

The Kajo Learning Environment

A case study



play . create . learn



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Background

For India to claim its rightful place on the world stage, we need our children to learn the essential skills of the future, while being grounded in rootedness and pride in Indian culture and thinking.

How to make the above happen is the big challenge facing the Indian education system today.

The NEP 2020 and NCF 2023 try to provide answers to this question by talking about essential skills, capacities, values, and dispositions – that are required for the future.

Coding is an activity that can provide a rich playground for learning these essential “skills”, while in itself being an important skill for the digital world of the future.

Kojo (www.kojo.in), an innovative coding platform, has garnered attention for its ability to make coding education accessible and engaging. This comprehensive case study explores the Kojo's value proposition.

Need for Coding, and Challenges Faced by Schools in imparting coding education

The Need for Coding

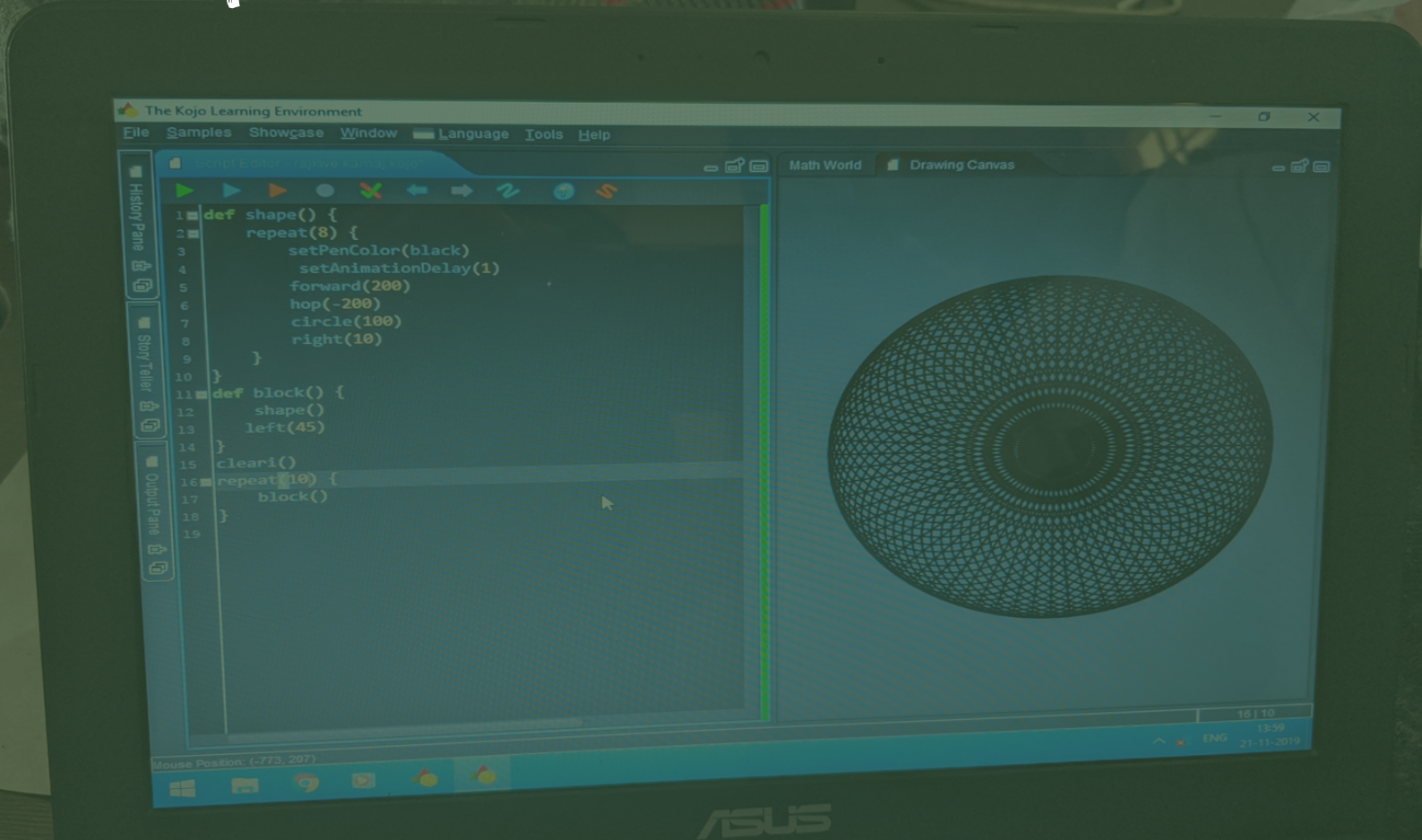
Incorporating coding education is crucial to achieving the vision of NEP and NCF. Equipping students with coding skills empowers them to:

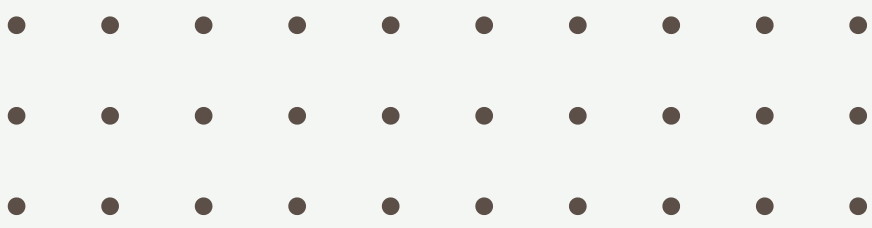
- **Develop essential skills:** Coding fosters computational thinking, critical thinking, creativity, collaboration, and communication.
- **Thrive in the digital age:** Coding is a foundational skill for the modern workforce, opening doors to various career opportunities.
- **Become engines of growth:** Learning to code empowers students to become creators, not just consumers, of technology.

