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STEAM Education for a Better Future

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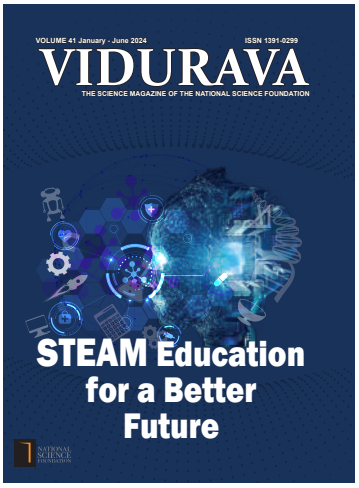

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Editorial

The expectations of STEAM Education

STEM education is apparently a system of education expected to generate innovation skills through integration and possibly facilitate the development of Artificial Intelligence. Many Western countries are known to use STEAM education, although apparently Finland seems to have the best adoption, which begins in primary education.

No one knows the type of education that prevailed in ancient Sri Lanka, although it is clear that a system of knowledge transfer may have existed in ancient Sri Lanka, where it is amply seen in the spectacular technological marvels of the ancient hydraulic civilization.

Henry Parker (1909), the British engineer in colonial Ceylon, who investigated most of Sri Lanka's ancient hydraulic contraption, of all, the *Bisokotuwa* was considered a unique water-tight device to control the flow of water from the massive reservoirs to the low-lying paddy fields. Incidentally in the middle of the Nineteenth century, similar opens wells called value pits had been built in numerous reservoirs in Europe. These were also meant to regulate the flow of water for reservoirs. Parker (1909), concludes in this context that also was the function of the *bisokotuwa* of the ancient Sri Lankan engineer, they were in fact the inventors of the value pits more than 2100 years ago.

Yet another engineering marvel was the ecosystem based trans basin 50-mile-long *Jaya Ganga* in the *Kala Oya* Basin taking water to Anuradhapura to replenish water in the City reservoirs. R. L. Brohier commenting on the magnificent engineering marvel of the latter, state that it verily baffles understanding how a canal of such magnitude could have been planned and executed over a difficult terrain nearly 1500 years ago which meanders over the first 17 miles at an unbelievable gradient of no more than 6 inches per mile.

Nevertheless, it is necessary to await the successful implementation and outcome of the STEM or STEAM education system which will undoubtedly turn tide in transforming the technological and economic development in Sri Lanka.

M. Asoka T. De Silva

STEAM is Everywhere: Embracing the Interdisciplinary Future

Dr. Jayantha Wattevidanage

In recent years, the acronym "STEM" (Science, Technology, Engineering, and Mathematics) has gained tremendous recognition and influence in education and career fields. However, the integration of arts and humanities into this mix, giving rise to STEAM, has emerged as a powerful catalyst for innovation and creativity by using both hemispheres of the brain. By seamlessly blending science, technology, engineering, aesthetics, and mathematics, STEAM provides a holistic approach to problem-solving and prepares individuals for the interdisciplinary challenges of 21st century.

Gone are the days of compartmentalized disciplines. Today's complex problems require a diverse range of perspectives and skills. STEAM education promotes collaboration and encourages students to work together across disciplines, fostering a spirit of innovation and creative problem-solving. When artists, engineers, scientists, and mathematicians collaborate, they bring their unique strengths to the table, generating dynamic solutions that draw from various domains of knowledge.

STEAM concepts are deeply ingrained in our day-to-day lives, influencing various aspects of our routines and activities. Here are some examples of how STEAM concepts play a role in our daily lives. Technology is everywhere in our lives, from smartphones to social media platforms. The principles of science, technology, engineering, and mathematics underpin the development and functioning of these devices and applications. Through coding and programming, individuals can create websites, apps, and software, incorporating artistic design elements. The seamless integration of these STEAM concepts allows us to communicate, access information, and connect with others instantly.

The transportation systems we rely on daily, such as cars, trains, and airplanes, are products of engineering and technological advancements. Engineers apply scientific principles to design efficient and safe transportation systems. Mathematics is used to calculate distances, fuel efficiency, and traffic flow. Moreover, the aesthetics of vehicle design blend engineering functionality with artistic appeal, demonstrating the influence of STEAM in creating vehicles that are both practical and visually pleasing.

STEAM concepts are evident in the architecture and design of buildings and structures. Architects combine artistic creativity with engineering principles to design aesthetically appealing and functional spaces. They use mathematics to calculate structural stability, proportions, and measurements. Engineering principles ensure the safety and durability of the structures, while artistic elements add beauty and character to our surroundings.

Engaging in do-it-yourself (DIY) projects at home often involves applying STEAM principles. Whether it's renovating a room, building furniture, or fixing household appliances, individuals rely on scientific understanding of materials, electrical engineering principles, mathematical calculations for measurements, and artistic design elements. DIY projects provide opportunities to explore STEAM concepts and develop problem-solving skills.

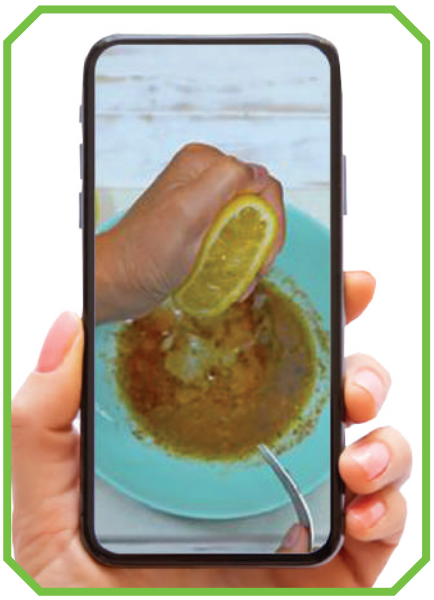
The culinary arts blend scientific knowledge and creativity. Cooking and baking involve chemical reactions, temperature control, and the understanding of flavors and textures. Chefs apply scientific principles to create innovative dishes and experiment with new recipes. Precision in measurements and timing relies on mathematical concepts. Furthermore, the presentation of food incorporates artistic elements, showcasing the fusion of science, technology, and creativity.

Gardening involves understanding scientific concepts related to plant biology, soil chemistry, and environmental conditions. Applying scientific knowledge, individuals nurture plants, monitor growth, and troubleshoot issues such as pest control and nutrient deficiencies. Gardening also connects individuals to nature and promotes environmental stewardship by fostering an understanding of ecosystems and the importance of sustainable practices.

