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Atal Tinkering Labs and the Global Notion of STEM Education

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Abstract

This study looks at the value of the Atal Tinkering Labs (ATLs) in advancing the idea of STEM learning on a nationwide scale (Atal Innovation Mission. 2017). Global notion of STEM education aligns with the objectives of Atal Tinkering Labs which is a vital part of India's efforts to promote STEM. The notion of STEM education as a whole is based on the knowledge that these subjects are crucial for technological development, innovation, and economic progress. Initiatives like Atal Tinkering Labs in India help advance the larger global effort to promote STEM (Grabowski Wehrell Diana 2021). education by allowing pupils to engage in hands-on learning and explore their interests. This paper explains the ATL initiative in the progress of Indian students to develop their ingenuity, creativity, and problem-solving abilities through technology. The study also considers the value of STEM education in a fast-changing international environment and focuses on the ATL model counterparts' global initiatives to advance STEM education. This study explains the influence of the Atal Tinkering Labs on fostering an innovation culture and equipping future generations with necessary abilities for the twenty-first century through a comprehensive review.

Keywords: *STEM Education, Atal Tinkering Labs*.

Introduction

A vital educational framework in the twenty-first century has emerged for all child development: STEM Schooling, is consist of the arenas of Science, Technology, Engineering, and Mathematics. It places a focus on integrating different disciplines to encourage students' innovative thinking, critical thoughts, and problem-solving capabilities. STEM education gives pupils

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the information with abilities they need to handle difficult problems and succeed in a society becoming increasingly more technologically dependent. This essay examines STEM education globally, underlining its significance and looking at numerous global initiatives supporting its adoption. (National Science Board 2016). Practical learning and hands-on activities will help young students develop an interest in STEM fields. It focuses on a wide range of ideas, including basic electronics, mechanics, data visualization, and woodworking, as well as other cutting-edge concepts like 3D printing, the Internet of things, and design thinking, which leads to the creation of prototypes for their notions. (Vivekananda International Foundation 2019).

India is also moving a step forward to inculcate STEM Education by implementing a motivating movement to establish the Atal Tinkering Lab (ATL) a project of the federal government of India that aims to foster a scientific mindset, innovation, and creativity in Indian students. (Ministry of Education 2016). It is a step in the direction of a brand-new India, one that will value and support original concepts and inventive inventions. (Brocchini Matt 2015).

Innovation and STEM Education

In order to promote economic growth, technological improvements, and societal progress, innovation and STEM education are essential. Overall, STEM education lays the groundwork for fostering innovation through the advancement of brainstorming abilities, nurturing of creativity, promotion of technological literacy, the encouragement of collaboration, the connection between the classroom and real-world applications, the instillation of an entrepreneurial mindset, and the tackling of global challenges. **(**Lancrin Vincent-Stephan and Kiira Karkkainen 2013). Societies can foster a future generation of innovators who will drive improvements and positively impact many industries by investing in STEM education. The following important points highlight the relationship between innovation and STEM education. STEM education equips people with the opportunities and difficulties of the modern world by fostering creativity, critical thinking, problem-solving, and cooperation. An outline of the connection between innovation and STEM education is given.

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(Hammoda Basel 2022).

Figure 1: Innovation and STEM Education

Importance of Stem Education in the 21st Century

STEM instruction is indispensable for the countless demands and challenges of a rapidly evolving global landscape. Here are some key reasons highlighting its importance (Figure 2)

International Initiatives Promoting STEM Education (STEM Education Coalition 2017).