Challenges faced

Schools, particularly government and under-resourced institutions, face challenges in implementing the NEP's coding vision. These challenges include:

- **Coding Platform:** Access to a good coding platform that is easy to use for teachers and students
- **Limited resources:** Lack of computers, internet connectivity, and proper teacher training.
- **Student engagement:** Keeping students motivated and interested in learning to code.
- **Time constraints:** Integrating coding effectively within the existing curriculum.





INTRODUCING

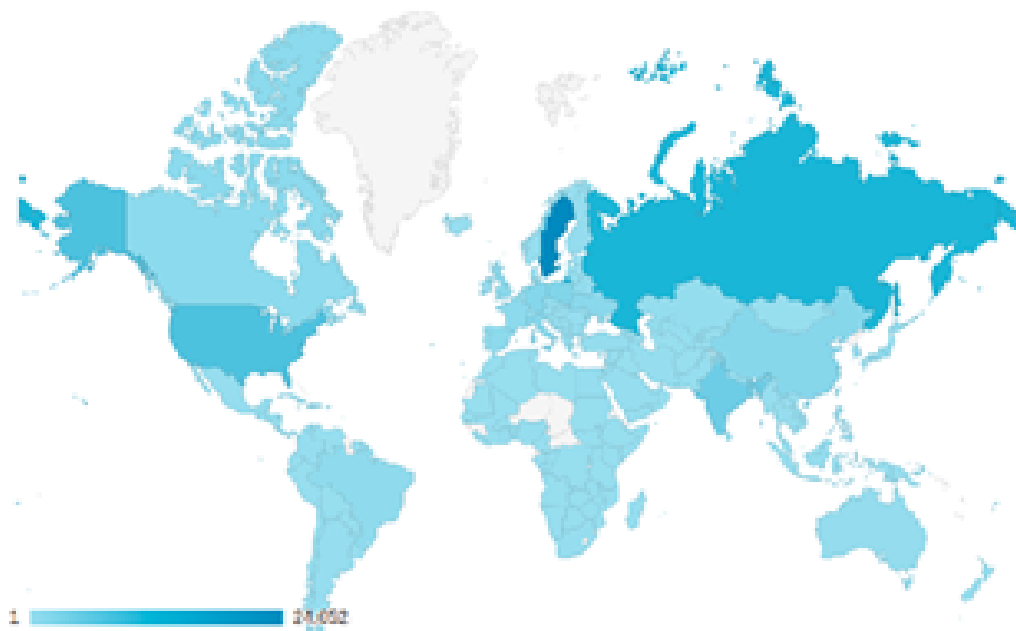


a **scalable**, **open-source**, **made-in-India**
coding platform designed specifically for
the needs of Indian schools.



Kojo: A Powerful Coding Solution

Kojo offers a compelling value proposition for educators and students alike. Its emphasis on practical application over rote learning fosters critical thinking and creativity. Noteworthy features such as user-friendly coding interface, powerful capabilities, rich areas of creative-coding, and publishing-grade output – enhance and enrich the learning experience.



Kojo Usage around the world

Downloads – 175000+
Countries – 180+
Students reached – 30000+
Instructors trained – 100+
Schools – 350+

Kojo offers a unique solution by leveraging the power of coding to teach essential 21st-century skills. It is a user-friendly platform designed to:

- **Spark curiosity and engagement:** Kojo's "Play. Create. Learn." approach fosters a love for learning through fun activities, creative expression, and real-world connections.
- **Develop holistic skills:** From computational thinking and problem-solving to critical thinking, creativity, and communication, Kojo caters to a wide range of essential skills.
- **Nurture rootedness and pride in India:** Kojo provides rich opportunities in the areas of generative art and gaming to do projects rooted in our culture and heritage.

What do Children learn in Kojo

21st-Century / Essential skills (through coding):

- Learning about computation (and its usage) / computational thinking.
- Learning to create, joyfully; process-orientation (instructionism to constructionism).
- Learning critical-thinking, creative-thinking, and attention-fullness.
- Learning problem solving and self-assessment; exploring success/failure boundary (with tight feedback cycle).
- Learning design thinking. Learning communication and collaboration.
- Holistic learning (combining math, science, technology, art, ...) with real-world connects.
- Learning patience, grit, motivation, and healthy self-esteem

How do Children learn in Kojo

Through Kojo's method of "**Play . Create . Learn**" – doing creative and fun activities with sustained practice, constant feedback, exploration, discovery, and real-world connects. To support this, Kojo provides:

- A strong yet beginner-friendly programming language – Scala (which has great support for all the essential ideas in computing and coding – via structured, functional, object-oriented, and concurrent programming).
- A powerful and easy-to-use App (with modern features like syntax-highlighting, code-completion, IPM, Tracing, History, etc.)
- Rich areas for programming and creation (with real-world connects and varied skills) – Turtle Graphics, Picture Graphics, Animations, Gaming, Music, AI, and Robotics, with good starter learning material.

