'Young Girls in Tech 2.0 webinar', we come to know that the curriculum has created a huge shift in teacher perspectives on computer science.

Monica Sharma, Anjali Charak and Sonika Bhandari, teachers from govt. schools in Jammu and Kashmir share their experience of learning Computer Science.

"CS is for everyone. It builds problem solving and creative skills in the process" – Monica Sharma, Govt School, Udhampur

"I didn't have the confidence that I will be able to learn CS. Even though I know about computers, I was doubtful. I thought CS only meant coding. But I've come to realize that it's logic" -Anjali Charak, Govt. School, Samba

"I had a fear of coding but I realized that it's just another language. Just like a language we used to talk to each other, code is a language we used to communicate with a computer and CS is beyond coding" – Sonika Bhandari, Govt. School, Jammu

Mahwash Goni, Programmer at Directorate of Samagra Siksha, J&K Govt. of India says,
"If you can figure out the proportion of spices/masala for a finger licking lish, you can easily do any technology"

Surya Saraf, Client partner, Tech Mahindra says, "Through contextualized curriculum, I hope to see my Kashmiri girls emerge stronger and higher in the tech field"

10. Lessons learnt (300 words)

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To the extent possible, please reply to the following questions:

- i) What were the key triggers for transformation?
- ii) What worked really well – what facilitated this?
- iii) What did not work – why did it not work? *

The major trigger for embarking on this curriculum is to help close the gendered digital-divide and the stereotypes around young girls learning and taking up careers in STEM and computing.

What worked really well is being able to create a video-based curriculum that could broaden the reach to several thousands of minority students in the post-pandemic times.

One of the challenges we faced is to put-together a curriculum that not only delivered the foundation of computer science but also instilled socio-emotional values, digital citizenship and well-being, future skills-based topics like machine learning and big data, 21st century skills like problem solving, critical thinking, computational thinking and design thinking, all in one place. The aim was to deliver a curriculum that doesn't overwhelm students with these concepts, rather encourages them to learn powerful concepts through simple and culturally relevant examples. We are currently working to scale and create more contextualized version of the curriculum for different geographies and one of the goals is to make it more accessible to challenged learners too.

11. Conclusions (250 words)

Please describe why may this intervention be considered a “best practice”.

What recommendations can be made for those intending to adopt the documented “best practice” or how can it help people working on the same issue(s)? *

The Let's Code curriculum is centered around the three core principles outlined in the 2021 Rewired Global Declaration on Connectivity in Education:

- 1. Center the most marginalized;
- 2. Free, high-quality digital education content;
- 3. Pedagogical innovation and change.

UN reports that 244 million learners were out of school in 2021. Having a video-based curriculum helped us deliver a high-quality digital computing curriculum which incorporated some of the best pedagogical practices to marginalized students.

In addition, it also adopts some of the inclusive, equitable and culturally relevant instruction practices to teach quality computing education and increase access to participation. Every \$1 dollar spent on girls education would generate a 2.8\$ return. And girls and women are the most affected even when it comes to a climate crisis. We realize that educating girls about technology, STEM and computing will have a truly remarkable change in not just their lives but also in transforming education, climate change and several critical issues the world is currently facing. We have put-together some of the many best practices that could be adopted to teach computing to the under-represented students and girls across the world.

12. Further reading

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Please provide a list and URLs of key reference documents for additional information on the “best practice” for those who may be interested in knowing how the results benefited the beneficiary group/s. *

<https://tiny.cc/letscode>