In the realm of entertainment and media, STEAM concepts are integral. Movies, video games, and animations rely on technology, computer graphics, and digital artistry. Sound engineering combines physics principles with artistic creativity to create immersive audio experiences. Virtual reality and augmented reality technologies merge science and art, transforming the way we engage with entertainment and media.

These examples illustrate how STEAM concepts are woven into our daily lives, influencing various fields and activities. By recognizing the multidisciplinary nature of STEAM, we can appreciate its impact on innovation, problem-solving, and creative expression in everyday experiences. Therefore, by embracing STEAM, individuals are better equipped to navigate a world increasingly shaped by these interconnected disciplines.

When it comes to STEAM education, several key characters play vital roles in its success. Let's explore the main characters that make STEAM education come alive. At the heart of STEAM education are the students themselves. They are the curious, creative, and



inquisitive individuals who embark on the journey of interdisciplinary learning. Students actively engage in hands-on projects, problem-solving activities, and collaborative work that integrate science, technology, engineering, arts, and mathematics. They develop critical thinking skills, creativity, and a growth mindset, preparing themselves for the challenges and opportunities of the future.

Educators serve as guides, facilitators, and mentors in STEAM education. They foster a supportive learning environment, where students can explore, experiment, and discover. STEAM educators possess a deep understanding of multiple disciplines and employ innovative teaching strategies to integrate arts and humanities with STEM subjects. They inspire students, encourage their curiosity, and help them to develop the skills necessary to thrive in an interdisciplinary world.

Artists bring the element of creativity and aesthetics to STEAM education. They help students explore their imagination, express

their ideas, and communicate effectively through various artistic mediums. Artists inspire students to think differently, push boundaries, and infuse beauty into scientific and technological concepts. Their expertise in visual arts, music, dance, theater, and other creative disciplines enriches the STEAM learning experience, making it engaging and inspiring.

Scientists and engineers form the backbone of STEAM education. Their expertise in scientific inquiry, experimentation, and problem-solving contributes to the rigorous scientific and technical aspects of STEAM learning. They introduce students to the wonders of the natural world, cutting-edge discoveries, and the process of scientific inquiry. Engineers, on the other hand, provide practical knowledge and skills in designing and building solutions to real-world problems, integrating the principles of mathematics and engineering design into the STEAM curriculum.

Technologists play a crucial role in STEAM education by introducing students to the latest technologies and tools. They help students develop digital literacy, computational thinking, and coding skills, enabling them to navigate the rapidly evolving digital landscape. Technologists expose students to virtual reality, robotics, 3D printing, programming, and other technological advancements, fostering a deeper understanding of how technology intersects with other STEAM disciplines.

Collaborations with community partners, such as museums, research institutions, local businesses, and non-profit organizations, are an essential aspect of STEAM education. These partners provide students with opportunities to engage with professionals in various fields, participate in real-world projects, and gain exposure to different career paths. Community partners offer mentorship, internships, and resources that enhance the authenticity and relevance of STEAM learning, bridging the gap between the classroom and the wider world.

In the world of STEAM education, these characters come together to create a vibrant ecosystem of learning, where interdisciplinary thinking, creativity, and collaboration thrive. By working in harmony, they nurture the next generation of innovators, problem-solvers, and leaders who will shape our future.

Art and creativity have long been hailed as essential elements of a well-rounded education. When combined with STEM subjects, they unlock a world of possibilities. STEAM encourages individuals to think outside the box, fostering creative thinking and originality. Whether it's a painter leveraging digital tools to create immersive installations or a scientist incorporating visual storytelling to communicate research findings effectively, STEAM empowers individuals to bring their imaginative visions to life.

The world we live in is rapidly evolving, with technological advancements transforming industries and shaping our daily lives. In this age of automation and artificial intelligence, the ability to adapt and learn new skills becomes

crucial. By integrating arts and humanities into STEM education, STEAM equips individuals with the ability to think critically, solve complex problems, and embrace lifelong learning. It ensures that students are prepared for the challenges and opportunities that lie ahead, irrespective of their chosen career paths.

Cultivating Diversity and Inclusion:

Another significant advantage of STEAM lies in its potential to promote diversity and inclusion. By merging various disciplines, STEAM encourages individuals from different backgrounds and perspectives to collaborate, fostering a rich tapestry of ideas and innovation. This interdisciplinary approach helps break down barriers and invites individuals with diverse interests and talents to contribute their unique perspectives, resulting in a more inclusive and equitable society.

STEAM represents a paradigm shift in education and the workforce, enabling individuals to thrive in a rapidly evolving world. By embracing the intersection of science, technology, engineering, arts, and mathematics, we harness the power of creativity, innovation, and collaboration. From nurturing a new generation of problem-solvers to revolutionizing industries, STEAM is everywhere, providing the tools and mindset needed to address the complex challenges of today and tomorrow. Let us embrace the interdisciplinary future and unlock the boundless possibilities that STEAM offers.

STEAM education prepares individuals for the jobs of the future by providing them with a well-rounded skill set that combines technical knowledge, creative thinking, and problem-solving abilities. As industries continue to evolve and technology continues to shape our world, STEAM - educated professionals will be at the forefront of innovation, contributing to economic growth, sustainability, and societal advancements. Embracing STEAM education not only equips individuals for future job opportunities but also empowers them to make a positive impact on the world around them.

By integrating STEAM into the Sri Lankan school system, students will be equipped with the skills necessary to navigate a rapidly changing world. STEAM education fosters creativity, critical thinking, collaboration, and innovation qualities that are essential for students to thrive in the 21st century workforce and contribute to the socio-economic development of Sri Lanka.

Dr. Jayantha Wattevidanage
Chairman
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STEAM to School

Dr A.D. Asoka De Silva

What is STEAM Education?

STEAM education is a learning approach which integrates Science, Technology, Engineering, Arts, and Mathematics. Learning these five subjects together is a more holistic approach for students to understand the surrounding world. STEAM education framework embraces a practical learning model involving planning, building, testing, and designing, and STEAM focuses on encouraging students to discover deep into the subject, and students thrive on enthusiasm and deep understanding of the subject. The ultimate objective of STEAM is to advance 21st-century skills in students such as cooperation, critical thinking, problem-solving, and creativity and prepare them to find solutions to real-world challenges and future careers. By including Arts and creativity into the traditional STEM framework that focused on Science, Technology, Engineering, and Mathematics, STEAM expands its scope to uplift not only Science and Technology but also creativity and aesthetic perception. It encourages students to think out of the box, address problems through multiple perspectives and develop real-world skills.