Here's how Kojo addresses the challenges faced by schools:

- **Low resource requirement:** Kojo functions on older computers without an internet connection, making it accessible to schools with limited resources.
- **Proven experience:** Over 14 years of successful implementation with the target demographic.
- **Solid foundation:** Built on a robust framework that empowers educators and engages students.
- **Easy to learn and use:** for children and teachers.

- **Part of the government curriculum or project:** which makes it easier to get coding into the timetable
- An **ecosystem** that enables the following:
 - Effectively imparting coding education
 - Having good LM available
 - Providing good teacher training and support
 - Engaging students in the process of learning (by making learning enjoyable)
 - Providing computers to support the above

Kojo Usage Case Study

Objective:

To understand the effectiveness of Kojo and our ecosystem around it for teaching essential skills via coding to children, and to understand its strengths and weaknesses.

Methodology:

- Feedback was taken from 2 main types of Kojo teachers:
 - **Kojo-Kalpana Project Teachers:** This is a project run by us (along with partner Smartgaon) that aims to make the full benefits of Kojo/coding available to participating schools - aligned with NEP 2020 – where 900+ students of classes 6th to 8th (and other classes as desired) can learn 21st century skills through coding. Currently, twelve schools* in four states are enrolled.
 - **Goa Government School Teachers:** Kojo is part of the coding curriculum in the state of Goa – for grade 7 (standard and elective curriculum) and grade 8 (elective curriculum) – and is being used by 8000+ students in 340+ schools since June 2023.
- **One-on-one interviews** were conducted with the participants of Kojo-Kalpana project and a few teachers from Goa.
 - Kojo-Kalpana Teachers = 8
 - Goa Teachers = 5
- **A feedback survey** of Goa teachers was taken after a training session. 60 teachers filled out the survey form.

Findings in a nutshell

80%

Teachers consider Kojo a very useful learning app for children*
None of the teachers we got feedback from considered it a 'not useful' learning app for kids

Teachers think Kojo is not difficult to learn for teachers*

78% think it is 'easy' and 21% think it is 'neither difficult nor easy' for the teachers

99%

87%

Teachers think Kojo is not difficult to learn for children**
50% think it is 'easy' and 37% think it is 'neither difficult nor easy' for the kids

Teachers love Kojo:

Teachers appreciate Kojo's user-friendly interface, engaging features, and ability to effectively teach coding concepts.

Students enjoy learning with Kojo:

Kojo's engaging approach and focus on creativity keep students motivated and interested in learning.

Kojo helps in building essential skills:

Teachers have observed improvements in critical thinking, creativity, problem-solving, and collaboration among their students.

Kojo is effective for beginners:

Kojo is seen as a perfect tool for introducing coding to young students with no prior programming experience.

Good material and support from the team:

Kojo team provides effective learning material and teacher training that is helpful in understanding the concepts and teaching them to students

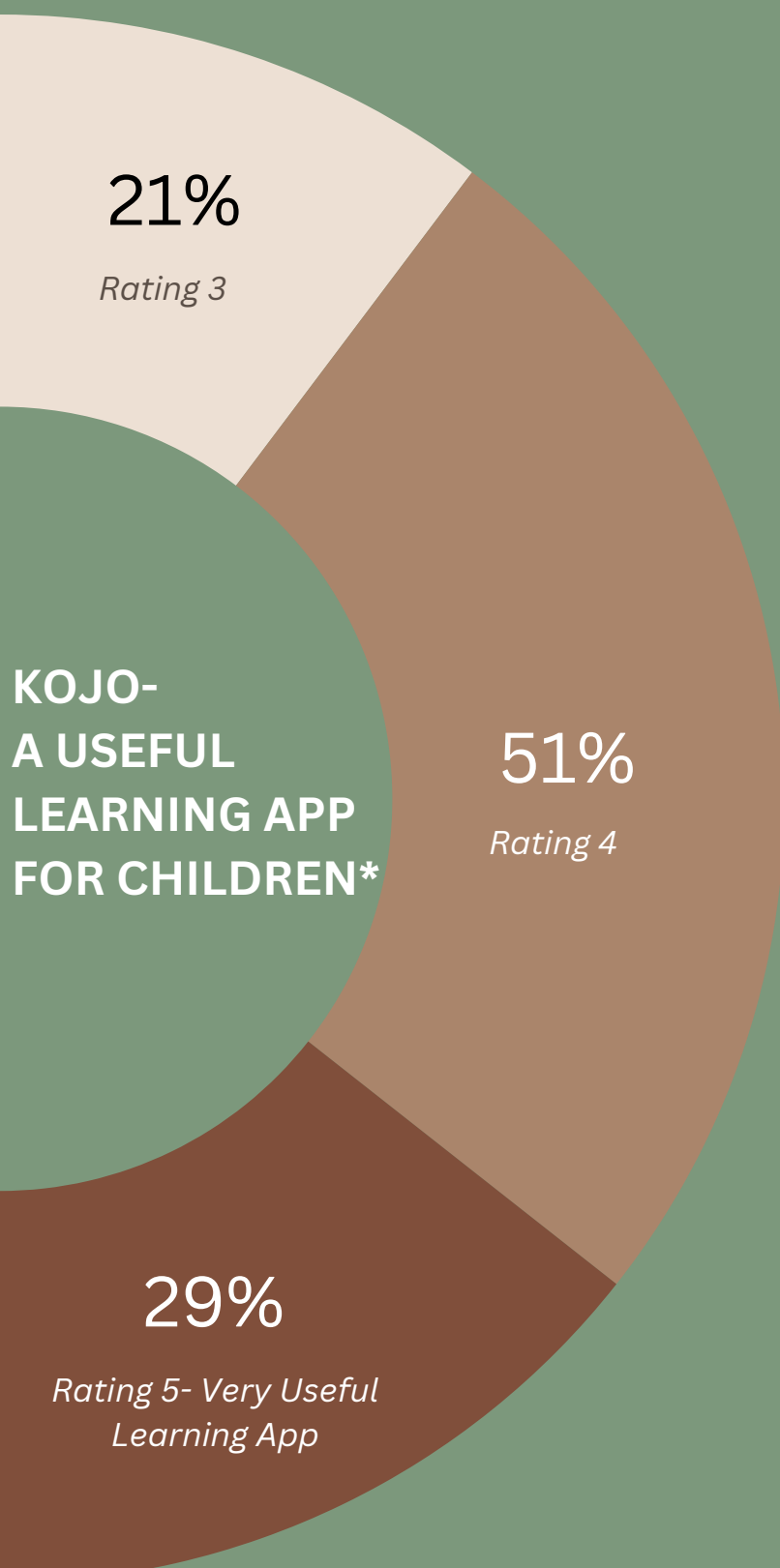
Above data taken from one-on-one interviews and online survey.

