Balancing Wellbeing, Equity and Workforce preparation through 'Art with Shapes'

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Abstract: This paper presents *Art with Shapes*, a cross-disciplinary middle school lesson integrating mathematics, art, and computational thinking (CT) in Indian public schools. Grounded in India's National Education Policy (NEP 2020) and aligned with the OECD Learning Compass and UNESCO's Happy Schools, the lesson exemplifies effective ICT education goals and the challenges of translating them into sustainable classroom practice. Blending geometry, art, and coding, *Art with Shapes* offers culturally responsive learning and serves as a touchstone to illustrate the practical interplay between the educational aims of wellbeing, equity and workforce preparation. Narrative, process-focused and choice-based tasks foster equity, address the digital divide, and promote wellbeing through personal creative expression, while developing computational thinking skills for workforce readiness. The paper analyzes the lesson, identifies tensions between curriculum goals and classroom realities, and calls for teacher participation in learning design, targeted professional development, and policy-aligned strategies to advance equitable and sustainable computational thinking education. Art with Shapes is now embedded in Telangana's SCERT Digital Literacy curriculum and 8,783 teachers were trained via state-level workshops. Through Codemitra app, 4,000+ students across 30+ states participated, with over 70% of learners in Maharashtra, Chhattisgarh, and Jammu & Kashmir completing more than half the activities, demonstrating widespread reach and sustained engagement.

Keywords: Computational Thinking, culturally responsive pedagogy, wellbeing, equity, workforce preparation, NEP 2020, Cross-Disciplinary Learning, Art-Integrated Learning

1. Introduction

The goals of education extend beyond academic achievement or workforce readiness to include personal wellbeing, democratic participation, creativity, and ethical agency (Biesta, 2009; Noddings, 2003; National Education Policy, 2020). In India's public education system, these aims are complicated by economic marginalization and systemic inequities. NEP 2020 calls for "holistic, inclusive and multidisciplinary education" that integrates critical thinking, empathy, creativity, and ethical reasoning with digital and vocational skills. This paper examines such integration through *Art with Shapes*, a Grade 6 CT lesson in under-resourced public schools. Grounded in constructionist theory (Harel & Papert, 1991), it engages students in creating personally meaningful artifacts through unplugged geometry activities, local art forms, and mobile-friendly coding tasks in vernacular languages. While ICT in education often emphasizes skills for economic competitiveness, *Art with Shapes* reframes coding and mathematics as expressive, inclusive, and relational, highlighting how curriculum design can balance wellbeing, equity, and workforce readiness, while identifying teacher professional development needs for sustainable enactment.

2. Balancing Workforce Preparation, Wellbeing, and Democratic Values

Modern democracies demand learners who are not only job-ready but civically engaged and ethically aware (Dewey, 2018; Nussbaum, 2010a). This lesson resists the neoliberal framing

of learners as mere economic actors by embedding geometry and coding within a culturally responsive and inclusive pedagogy. Activities as shown in Figure 1 allow students to explore geometry and shapes through cultural and indigenous art forms (e.g., Warli patterns). The dialogic structure of lesson, led by characters like Pooja and Yahi, encourages collaborative inquiry and empathy (Shor, 1993). The lessons' design embodies Universal Design for Learning (CAST, 2024) and uses multimodal tools (e.g., unplugged activities, a free mobile-based block-based programming app called Codemitra that supports offline access and vernacular content through videos and coding tasks as in Figure 2) to ensure equitable access, addressing India's digital divide (IAMAI & Kantar, 2024). Skills such as abstraction, debugging, and iterative design are not taught in isolation but within meaningful contexts, developing not only technical literacy but also critical consciousness and ethical engagement (Freire, 1996; Camicia & Franklin, 2011). Activities like *"Test and Debug"* (Figure 2.a) build creative resilience and foster a growth mindset by framing failure as a step toward innovation and creativity, traits that are essential for workforce readiness (Wang et al., 2024; Creely et al., 2019).
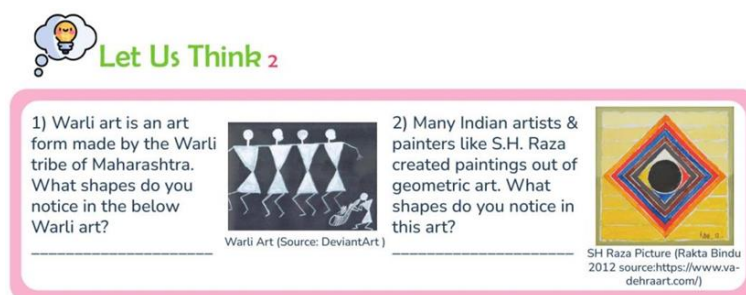

