

# Steam Rather Than Stem? Reconsidering Educational Reform in Sri Lanka's School System

Dr. Nishshanka Abeyrathna.

Department of South Indian Music, University of the Visual and Performing Arts,  
Colombo, Sri Lanka.

DOI: <https://dx.doi.org/10.47772/IJRISS.2026.1026EDU0121>

Received: 13 February 2026; Accepted: 19 February 2026; Published: 12 March 2026

## ABSTRACT

Debates concerning the relative merits of STEM (Science, Technology, Engineering, and Mathematics) and STEAM (Science, Technology, Engineering, Arts, and Mathematics) education have intensified globally, particularly in developing knowledge economies. While STEM education has been widely promoted to enhance technical workforce capacity, some scholars argue that the exclusion of the Arts may limit creativity, interdisciplinary thinking, and cultural responsiveness.

This study critically examines whether STEAM constitutes a more contextually appropriate educational framework than STEM for Sri Lanka's school education system. Using qualitative policy analysis and secondary empirical review, the study analyzes national education reform documents, published research, and pilot program reports. Findings indicate that STEAM aligns more closely with Sri Lanka's cultural-civilizational heritage, learner diversity, and emerging innovation needs. However, implementation challenges—including teacher preparedness, assessment reform, and infrastructural inequality—remain significant. The study contributes to global discussions on postcolonial curriculum reform and interdisciplinary education by situating STEAM within a South Asian context.

**Keywords:** STEAM education, STEM education, Sri Lanka, curriculum reform, interdisciplinary learning, postcolonial education

## INTRODUCTION

Educational systems worldwide are undergoing structural transformation in response to technological acceleration, automation, globalization, and shifting labor-market demands. STEM education has emerged as a dominant policy response, intended to strengthen national competitiveness in science and technology sectors (Smith & Lee, 2020). However, growing concern has been expressed that a narrowly technical emphasis may insufficiently address creativity, ethical reasoning, and socio-cultural dimensions of innovation (Bequette & Bequette, 2012; Robinson, 2011).

In this context, STEAM education has gained traction as an expanded framework incorporating the Arts into STEM. Proponents argue that arts integration fosters creativity, design thinking, collaboration, and culturally responsive learning (Gardner, 2011). While the STEM-STEAM debate has been widely examined in Western and East Asian contexts, limited scholarship critically evaluates this question within South Asian education systems.

Sri Lanka presents a particularly significant case. The country combines high literacy rates and strong educational access with persistent concerns regarding examination-centered pedagogy, limited creativity, and graduate unemployment. Recent policy discourse from the Ministry of Education (2022) references STEAM as a strategic direction for reform. However, systematic academic evaluation of its contextual suitability remains underdeveloped.

This study addresses the following research question:

## Is STEAM education more contextually appropriate than STEM education for Sri Lanka's school system?

Rather than assuming STEAM's superiority, this article critically evaluates its theoretical foundations, empirical support, and policy implications within Sri Lanka's socio-cultural and developmental landscape.

### Theoretical and Conceptual Framework

#### STEM Education: Policy Origins and Limitations

STEM education emerged in the late twentieth century as a response to perceived declines in scientific competitiveness. It emphasizes disciplinary rigor, quantitative reasoning, and technological fluency (Smith & Lee, 2020). Empirical research demonstrates improvements in problem-solving and analytical capacity under integrated STEM models.

However, critics identify three recurring limitations:

1. Overemphasis on technical rationality
2. Marginalization of aesthetic and ethical inquiry
3. Limited integration of local cultural knowledge systems

In postcolonial societies, these limitations may reproduce inherited technocratic models detached from indigenous epistemologies.

#### STEAM Education: Epistemological Expansion

STEAM extends STEM by integrating artistic processes such as design, narrative, performance, and visual thinking. Importantly, arts integration is not merely additive but epistemological: it reframes knowledge production as creative, embodied, and socially situated (Bequette & Bequette, 2012).

The theoretical foundations of STEAM intersect with:

- Constructivist learning theory
- Experiential education
- Howard Gardner's theory of multiple intelligences (Gardner, 2011)
- Design-based learning

Within this framework, creativity is conceptualized not as aesthetic embellishment but as a mode of inquiry central to innovation.

#### Sri Lanka's Educational and Cultural Context

Sri Lanka's education system reflects layered historical influences: pre-colonial Buddhist and Hindu monastic learning traditions, colonial examination systems, and post-independence nationalization reforms.