Why STEAM Education?

Currently, almost every country in the world is working on embracing the STEAM education approach. Let's discuss the reasons for this global trend toward the STEAM approach.

- It promotes a holistic approach to education by combining Science, Technology, Engineering, Arts, and Mathematics. It encourages students to think critically, creatively, and analytically, facilitating them with richer learning experiences.
- STEAM learning approach emphasizes applying knowledge and skills practically. It demonstrates how these subjects are linked together and how they can apply to real-world problems. This is an integrative approach in preparing students for future careers.
- Via STEAM, education encourages students to explore, experiment, and discover innovative solutions and also improve skills that are required for the modern world such as communication, cooperation, analytical thinking, and critical thinking.
- Most of the highly paid and fast-growing future careers lie in the scope of STEAM. STEAM education prepares students for a wide range of career paths by providing a solid foundation of subjects. STEAM education equips students with the necessary skills that are required to succeed in the technology-based modern world.
- STEAM education facilitates creativity and innovative ideas. Encourages students to uplift out-of-the-box thinking, take risks and develop entrepreneurial skills. Instead of using traditional methodologies by polishing entrepreneurial mindset empowering students into becoming inventors, creators, and problem solvers.
- To withstand the current more competitive global market every country is trying to output a highly skilled workforce. STEAM education plays a

critical role in competing in the rapidly evolving world of technology by providing the necessary knowledge and skills.

Overall, the key importance of STEAM is to prepare students for the future, equip them with the necessary skills, and contribute to the development of a competitive society by promoting innovation.

Plans, Resources, and Teaching Methods that Facilitate STEAM

The key to nurturing STEAM education is to provide students with an active learning experience that utilizes practical applications, and interactive curricular activities that promote critical thinking and creativity. To achieve that learning environment in a classroom there must be a collection of plans, resources, and teaching techniques. Let's consider each of these plans, resources, and teaching techniques.

When considering planning, curriculum development and organization of related school programmes are important. When considering the curriculum, providing room-to-subject integration can generate opportunities for STEAM education via introducing STEAM education streams or specially including STEAM activities. It also encourage performance evaluations on curriculum based on planning and implementing STEAM education opportunities via curricular and extra curricular activities.

Providing resources such as laboratories for science & mathematics, and computer markerspaces are important providing other necessary technical tools and internet facilities are mandatory when considering resources. It's vital to follow the student-centered interactive approach when planning the teaching methods. It can make the STEAM education experience more meaningful by using constructivism-based teaching technics such as project-based learning and problem-based learning.

STEAM education for schools today

The introduction of STEAM education to schools in Sri Lanka can be considered in two stages. The first phase is to update the current curriculum. Implementing suggested group activities in such a way that the curriculum is focused and practical is vital. It's important to guide students to complete every activity creatively and successfully rather than just completing the curriculum. Providing room for group study activities is very important when achieving goals in STEAM education. Encouraging students to use their different skills and potential when doing group activities provides an opportunity to use their unique Science, technical, Engineering, art, and mathematical skills efficiently and to understand the connection between those subjects.

Organizing field visits to natural environments, workplaces, and public places also provides STEAM education experience. Field trips should be organized to cover several subjects without limiting to one subject. During these field visits, special care should be taken to create opportunities for experts to share their experiences in the working world. Also, it is more effective to engage the students in post-work such as in-depth observation of the functioning of machinery, their technology, production process, aesthetics of finished products, dealing with the market, preparation of reports, creation of models, etc. After studying community services, planning an extension to organizing and implementing such services is also a role that the school should play to expand the STEAM education experience.

Another area that educational systems around the world are focusing on for creating STEAM educational experiences is STEAM competitions and games. This strategy is more suitable for pre-school and elementary stages. There are many software and applications specially designed for this purpose. Examples include video games such as "Kerbal Space

Program", coding games such as "Code Combat", and educational computer games such as "The Oregon Trail".

These games provide engaging and interactive experiences that support STEAM learning. They can be used as supplemental resources to enhance classroom instructions or as stand-alone activities to foster independent learning.

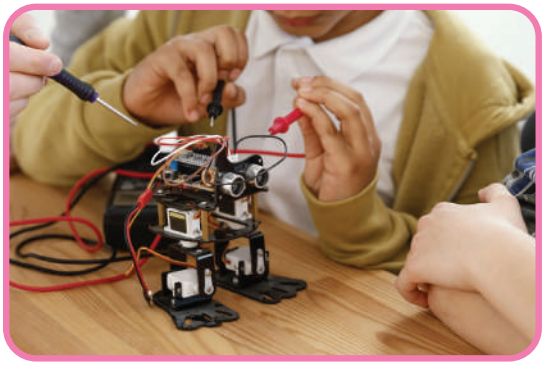
Additionally, there are many extracurricular activities that nurture students with STEAM educational experiences that can be introduced within the current school environment as well as under an educational reform. The establishment of STEAM Associations, STEAM Days, STEAM Camps, and STEAM Exhibitions are prominent among them.

It is important to pay more attention to popularize innovation associations that are already active in some schools. These programs can be expanded not only at the school level but also at divisional, regional, provincial, and national levels. The ultimate goal should be to expand the above programs to the international level.

STEAM education for future school

Education reforms play an important role as a measure to be taken at the national level to install the STEAM education approach more effectively in the Sri Lankan education system. Under that, a great role can be played through various reforms. The STEAM curriculum must be identified as a priority in future reforms. Also, introducing a module system that encourages self-study and knowledge-building will be a great help to take STEAM education to a more effective level. The

Learning Methodology	Example
Project Based Learning	Planning a sustainable city Students work in teams to design a sustainable city that addresses environmental, social, and economic aspects. They research on renewable energy sources, efficient transportation systems, waste management, and urban planning. They create a comprehensive plan, including architectural plans, financial models, and sustainability strategies, and the project culminates in a presentation of their city plans to a panel of experts.
Problem-Based Learning	The water conservation challenge Students are presented with a real-world problem of water scarcity in their community. They research the causes and consequences of water scarcity and explore potential solutions. They analyze water usage patterns and suggests conservation strategies. Develops educational campaigns to raise awareness. They present their findings and recommendations to local authorities or the community.
Phenomenon-Based Learning	Exploring climate change impacts Students investigate the phenomenon of climate change and its effects on ecosystems. They explore temperature changes, weather patterns, and biodiversity. They collect and analyze data, conduct experiments, and conduct field observations. Students collaborate to understand the causes of climate change and propose mitigation and adaptation strategies.
Blended Learning	Flipped classroom In a blended learning environment, students access online resources to watch pre-recorded video lectures or learn new subject content at home. Classroom time is then used for collaborative activities and discussions to reinforce understanding and apply knowledge. For example, students watch instructional videos on math concepts at home and then engage in problem-solving group activities in class and engage in discussions on the use of relevant concepts.



introduction of a set of core modules studied by all students and a set of elective modules for each grade will be fruitful. It is recommended that the optional modules be tailored to different areas of application of STEAM education experiences. The modules provided should provide opportunities for knowledge exploration, design, interactive learning, and presentation of discoveries in innovative ways. The proposed reforms should set the stage for more widespread implementation of constructivist learning theory-based learning methodologies in the classroom. Accordingly, project-based learning, problem-based learning, phenomenon-based learning, inquiry-based learning, and blended learning are implemented in connection with modules whenever possible. An example for each of the above is shown below.