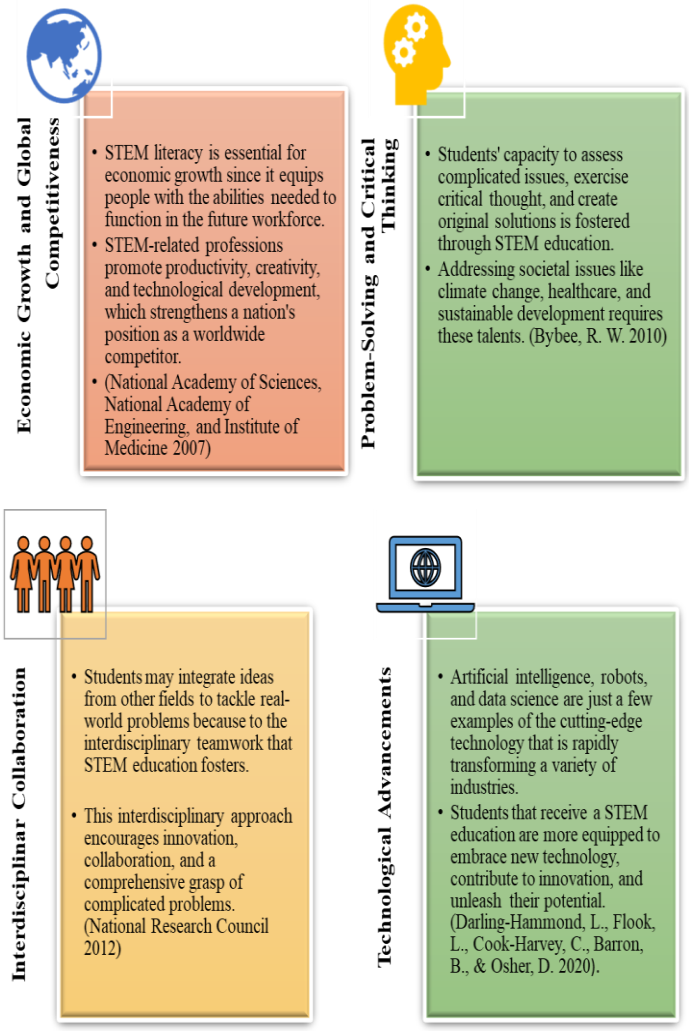

Figure 2: Importance of Stem Education in the 21st Century

Numerous international projects have been launched to promote and develop STEM education globally. These programs seek to improve STEM literacy, widen the availability of high-quality instruction, and alleviate educational opportunity gaps. Several notable examples include**:**

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PISA (A Program for International Student Assessment):

Figure 3. PISA (https://www.oecd.org/pisa)

PISA is a worldwide assessment that evaluates the knowledge and skills of fifteen-year age group students in various subjects, including science and mathematics. (PISA 2012). It provides valuable data and insights to inform education policies and improve STEM education worldwide (OECD 2016).

European Framework for Action on Mathematics Education:

It is an initiative led by the European Commission to enhance mathematics education across Europe. It focuses on improving the quality of mathematics teaching, promoting innovative teaching practices, and fostering collaboration among European countries (European Commission 2023).

European Commission. (2020). European Framework for Action on Mathematics Education (EFAME):

The STEM Education Coalition is a U.S.-based alliance of organizations advocating for policies and initiatives to promote STEM education. It works to raise responsiveness about STEM education to support collaboration between government, industry, and educational institutions (STEM Education Coalition 2017).

International Council of Associations for Science Education (ICASE):

ICASE is a global network of science education associations and institutions. It facilitates international collaboration and exchange of best practices in science

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education, including STEM education, through conferences, workshops, and publications.

These initiatives, along with many others, demonstrate the concerted efforts of governments, international organizations, and educational stakeholders to promote STEM education on a global scale. (Education Commission, 2016).

By sharing experiences, resources, and innovative practices, these initiatives contribute to its advancement and transformative influence on learners.

The following are examples of Atal Tinkering Lab with significance and effects:

(Nayee Dishayein Naye Nirmaan Naya Bharat 2019).

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UNESCO's STEM and Gender Advancement (SAGA) Project:

UNESCO's SAGA project aims to promote gender equality in STEM education and careers. It focuses on removing gender biases, empowering girls and women in STEM, and promoting inclusivity and diversity in STEM fields. (UNESCO 2021).

Atal Tinkering Labs Encourages STEM

The Government of India has launched a programme called Atal Tinkering Labs (ATLs) to encourage kids to pursue STEM education. These labs are designed to encourage young brains' capacity for innovation, creativity, and problem-solving (Brocchini Matt, 2015).

Conclusion

In conclusion, Atal Tinkering Labs and the global idea of STEM education are major factors in influencing the educational environment, preparing students for future difficulties, and encouraging an innovative and entrepreneurial culture. These programs play a crucial role in creating a more enlightened and technologically sophisticated world by cultivating young brains and providing them with the required abilities, information, and mindset (Hammoda Basel 2022)

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