* N=73

** N=60

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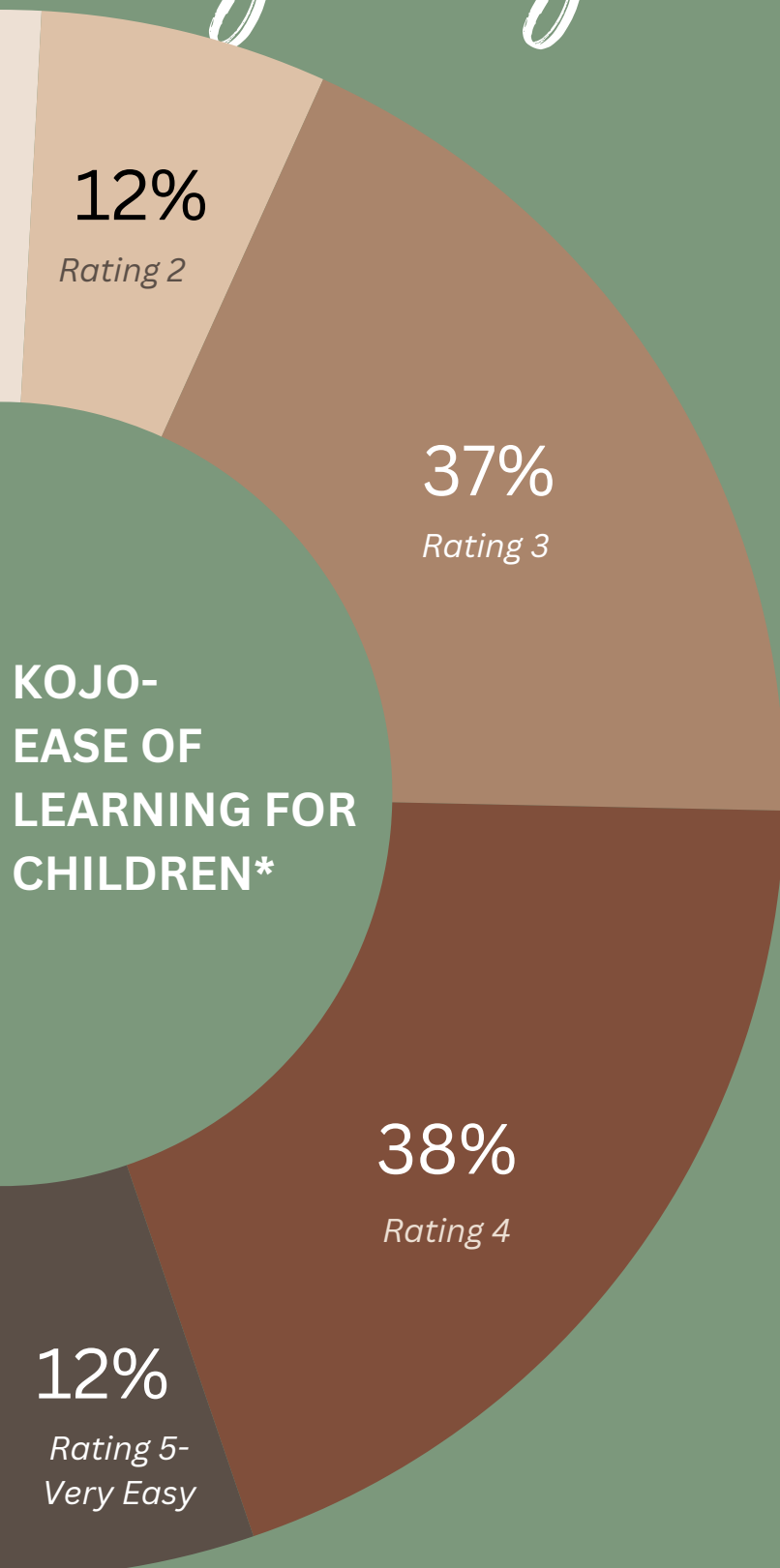
Kojo is a useful and effective learning tool for coding