Assessing students in STEAM education

When assessing students engaged in STEAM education, it is important to use a variety of assessment tasks that are consistent with the interdisciplinary nature of the subject. Using Rubric in those assessment tasks can help maintain consistency and transparency and provide timely feedback. Below are some assessment tasks suitable for STEAM education.

Project Portfolio: Students may maintain a portfolio showcasing their work throughout their time on a project. This may include design sketches, engineering diagrams, code copies, scientific observations, and process observations. Accordingly, students' ability to apply knowledge, demonstrate skills and communicate their understanding can be assessed.

Performance-Based Assessments: Here, students are provided with practical tasks or simulations that demonstrate their skills and knowledge in real-world contexts. For example, students can be assigned to build a working model, conduct experiments, present a scientific demonstration, or design a robot to complete a specific task. There they can assess their ability to apply concepts, solve problems and communicate their processes and results.

Collaborative Problem-Solving: Group tasks or projects can be assigned where students work together to solve complex problems. Students can be assessed considering their contribution to collaborating and communicating effectively in the team's solution.

Presentations and Exhibitions: Students may be assigned to showcase their learning and projects, prepare, and present presentations, or participate in exhibitions. Student's ability to communicate ideas, present evidence, and engage with an audience should be assessed.

Problem-Solving Scenarios: Students are presented with real-world scenarios or case studies that require them to solve interdisciplinary problems. Student's ability to identify the problem, analyze relevant information, propose solutions, and justify their arguments is assessed. A rubric that assesses critical thinking, creativity, and integration of multiple disciplines is appropriate here.

Strengthening the STEAM education approach as a whole requires the active participation of all stakeholders involved in the education process. The student is a self-motivated active learner, critical thinker, and problem solver, the teacher is a facilitator and resource person, the principal is a collaborative leader and strategic resource provider, the educational administration is the coordinator of all stakeholders, parents are resource providers, and the overall supporters. The general public should also be determined to make the current generation of students suitable for the new job opportunities of the future world and overcome global challenges by contributing to strengthening the approach.

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Integrating Aesthetic Subjects with STEM Education

Dr. Nishad Handunpathirana

In this 21st century the STEM (Science, Technology, Engineering, Mathematics) education method is successfully practiced in many developed countries. The basic foundation to introducing the STEM education method to the Sri Lankan school system also has now begun. In this country if it is called STEAM education is to include Science, Technology, Engineering, Arts and Mathematics there by accessing a deeper human development in a wide sense.

STEAM reflects an integration of the subjects including Science, Technology, Engineering, Arts and Mathematics. As used here 'Arts' represents the study of subjects related to humanities. Through this more attention (or emphasis) has been paid to the integration of the subjects of the aesthetic stream. According to the opinion of the American psychologist Roger Sperry experiencing the subjects such as Science, Mathematics, Technology and Engineering contributed to the development of the left hemisphere of the brain while the stimulating subjects such as Aesthetics, Arts and Literature make a beneficial contribution to the development of the right hemisphere. Accordingly, an integrated education method such as the STEAM method would undoubtedly be more successful and fruitful in molding a citizen with a balanced mind.

In order to achieve this, it is necessary to pay attention to building the learning-teaching process such that the subjects Science, Technology, Engineering and Mathematics are integrated with the aesthetic subjects. (If it is necessary to employ methods which will minimize the weaknesses of the current education process which has separated out these subjects into different time slots in the time table) Therefore it is necessary to investigate this depth how the teaching of aesthetic subjects can contribute or intervene in STEAM education scheme.

The aesthetic education stream in the schools of this country is built on the four columns of the basic subject areas – music, dance, drama and theatre and drawing. (Art). Of these the three subjects Music, Dance and Drama are related. These subjects are included in the subject confluences (Center) of performing arts, drawing and sculpture fall under the field of visual arts. The performing arts are considered as intangible heritage. It is possible to identify three facts that should be stimulated/activated in the education/teaching process in our schools, if we are to more effectively bring about a merger of the aesthetic stream with STEAM education. There are ;

1. To effect the understanding of some of the contents of the subjects of Science, Technology, Engineering and Mathematics it is necessary to relate them to the experiences of the subject of aesthetic or integrate with it.

2. Bring about the various concepts of the subjects Science, Technology, Engineering and Mathematics which are integrated with the contents of the aesthetic stream subjects and through this provide the related experiences.

3. Provide general or shared experiences of performing arts through practical programmes of aesthetics, exhibitions and competitions which are introduced as extra-curricular activities and also as activities which are conducted in parallel with the or regular curricular teaching of the subjects.

Now time is ripe for the subject experts in the field of education to focus their attention and get involved in dialogues in order to carry out analytical studies and conduct subject related research on specific aesthetic subjects as relevant to the three (1 – 3) activities stated above.

The basic aim of this article is to briefly investigate (as an introductory measure) selecting music on the theme from among the subjects of aesthetic studies.