Figure 1. Unplugged activities asking students to identify shapes in traditional art.
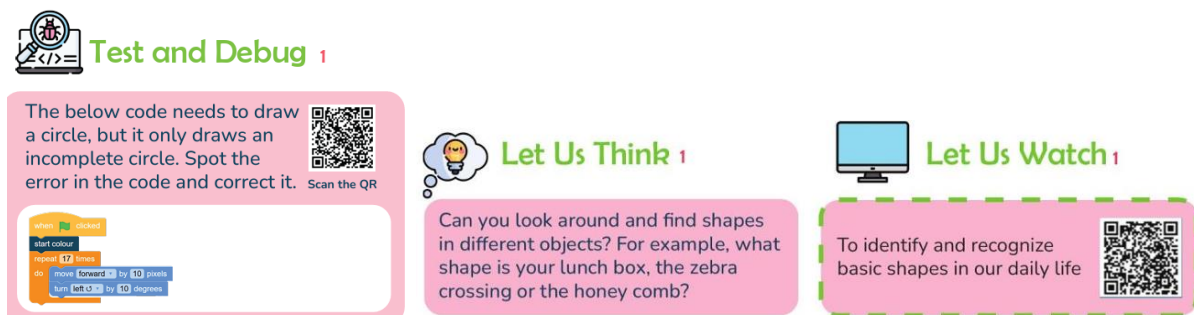

Figure 2. a) Test and Debug activity   *b)* Let us Think & Watch activity

Wellbeing is often sidelined in STEM instruction, yet research confirms its strong correlation with academic engagement (Durlak et al., 2022; Noddings, 2003). Art with shapes integrates joy and curiosity through storytelling and discovery-based experiential learning aligning with eudaimonic principles that connect wonder, curiosity, and emotional growth with subject learning (Egan, 2013; Kristjánsson, 2017). Tasks such as *'Geometry Art in Nature'* (Figure 3), where students create a magical flower using nested loops, encourage awe and creative engagement (Egan, 2013). These activities embody what Noddings (2003) calls the pleasures of classroom, recognizing that students learn best when curiosity, identity, and creativity are engaged. Such integrative approaches humanize STEM learning, fostering intrinsic motivation in early adolescence. Critics argue that wellbeing discourses risk diluting rigor (Ecclestone & Hayes, 2009), yet this lesson shows joy and rigor can co-exist. Through creative freedom and cognitive challenge, such as nested loops and debugging, it addresses the "whole child" without compromising outcomes. Tasks like *'Draw your own animal'* and *'Draw your own art'* (Figure 4) connect geometry to personal creative expression, while *Let Us Think 1* (Figure 2.b) asks students to identify shapes in familiar objects such as lunch boxes, honeycombs, or zebra crossings. These activities resonate with Dewey's (2018) emphasis on