KOJO IS EASY TO LEARN AND USE	KOJO HAS USER-FRIENDLY INTERFACE AND ENGAGING FEATURES	STUDENTS ENJOY LEARNING WITH KOJO	TEACHERS ENJOY TEACHING WITH KOJO
<ul style="list-style-type: none"> • Kojo is seen as a perfect tool for introducing coding to young students with no prior programming experience. • Auto completion of code and syntax helps students to get familiar with coding in an easy way. 	<ul style="list-style-type: none"> • Features like interactive coding, auto-completion, and rich areas for programming resonate well with educators. • Kojo Code Exchange for sharing their design and code with others is also well liked. 	<ul style="list-style-type: none"> • Kojo's engaging approach and focus on creativity keep students motivated and interested in learning. • Being able to incorporate animation and music also makes Kojo very exciting for them 	<ul style="list-style-type: none"> • Positive student responses motivate teachers and make them enjoy the teaching process • In the process teachers themselves are also learning new things
<ul style="list-style-type: none"> • "easy way for kids to learn coding" • "is an effective tool to teach kids who are not interested in studies. They can learn things in an easy and fun way." 	<ul style="list-style-type: none"> • "Very user-friendly to code as well as to understand." • "it incorporates features like sound, so there is no need to separately learn Sonic pi or any other software. Animation is also nice feature." 	<ul style="list-style-type: none"> • "Children are excited to work on Kojo and wait for their turn as Kojo class is scheduled alternate days." • "students are even interested to do Kojo in their free periods" • "Gives them a WOW factor when they learn things and encourages them to explore more" 	<ul style="list-style-type: none"> • "Kids love to play with Kojo. During competitions they bring their own designs and try different formulas and angles to make those designs" • "After doing animations in Kojo, the concepts of physics and Maths have become very simple for me"

*Scale of 1-5, where 1 is 'not a useful learning app for children' and 5 is 'very useful learning app for children'. No one selected 1 and 2

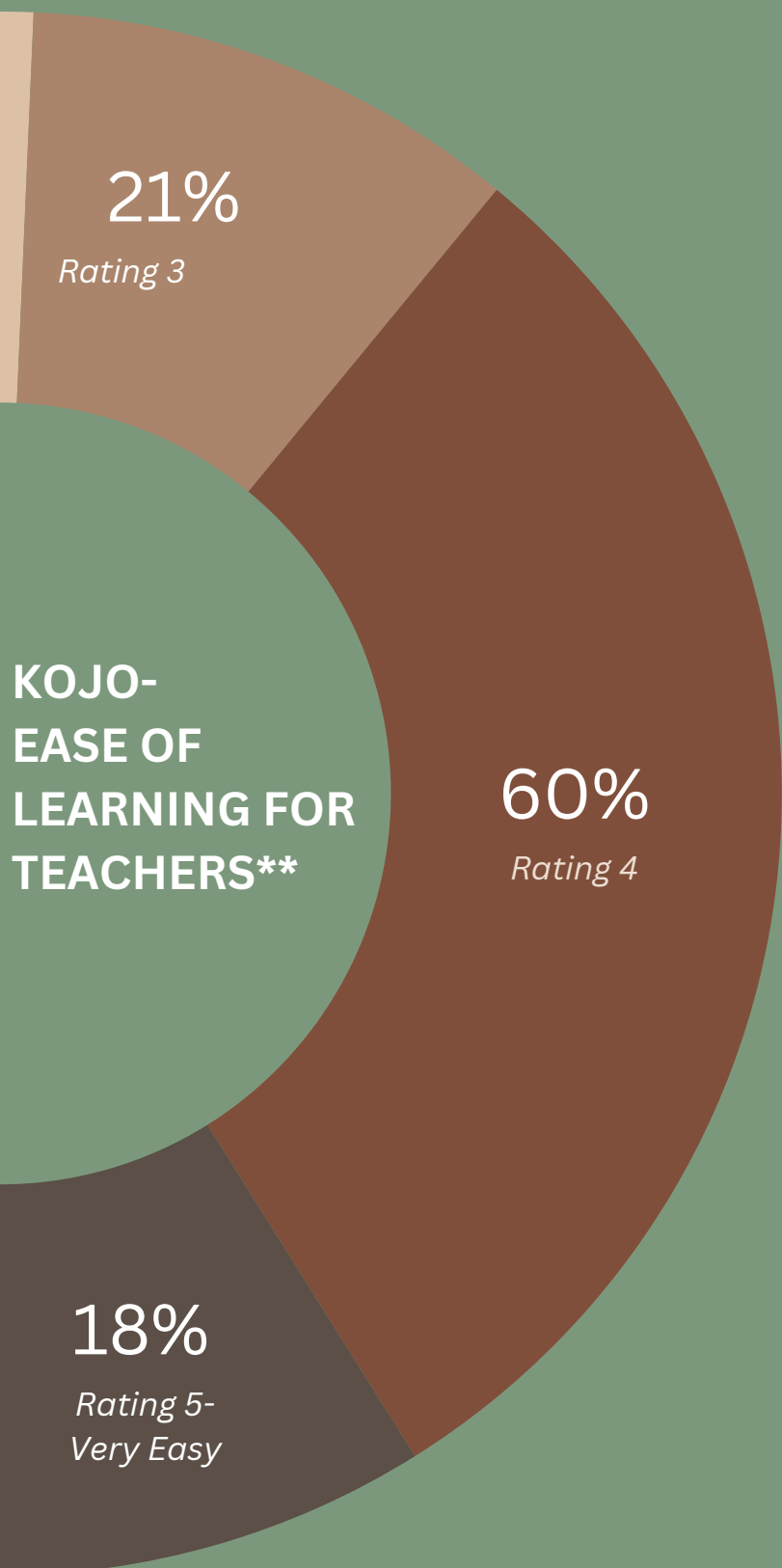
Kojo helps children learn essential skills via coding in an easy way