As an example let us consider the lessons on sound which is part of the contents of the subject Science. In order to get practical experience related to the basic concepts of sound using the musical instruments and obtaining the assistance of the music teacher should be sought. If the education process is developed through this, then space is created for the advent of STEAM education. For example as relevant to the lesson on sound :

I. How is sound produced?

II. How do we hear sound?

III. How does sound travel?

IV. What are the media through which sound travel?

V. What factors influence the variety of sounds produces (Such as amplitude, pitch, timbre)?

When discussing the answers to the above questions if it is possible to present lessons in Science citing examples and in a more appealing and a practical manner, through singing, sound modulation and playing musical instruments as relevant to the subject of Music. In such instances it is possible to introduce examples by playing musical instruments such as string instruments, percussion instruments (Drums covered with animal skins) solid instruments (metal instruments such as the 'Thalampota') and wind instruments (Instruments such as the flute producing sound with the help of wind)

For example it is possible to show how the string instruments produce variation in sound by varying the nature of the strings:

I. By increasing or decreasing the length of the string

II. By increasing or decreasing the thickness of the string

III. By increasing or decreasing the tension of the string

IV. By changing the nature of the material of the string example: Steel, Brass, copper, intestine of animals used as string material

V. By altering the nature of the string : around some strings another fine string is wound in a spiral manner as in the strings producing the low sounds in the guitar

VI. The way the string is attached or fixed – a goat skin is spread over an area with a hole and on it a bridge is placed and the string run across the bridge (*Israge*, *Dilruba*, *Sarangi* and *Sarodh*) In the case of the violin and the Sitar the bridge is fixed to a wooden covering and the strings run across the bridge

VII. The variation in the vibration of the sound is dependent on the number of strings layed in the instrument in some musical

instruments for the some note either two or many strings are placed close to each other and they are strung to produce the sound. For example, in the mandoline four groups of two strings each are layed. In the instrument santhar a series of strings each group having three strings are fired. The series of strings are tuned to the same note. The sound is produced by playing the three strings of each of the series simultaneously. In some instruments the variation in the spreading quality of the sound is due to the vibration of the sympathetic strings (In instruments such as the Sitar, Israj, Sarangi, Surodh and Dilrubah the sympathetic strings which are tuned to be the same as the note played, vibrate

VIII. The variation of the sound is what brought about by the nature of the "helper" that in employed to produce the sound in the string (using a bow, fingertips or finger nails are employed.

IX. Variation of the sound is brought about in the same note or series of notes, depending on the friction or pressure exerted on the string (stroke) to produce the sound (modulation)

X. Producing the sound by playing the string just once and allowing the sound to spread. The nature of the vibration imposes the 'feeling' of the sound. In music these situations are identified as minor, major, diminishing minor and so on. The sound produced by playing a scale just once in instruments such as the Sarodh and Sitar and allowing the sound to gradually decrease and diffuse, may be cited as an example.

XI. In certain musical instruments the position in the string that comes into confact with the bridge is specifically indicated, so that the musical drone is made possible. In the jargon of music this is called "Javari" e.g. In the Sitar and Thampura. The bridge in the sitar is slightly curved. In the Thampura the position where the string in placed on the bridge is indicated by fieing a piece thread the resulting vibration of the sound because this is specific.

XII. For the production of scales, various methods of music adopters are employed (Gamak, Meenol, Ghasheef, Kan, Moorki, Aandelen) for these the strings are played using various methods. Due to the Technical devices used to generate the sound and the specific vibrations of the sound and its expansion, the vibrational changes in the sound are also specific.

The 12 above mentioned instances indicate only a few of the ways by which a science session on sound may be practically integrated with a lesson in music. The examples sited above are with respect to the playing of string instruments. However if is also possible to discuss and explain across a wider field to explain in many ways the nature of sound by using percussion, wind and solid instruments, and by voice modulation many such lessons can be identified in the science syllabus. Teachers should carry out further studies along these lines.

The above discussion explored the use of suitable examples on how music can be used to study the subject of Science in one of the lessons. Similarly to make students understand certain subject areas singing of songs have been employed as a learning technique in this country in the past . There are instances where such methods have been used in the school system also. As an example we can show how singing (songs) has been used to learn the multiplication table connected with the subject of Arithmetic. Given below is how a song/verse comes in a book of songs produced on multiplication tables and in a CD. The title of the book is

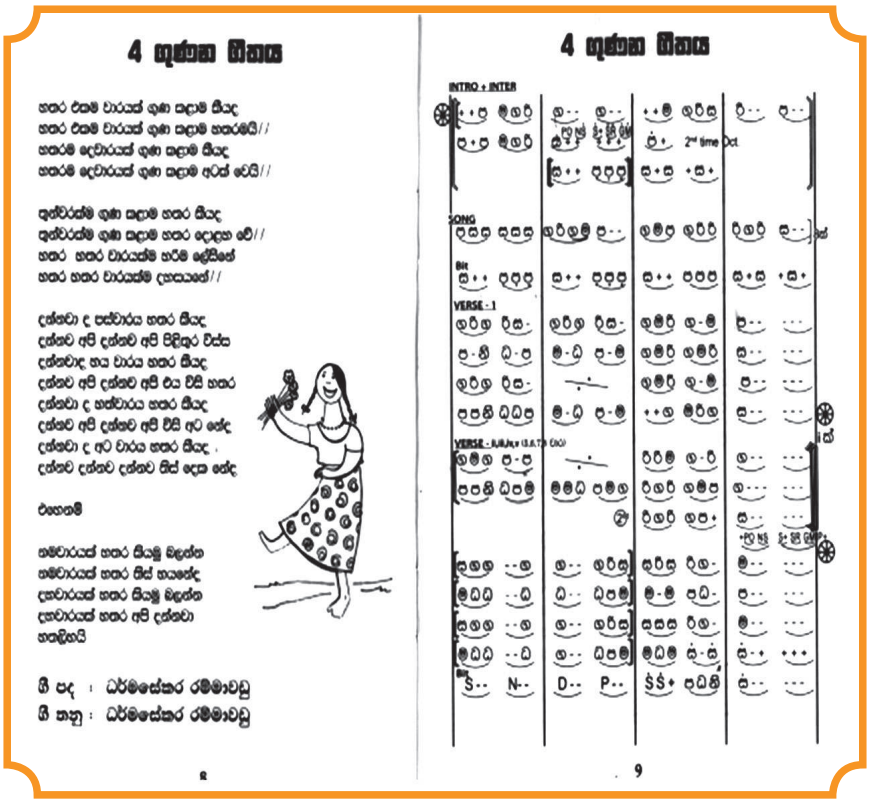

Figure1: "චක්කරේ ගුණන ගී" Song to learn the multiplication tables

"චක්කරේ ගුණන ගී" (Song to learn the multiplication tables)

This shows an instance where the subject of music has been integrated with an Arithmetic lesson. There are instances where drama and theatre are used as subjects of aesthetic that have been successfully used and integrated with lessons in mathematics. The teacher Amitha Rabbidigala who was a Teacher in the school Kingswood in Kandy has written many dramas with musical concepts as the theme. She produced mant stage plays using the publication of students of this school. She also produced some dramas (over a period of time) through the National Rupavahini channel for the programme titled "නිම් වළලු" (Nim Walalu) and these dramas were used to clarify (explain) certain mathematical concepts. These productions can be cited as examples which provide more successful learning opportunities regarding mathematical concepts through informal learning methods.