The country possesses a rich artistic heritage, including Kandyan dance, temple mural traditions, craft practices, and classical music systems. Historically, artistic knowledge was integrated with moral and spiritual education. However, twentieth-century reforms increasingly privileged examination performance over creative engagement.

Recent reform documents from the Ministry of Education (2022) indicate renewed interest in interdisciplinary learning and creativity development. Yet policy statements alone do not guarantee systemic transformation.

## METHODOLOGY

### Research Design

This study employs qualitative policy analysis combined with secondary empirical synthesis. It does not report primary fieldwork but critically analyzes:

- National reform documents
- Peer-reviewed international research
- Published accounts of Sri Lankan STEAM pilot initiatives

### Data Sources

Sources include:

- Official policy frameworks (Ministry of Education, 2022)
- Peer-reviewed STEAM research (Bequette & Bequette, 2012; Smith & Lee, 2020)
- Sri Lankan education studies (Perera, 2018)

### Analytical Procedure

A thematic analysis approach was used to identify recurring dimensions:

- Creativity development
- Student engagement
- Cultural alignment
- Implementation feasibility

Themes were compared across STEM-only and STEAM-oriented models.

### Comparative Analysis: STEM and STEAM

Dimension	STEM	STEAM
Core emphasis	Technical proficiency	Technical + creative integration
Knowledge structure	Discipline-centered	Interdisciplinary
Dimension	STEM	STEAM
Cultural integration	Limited	Context-sensitive
Student engagement	Variable	Often enhanced
Innovation model	Analytical	Analytical + design-oriented

While STEM strengthens technical competence, STEAM broadens innovation capacity through aesthetic and human-centered approaches.

## Empirical Insights from Sri Lanka

Published accounts of pilot initiatives suggest several patterns:

- Increased student participation in project-based learning
- Improved communication skills
- Greater inclusion of students previously disengaged from technical subjects
- Positive teacher perceptions of interdisciplinary flexibility

However, these findings remain preliminary and largely descriptive. There is limited longitudinal or largescale quantitative data available. Thus, claims regarding nationwide impact must remain cautious.

## DISCUSSION

The findings suggest that STEAM may offer contextual advantages for Sri Lanka in three domains:

### Cultural Responsiveness

Integration of arts aligns with Sri Lanka's long-standing aesthetic traditions. STEAM potentially reconnects formal schooling with indigenous expressive practices rather than replicating purely technocratic Western models.

### Innovation and Economic Development

Innovation increasingly depends on design thinking and creativity alongside technical skill. A STEAM framework may better support entrepreneurship and creative industries.

### Holistic Development

Sri Lanka's examination-driven system has been criticized for stress and narrow achievement metrics. STEAM's project-based orientation may contribute to more balanced learner development.

Nevertheless, structural barriers remain:

- Teacher training deficits
- Examination system rigidity
- Resource inequalities between urban and rural schools

Without systemic reform, STEAM risks becoming rhetorical rather than transformative.

### Limitations and Future Research

This study is limited by its reliance on secondary data and policy analysis. Future research should include:

- Longitudinal comparative studies of STEM vs. STEAM classrooms
- Quantitative measurement of creativity and innovation outcomes
- Teacher professional development evaluations
- Rural-urban implementation comparisons

Such empirical expansion is essential for evidence-based policymaking.

## CONCLUSION

The analysis indicates that STEAM education demonstrates stronger alignment with Sri Lanka's cultural heritage, interdisciplinary aspirations, and innovation needs than a narrowly defined STEM framework. However, contextual appropriateness does not automatically ensure successful implementation. Effective reform requires sustained investment in teacher preparation, curriculum redesign, and assessment transformation.

This study contributes to international discourse by situating the STEM–STEAM debate within a South Asian, postcolonial educational context. Rather than treating STEAM as a universal solution, the findings underscore the importance of culturally responsive adaptation in curriculum reform.

## REFERENCES

1. Bequette, J. W., & Bequette, M. B. (2012). A place for art and design education in the STEM conversation. *Art Education*, 65(2), 40–47.
2. Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences* (3rd ed.). Basic Books.
3. Ministry of Education. (2022). *National STEAM education policy framework*. Colombo, Sri Lanka.
4. Perera, S. (2018). STEAM education initiatives in Sri Lankan schools: Creativity and cultural integration. *Sri Lanka Journal of Educational Research*, 10(1), 25–45.
5. Robinson, K. (2011). *Out of our minds: Learning to be creative*. Capstone Publishing.
6. Smith, J. A., & Lee, R. (2020). Integrating STEAM into secondary education: Cognitive and cultural impacts. *Journal of Educational Research*, 113(2), 145–162.