



Chapter 4

Policy Frameworks for Personalized STEAM Education: Ensuring Sustainable Learning

Andi Asrifan

 <https://orcid.org/0000-0002-9934-6129>
Universitas Negeri Makassar, Indonesia

Syamsuardi Saodi

 <https://orcid.org/0000-0001-8551-9300>
Universitas Negeri Makassar, Indonesia

D. Saripuddin

Bapenda Pemerintah Kabupaten, Indonesia


Ahmad Rossydi

Politeknik Penerbangan Makassar, Indonesia

Romansyah Sahabuddin

Universitas Negeri Makassar, Indonesia

Sulaeman Sulaeman

 <https://orcid.org/0009-0000-7579-5408>
Universitas Muhammadiyah Makassar, Indonesia

ABSTRACT

This chapter highlights the growing importance of personalized STEAM education in preparing pupils for 21st-century issues. Individualized learning that meets students' needs and interests boosts creativity, critical thinking, and problem-solving. Personalized STEAM education matches students' learning preferences in pace, topic, and teaching approaches, improving engagement and retention. Arts-STEM interaction promotes innovation and holistic thinking. The chapter notes that personalized STEAM efforts require strong policy foundations. Policy priorities include teacher training, equitable technological access, and innovation through AI and adaptable platforms. By addressing these demands, governments and institutions may establish a more inclusive educational system that provides high-quality STEAM education to all children, regardless of socioeconomic background or academic ability. Finally, tailored STEAM education prepares students for a quickly changing, multidimensional world.

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INTRODUCTION

1.1 The Shift Toward Personalized STEAM Education

Recent years have seen a shift toward individualized STEAM (Science, Technology, Engineering, Arts, and Mathematics) education, reflecting its growing importance in educating pupils about 21st-century issues (Lavicza et al., 2022) (Leavy et al., 2023) (Belbase et al., 2022). This strategy stresses individualizing learning to students' needs, interests, and learning styles. Personalized STEAM education helps students develop creativity, teamwork, and problem-solving by making education relevant to their lives and jobs.

Rapid global economic and workforce change is driving this transition. New technologies like artificial intelligence, robotics, and data science require people with technical skills, creativity, critical thinking, and adaptability (Rawboon et al., 2021; Johnson et al., 2021). STEAM education integrates arts and STEM courses for a comprehensive approach to learning that promotes analytical and creative thinking. The arts help students understand how technology and creativity interact, giving them new methods to solve complex challenges.

Personalized STEAM education gives kids alternative paths to succeed by meeting their different needs (Belbase et al., 2022; Bertrand & Namukasa, 2023). It prevents students from falling behind in fast-paced contexts by adapting information and delivery to their abilities, preferences, and learning pace. This strategy supports education equity by offering high-quality STEAM learning to all children regardless of socioeconomic background, learning style, or academic ability.

Personalized STEAM instruction boosts student engagement. Students are more motivated and invested in their studies when investigating areas they like. Students learn and retain more while engaged, preparing them for exams and real-world applications. Personalized STEAM education helps kids become lifelong learners who can succeed in a complex, multidisciplinary world.

Policy frameworks that enable personalized STEAM education's development and sustainability are necessary to maximize its potential. Governments, educational institutions, and legislators must collaborate to promote teaching and learning innovation, provide enough resources and infrastructure, and give all students a tailored STEAM education (Yang et al., 2020).

This chapter examines the significant issue of inequalities in access to STEAM education to tackle challenges in education successfully. A multitude of children, especially from underprivileged communities, encounter substantial obstacles, such as restricted access to resources, technology, and proficient educators. These differences impede their engagement with STEAM courses, diminishing participation and achievement rates. Moreover, conventional pedagogical approaches frequently do not address varied learning styles and requirements, intensifying the issue. This chapter emphasizes personalized STEAM education to showcase creative techniques that promote diversity and improve student involvement in these essential disciplines.

1.2 Defining Personalized Learning in STEAM

STEAM (Science, Technology, Engineering, Arts, and Mathematics) personalized learning tailors training to students' needs, preferences, and interests. Personalized learning adapts information, timing, and methods to each student's learning style and skills (El-Sabagh, 2021; Shemshack & Spector, 2020).

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