"Providing experience by surfacing the concepts in science, Technology, Engineering and Mathematics" is the second matter/issue raised earlier. Therefore, it is especially important to identify a few such experiences in the subject of Music.

The syllabus of the music subject as in our system of education encompasses a wide range. It includes Raghadari music, Folk music, simple creative music, computer music and indicators of the theoretical and practical aspects of the content under each of the subjects and lessons it in possible to bring out the basis and analysis related to the subjects of Science, Technology, Engineering and Mathematics. This article does not intend to discuss all these areas, but it intends to initiate a basic approach to build up a teaching method connecting all these subjects.

Music is a practical subject. Through music it is expected to give experiences related to transfer of culture in creativity and performing arts and thereby assist in the development of intelligence and knowledge. In order to suitably align / relate the learning – teaching processes of the subject music it is necessary to separate the concepts of the subject content. The content has to be identified as concert concepts and abstract concepts. It is possible to teach the basics, theories and principles which are included in the concrete concepts. On the other hand, the abstract concepts such as creativity and emotional expressions which originate in the mind have to be learned (as it is difficult to teach these concepts)

In order to build up the subject of music the foundation is layed primarily on Science, Technology and Mathematics according to the concrete concepts of Music who reflects the Scientific, Technological and Mathematical contents. The scientist who studies the content by adhering to this foundation will present a creation or an expression which reflects the results of brain storming. In so doing he will match the content and substitute the content as deem fit by him. It can be composed with subject of

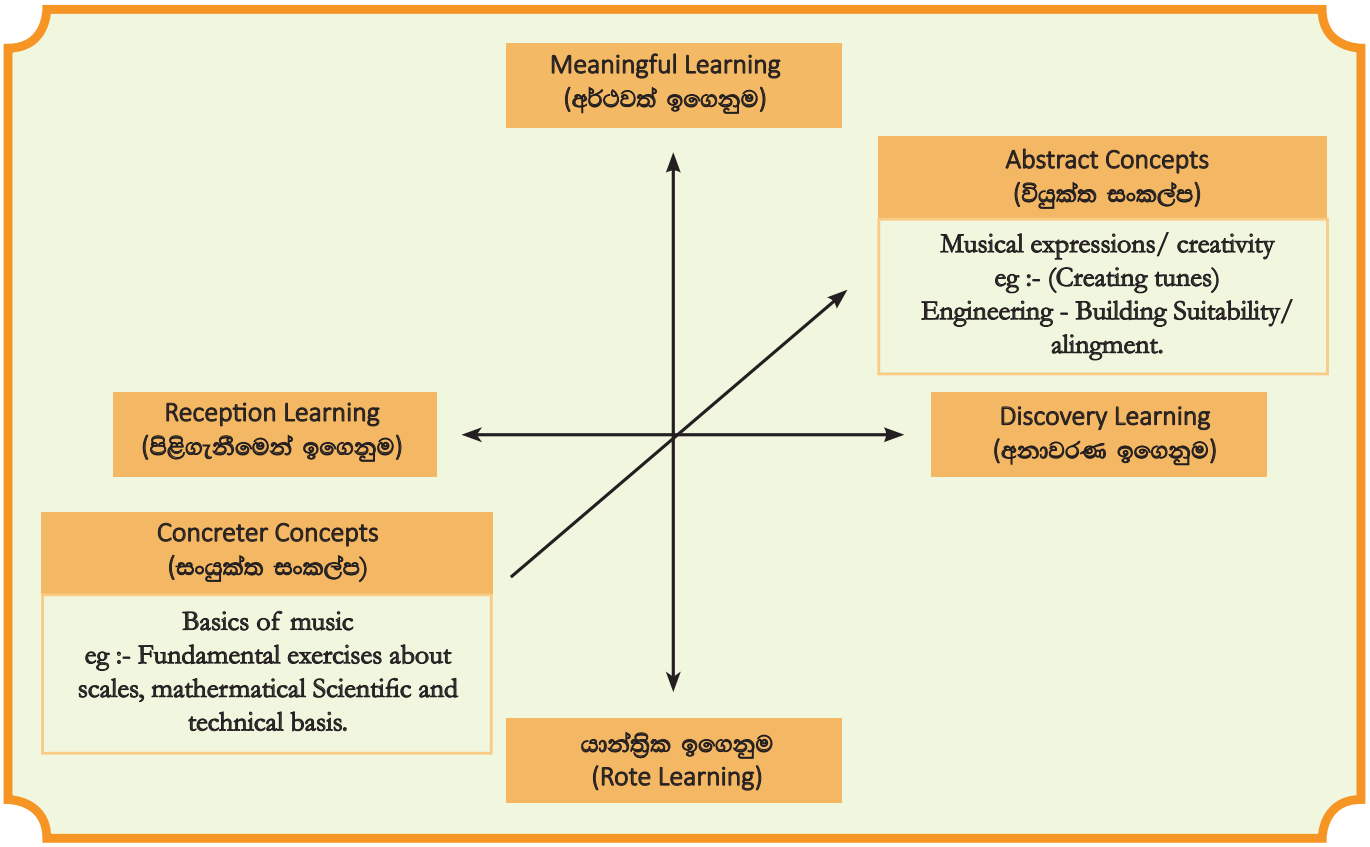

Figure 2: Meaningful Learning

Engineering. Here there is the presentation as through performing arts or there could be the build up of an abstract concept through the expression. The following diagram may impart a better understanding about this.

The above figure can be further explained by giving a simple example relating to exercises on "ස්වර" (scales) (For concrete concepts)

Science ⟶ In order to correctly produce the sounds for scales (ස්වර) relate it to the vibrational frequency (eg: In සඩ්ජ the vibrational frequency for (ස) is 256 Hertz.

Mathematics ⟶ Include exercises in which the scales are played rhythmically according to a definite pattern.

ස රි ග - / රි ග ම - / ග ම ප - following a pattern like this
1 2 3 - / 2 3 4 - / 3 4 5 -

ස රි, ස රි ග (1 2 / 1 2 3) රි ග, රි ග ම (1 2 1 2 3) expressing rhythmically like this

Technology ⟶ Voice modulation, correct pronunciation, if it is a musical instrument- the posture, tuning and the fingering exercises can be given as simple examples.