experiential learning and Noddings' (2003) advocacy for a relational pedagogy that nurtures attentiveness to the natural world. They also align with Egan's (2013, p.157) notion of exploring "the technology of familiar things," enabling students to recognize ordinary objects in meaningful new contexts. These design choices resonate with UNESCO's "Happy Schools" framework and NEP's emphasis on joyful, integrated learning. Figure 4.b illustrates this enactment in practice, where students collaboratively code and draw a magical flower using shapes.
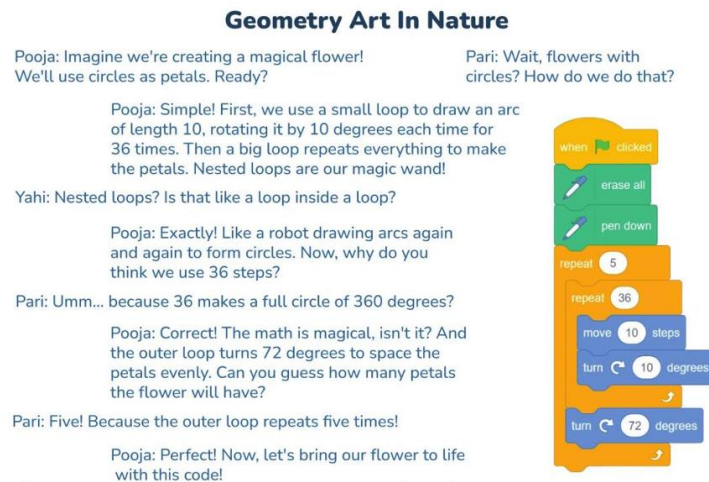

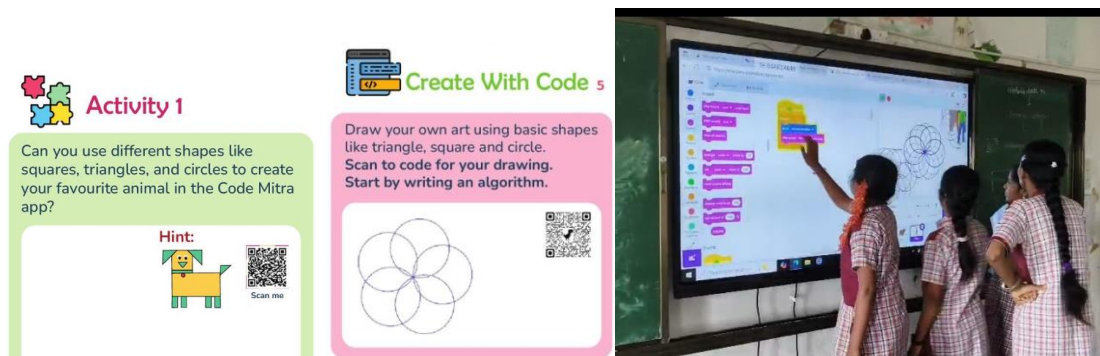*Figure 3.* Geometry art in nature, an inquiry-based dialogue about a magical flower

Figure 4.a) 'Draw your own animal' and 'Draw your own art' activity using basic shapes
b) Classroom enactment (students drawing the magical flower)

The lesson's strengths lie in its alignment with NEP's pluralistic vision, bridging vocational skills, emotional resilience, and cultural inclusion. However, gaps remain. Although students collaborate in practice (Figure 4.b), the lesson design does not include structured collaborative tasks that are vital for wellbeing and democratic values. Implementation is further constrained by rigid 45-minute class periods, exam-driven curricula, siloed subjects, and the absence of CT as a standard subject in Indian schools. Teacher preparation also remains a bottleneck, as many lack training to facilitate transdisciplinary and contextualized learning (Wilkinson, 2014). Realizing NEP's vision requires professional development enabling educators to integrate cultural assets, apply socio-technical pedagogies, and model empathy and criticality. Scalable adoption relies on modular content and formative assessments valuing technical skills alongside joy, creativity, collaboration, resilience, and ethical reflection.

3. Conclusion

The *Art with Shapes* lesson illustrates how computational thinking, if designed with cultural relevance and creativity, can move beyond narrow economic goals to support wellbeing,

equity, and democratic values. By blending geometry, art, and coding, it operationalizes NEP 2020's vision of joyful, inclusive, and integrated learning, showing that rigor and creative expression can co-exist in under-resourced classrooms. Beyond design, the lesson has been officially recognized in the Government of Telangana's SCERT Digital Literacy curriculum for Grade 6, with flagship activities like "Draw a magical flower using shapes" featured in both textbooks and the Codemitra app. A total of 8,783 teachers has been trained in Telangana through state-level hackathons and workshops. Nationally, Codemitra data show 4,000+ student enrollments, with more than 70% of learners in Maharashtra, Chhattisgarh, and Jammu & Kashmir completing over half of the lesson activities, underscoring both reach and sustained engagement.

Acknowledgements

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