KOJO EQUIPS CHILDREN FOR THE FUTURE	KOJO FOSTERS ESSENTIAL SKILLS IN CHILDREN	KOJO MAKES STUDENTS BETTER AND MOTIVATED LEARNERS	KOJO ENHANCES CHILDREN'S MATHEMATICAL ABILITIES
<ul style="list-style-type: none"> • Kojo is seen as a gateway to coding for the children, an essential skill for the 21st century • Teachers feel that it makes coding accessible and engaging for them 	<ul style="list-style-type: none"> • Teachers have observed improvements in critical thinking, creativity and problem-solving. • Collaboration among students has also gone up as they work in teams. • Students exhibit patience and grit to come up with the best possible design. 	<ul style="list-style-type: none"> • It improves student engagement and motivation • Kojo improves thinking abilities of the students • Increased student attendance was also mentioned by a few teachers 	<ul style="list-style-type: none"> • Teachers reported enhanced math skills among students.
<ul style="list-style-type: none"> • <i>"kojo is like a foundation of coding for children"</i> • <i>"children realize that the things that they learn here will be useful for them in the future and will help them in learning other languages like C++, Java etc."</i> 	<ul style="list-style-type: none"> • <i>"Kojo actually enhances critical thinking and you get to see this the most during competitions"</i> • <i>"Students are very excited to code in Kojo and try to come up with the best possible design"</i> • <i>"they discuss coding among themselves"</i> 	<ul style="list-style-type: none"> • <i>"Children are very enthusiastic about competitions and there is maximum participation from the kids in our school"</i> • <i>"They are no longer passive learners; they are actively involved in the learning process."</i> • <i>"Competition motivates them a lot to learn something new"</i> 	<ul style="list-style-type: none"> • <i>"Students have become much more comfortable with the use of numbers after using Kojo"</i> • <i>"Kojo has enhanced their skills in Maths because they see how numbers are changing"</i>

*Scale of 1-5, where 1 is 'very difficult' and 5 is 'very easy'.
2% selected rating of 1 ('Very hard').

Kojo comes with good learning material (LM) and Teacher Training*



**Scale of 1-5, where 1 is 'very difficult' and 5 is 'very easy'. Only 1 person selected '2' ('somewhat hard'). and none selected '1' ('Very hard')

KOJO LEARNING MATERIAL IS SEEN AS A VALUABLE RESOURCE	HIGH SATISFACTION WITH THE TEACHER TRAINING PROVIDED	TEACHERS HAPPY WITH THE ON-GOING SUPPORT PROVIDED TO THEM
<ul style="list-style-type: none"> The written material is easy to read and understand for both teachers and students. Appreciation for the good style of writing and well-arranged assignments Students enjoy the exercises included in the materials. 	<ul style="list-style-type: none"> Training helped teachers gain significant knowledge and skills, taking them from basic understanding to a confident level. The training included practical project implementation, solidifying their learning and preparing them for classroom application. Appreciate the patience and guidance provided by mentors. 	<ul style="list-style-type: none"> Teachers appreciated the dedication and helpfulness of instructors, who are available to help them whenever they get stuck. Fortnightly online classes for the kids are very helpful
<ul style="list-style-type: none"> "learning material is easy for both teachers and children- but practice is needed." 	<ul style="list-style-type: none"> "Trainers are very good and help in coding." "The training I received on Kojo was invaluable. It gave me the skills and confidence to teach effectively" "very good mentors who teach with patience." 	<ul style="list-style-type: none"> "mentors are always there to help" "If any problem in understanding then we talk to the instructors and attend online classes" "kids themselves call Nitin sir and get help"

*Kojo "ease of learning" results are from Kojo-Kalpna + Goa. Remaining results are from Kojo-Kalpna, as Goa teachers are not provided LM and detailed teacher training by our team.

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Interesting Quotes

" Kids get a chance to express their feelings "

" One great thing about Kojo is that you don't have to change windows to see what you did. It is seen in the same window. "

" it is colorful and kids can immediately see what they made "

" You just play with numbers and Kojo will do the magic for you "

" Kojo has made learning to code fun and engaging for my students. They are no longer passive learners; they are actively involved in the learning process. "

" Something that was limited to chalk and board, has come up on computer screen making it exciting for students to learn "

" Students understand difficult concepts more easily after they have used Kojo "

" Kojo is mathematical and logical "

" The funny thing is that they don't even know that they are learning Maths while they are doing Kojo. "

" you don't even need prior knowledge of music to use it in Kojo. "

"Our's is a village area and we never thought that our children can get such facility"