Engineering ⟶ The creation of a tune in a song (abstract concept) based on correct comprehension of scales and skill, using imagination and creative thinking, may be given as examples.

It is possible to realize that instances of integration with STEAM is possible not only with the subjects of music but also with the areas such as dance drama and other fields of aesthetics. For this it is necessary to study this in depth for the respective subjects.

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Additional Secretary (Quality Development, Education)
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Writing from 2025

Mr. Vipula Kulathunga

I took my eyes away from the telescope in distant space with the thought of how much more to discover. We became the first Sri Lankan team on our way to Mars, escaping earth's gravity and becoming space citizens. Ravana Abhiman's spacewalk, which was launched for the first time from Sri Lanka to explore the Mars with humans, gives me a sense of pride.

"Dad, did you go to this place when you were a kid?" asked my daughter, Viswatharani, who was still 14 years old. Some close photographs of Ganimid appeared on my screen. My special interest was made towards the Ganymede, due to the curiosity arose by reading the science fictions during my childhood than Ganymede occupied the place of largest of Jupiter's sub planets, was more likely to be the largest moon in the solar system. I held my eyes for a while and gave a short answer, "No."

"Dad, look, I found some information about Sri Lanka during your childhood period," she said, pointing to a lot of information she found on the internet due to curiosity aroused by the last few minutes.

"Come on! What's this? " She showed me a picture of people standing in line infront of a store.

My memories went back to my childhood.

"Dad, were we a poor country in those days?" she asked me without taking her eyes off the computer screen.

"Look at the way students went to school in those days, a big book bag. "To quench her curiosity, she searches further on the internet, and I make more focus on ganymede's photographs. I imagine that one day it would be possible to go to the same sub planetary planet with a magnetic field located in the solar system. I was really interested on the predictions regarding the emergence of life in one day since the planet is rich with oxygen and water.

"Really, how we won the space being in a country like that?" she asked, holding me. I took a deep breath and hugged her, realizing that the right time had come to talk.

"Yes, my daughter now I also feel that it was like a nightmare."

"In those days, it was supposed to be an achievements in countries like America, Russia and China. It's still amazing to think about it. "

I felt like she was sitting next to me to hear this amazing story. It was a special thing that I believed that the changes in education at that time were the sound foundation for the changes in our country. That's why I wanted to tell her about the education we experienced and how it changed.

"I'll tell you about our early education at the time. Yes, in those days we had a big bag full of books. When I went to school, it was too heavy to break my back. I couldn't carry the tab like I did now. The lessons on the tab now were in molded books in those days. There was a separate book for each subject. One book had all the necessary knowledge related to one subject. Therefore, we have to study the notes given by the teachers along with what's in those books. Because the exams are made up of what's in the text books, unlike the exams now you are experiencing. When all the lessons are completed, you'll get a two or three-hour question paper. Your score will depend on your memory capacity.

If you have a high memory capacity you can score a lot. In those days, there were kids who scored the highest marks. Your uncle also failed the exam because he didn't study hard. But he is an expert in breaking things down and rebuilding them. There was no any methos or scale to measure that skill." I think there was a question mark on my face.

"Does that mean dad that you studied and passed the exam?" she asked, mocking. I was a little embarrassed because I had a feeling that I had learn by heart and passed the exam.

"No, I'm just like my brother. But..." I was quiet for a while.

"Why did you say that?" she asked, breaking her silence.

"Yes. Fortunately, our education system changed at that time. By the time it arrived, your uncle was about to finish the exam. So it was not very useful for him. I was a kid like you at the time. I will tell you the difference in the education system as I understand it, as a part of the groups who directly affected by educational reforms.

I felt that the education reforms had made a significant influence on converting our country in to a developed nation. I gave the introduction to a long answer.

"Instead of those big books, we got a few new books. They're called modules."

"Dad, are they like our modules?" she asked quickly.

"Oh, no. Your module is in the tab. And now your modules are very advanced, but the modules we got at that time were very different from that mold book. The weight of the bag was reduced because the number of pages was low and the modules taken one time did not have to be taken to the other. In fact, we felt good about it. "

"Only the weight of the bag was reduced by the module?" She asked.

"No, a lot of things have happened. But it felt like a big deal at the time."

"The significant difference was that these modules had one-on-one activities, projects, challenges instead of what they used to memorize."

"The practice of teacher centered learning method has decreased as usual. They inspired us to look for information, to work together, to find new solutions. At first it was a problem. Since we have practiced to write down the usual teacher's note, study it and write answers to the exam. Our parents also protested against it for the same old mold book. The teachers weren't interested either. Some teachers said they weren't trained to use modules properly. Teachers were also worried that it will badly affect for the education of the students.

"We were afraid about the content of the exam paper.

So I searched for everything and studied. Since we do not have a proper study note.

"So what were there in the exam paper?" she asked at once.

"It was a very strange thing. Only a few questions had to be answered in memory as usual for the exam. All the rest of the questions have to be answered by thinking and analyzing the facts. So I answered the questions very easily. Those who were used to copy the answers from others never copied at this time. They seemed to be writing well. One day at the end of the exam, I asked one of my friends what he had written so much. He said that it was very easy since we have to write about the project that we have done.

We have to face a really different situation after marks were released.

One of my friends who scored lower marks previously, was able to score the highest marks.

Many of the students who scored higher marks in previous exams were failed to score much in this time. The best part is that a friend who didn't face for the exam also got a good score. Then we found out that the work we did in class and the projects we have completed were given marks and they were added to the final mark. The continuous marks of the activities we have done were considered for our final grade. All were very satisfied about their exam results. I shared my childhood experiences with her.

Eventhough there were many arguments regarding the marks of the students such as teachers have favourations for some students. With the experience not only the students but also the teachers understood that the marks obtained through the development of these skills is better than scoring by memorizing."

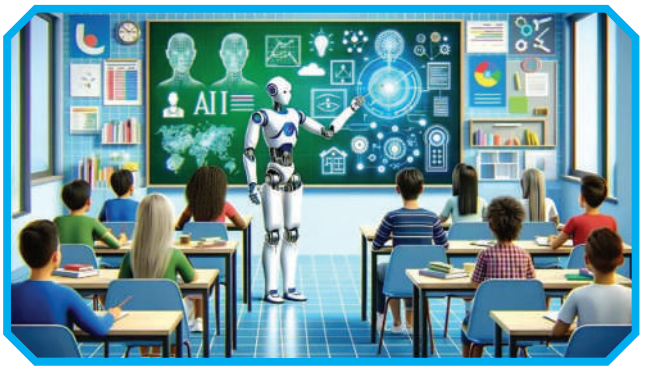
With the time teachers trained well and obtained many experiences on teaching modules. Teachers were very happy to teach the modules. The beaten friends who were scolded by the teacher for not listening to the lesson were became the most active students. Therefore, all the students became very obedient and active students. That cause for the important changes in the education system. That lay the foundation to develop our country with the capacity to explore the "*Mars*".