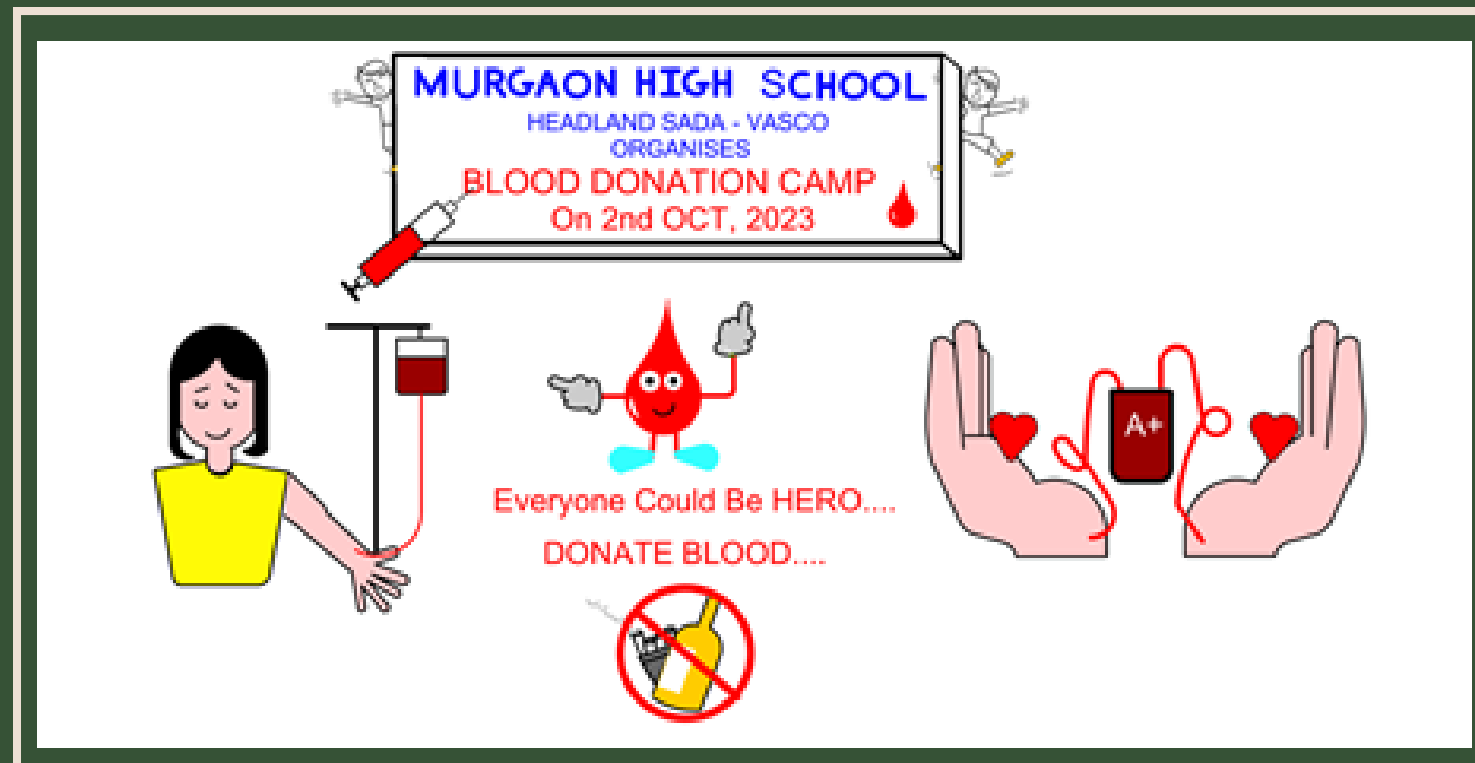
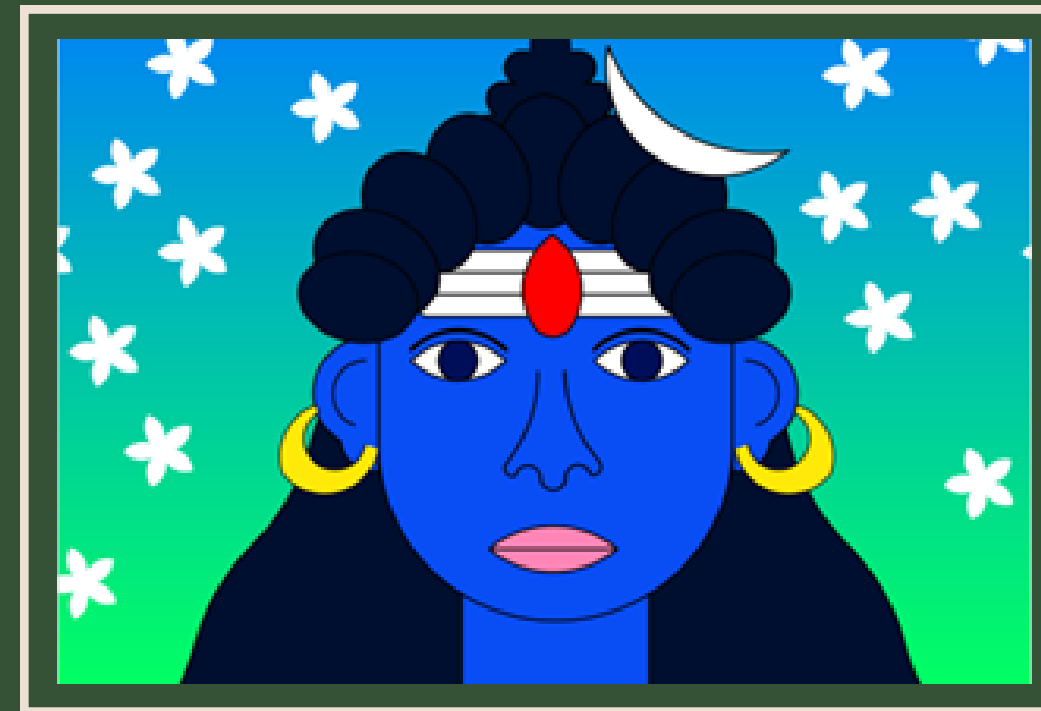
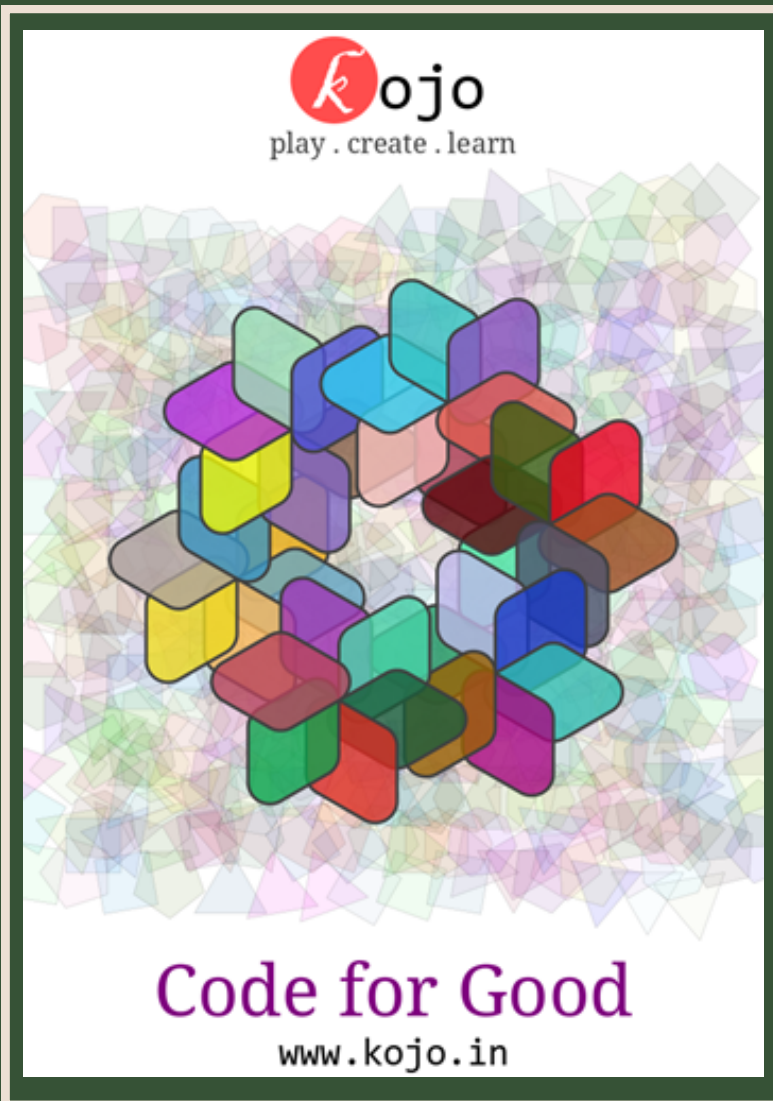
" they (students) discuss coding among themselves "

Suggested Areas for Improvement



- **More computers.** An adequate number of computers is not available in these schools to teach coding. Teachers have requested more computers to teach coding to students effectively.
- **Better Internet connectivity.** Many schools lack proper Internet connectivity, which is primarily needed for them to attend online training and on-going classes.
- **Printed LM.** Currently the learning material (LM) is available as in e-book format. There is a general request for hard copies of learning material, which students can use while working with Kojo and can also take home if needed.
- **More coding time.** Teachers across the board think that more time should be allotted for teaching Kojo.
- **Teacher Stipends.** There is a suggestion to give stipends to the teachers, to increase their motivation to teach Kojo in school.

Some Kojo Creations by Students and Teachers



Schools in Kajo-Kalpana and Goa using Kajo



- Mulvery Convent School (using Kajo since April 2022)
- Elite International School (since April 2022)
- CVN Science School (since April 2022)
- Pandit JP Tiwari Public School (since April 2022)
- Himalayan English School (since April 2022)
- Shivalik School (since July 2015)
- Himjyoti School (since April 2022)
- Shri Rajaram Chetna Intermediate Clg (since April 2022)
- Shiv Darshan Public School (since April 2022)
- Govt H. S. School, Kapkote, Bageshwar (since April 2023)
- Govt S.S. School Patoda, Rajsthan (since Nov 2023)
- Shri Timli Vidhyapeeth (since Nov 2023)
- 340+ Government and Government-Aided Schools in Goa

A group of approximately 12 children and two adults are standing in a line, wearing school uniforms. The image is overlaid with a semi-transparent green filter. The text "Join us in this journey, and make a difference that matters..." is written in a black, cursive font across the center of the image. The children's uniforms feature various logos and text, including "Kojo is a Game Changer", "Kojo is my Best Friend", and "कबड्डी".

*Join us in this journey, and make
a difference that matters...*