"Do you know that in those days I heard the word 21st century skill about a hundred times a day? Each and every programme was aimed to discuss about it. Innovation and creativity, logical thinking, communication skills were identified as essential skills for the future. Not only that, the fourth Industrial Revolution, the Technological Revolution, and STEM education were also heard all the time. In those days, around 2024 it was supposed that the current jobs will disappear soon and new jobs will be emerged. Innovation and creativity are the essential features to secure the future job market.

Dad, is that what really happened?" she asked.

"Yeah, during that period driving used to be a major job. Now it's hard to find someone who works as a driver. At that time, an accountant was a high-paying job. Where is it now... That's the job of an accountant replaced with AI (Artificial Intelligent) technology as a financial management. In those days there was a job called cashier, now there is no such job. Many of the jobs have disappeared or otherwise, they've been acquired with AI technology."

"A lot of our school teachers are robots, aren't they?" she asked.



And also your favorite announcer is also a robot. Our discussion seems to be more attractive and enthusiastic. In fact, the reforms in education at that time led to changes towards development of the country. Until then, the method of memorizing and writing answers to the questions asked in a two or three-hour examination was different from the educational reforms. Especially in the teaching method, inquiry learning, problem-based learning, project-based learning were introduced. The motivation for self-learning and the learning process based on pure experience made all these changes attractive to children. The role of the teacher as a facilitator, a coach, and a guider were the most striking change. With the confidence of students and parents in the assessments made at the school level, more such educational reforms began to be established.

The invasion by private class businesses was also influenced gradually. Due to the low impact of the national level examination on the final results of the student, the need to go to private classes was reduced by paying a large amount of money to the students.

We have to attend many of the tuitions after the schools those old days. Parents had to allocate a significant proportion of the salary for the tuition classes and they merely fulfilled their food requirement also.

"Attending tuitions after the schools "was an unfamiliar word to her.

"You don't know about the situation of those classes. About 20 years ago, the last private class was closed. What happened in class was to pay for what I learned in school and study again. But some of the modules in education reform couldn't be done in tuition. On the other hand, the school teacher gave the highest marks to the children, so it was necessary for the children to go to school.

Portion of the marks of the were allocated from the continous marks given by the school. Now that the coaching camp is the replacement for tuitions. She could not have enough experience to think about going to private classes because by now the tuition system had been rejected by the society along with the education system.

Dad, there's a STEM question paper in the exam. She recalled at once proving that the examination system had changed completely. She was able to face the exam at any time based on her choice from anywhere she wanted. Another feature of this was the opportunity to reject questions if she wanted to and ask for another question instead. In fact, there was no separate paper in mathematics and science at this time, so it was also a challenge for her to explain the changes in the examination system. This system originated with the educational reforms that took place at that time. At that time, the attempt was to create the examination paper in a semi-automatic system with the help of artificial intelligence can be named as the beginning of new revolution. At that time, the question papers were made using the question bank, which led to the building of trust in the examination.

Note

Education reforms should be introduced with the right vision to achieve sustainable development. All the basic approaches required for this are included in the new education reforms. The traditional curriculum and the lessons based on it will no longer be able to prepare the child for the challenges of a different world. The future labour market can be conquered only by directing the present child to the innovative revolution that takes place during the technological revolution. The future labor market can be conquered only through proper orientation of children. Stem/STEM education approaches required for this have been incorporated into the new reforms. It is necessary to change the curriculum, learning, teaching methods and examination system with the aim of this technological revolution. Changes have to be made in

the curriculum so that the child can build self-learning. For this purpose, the introduction of innovative learning experiences such as inquiry-based learning, project-based learning, problem-based learning, etc., are essential which are used whenever possible,are strong features of the new educational reforms.
As well as reducing the weight of the book bag through modules, new learning teaching methods are inspired through its content. The teacher is motivated to think in a different dimension towards teaching, and the teacher's work will vary from teaching to facilitator of learning. Continuous teacher development projects have to be implemented for this purpose. Through this, it should be expected that the teacher should be given the capacity to provide the necessary facilities to build the learning skills of the students.

It can be observed that the core of the proposed curriculum proposal is changes in the methods by which the subject is taken to the child rather than changing the content of the subject. In the proposed reforms, the priority has been given to the school-based evaluation of the examination system is a very important step. Evaluation is compounded through the learning-teaching process and by the compressed assessment that takes place at the end of it. Even if the national level examinations continue, the proposal to conduct it in a semi-automated system with a question bank will control the quality of examinations and build credibility in the society.

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Additional Director of Education
(Science Branch)
Ministry of Education
Battaramulla

Winners of the NSF School Science Competitions

Ms. Apeksha Herath

The National Science Foundation annually conducts science popularization programmes to school community to develop their skills, creativity and guide them to achieve their futureendeavors. The objective of NSF is to lay a sound foundation to create younger generation equipped with skills and sound attitudes which can contribute towards the economic development of Sri Lanka Accordingly following competitions were conducted during the year 2023 targeting all the age categories of the students. Further the contribution of teachers towards popularization of science is felicitated by the special award "NSF Teachers Award for Popularization of Science".

1) Kid Naturalist programme – Students from grade 1-6

2) School Science Competition – Students from grade 6-11

3) Science Research Project Competition – Students from grade 9-12

4) Science Society Star Ratings Competition

5) NSF Teachers Award for Popularization of Science

1) Kid Naturalist programme

The Kid Naturalist Programme (KNP) conduct by the NSF Science Communication and Outreach Division (SCOD) jointly with the Primary Section and Science Branch of the Ministry of Education (MoE) since 2020 aimed at students of grades from 1-6. The main objective of the programme is to nurture students to observe the nature that they live in following scientific methodologies thereby to ignite interest in learning science and create nature loving future generation.

The students who participate the progrmme are expected to prepare a nature journal based on the observations made by them in a period of 6-weeks according to the guidelines given by the NSF. The submitted nature journals were evaluated by a panel of evaluators appointed by the BoM. Accordingly, 1,506 applications were received for the programme in 2023 and 369 students have submitted the fully completed nature journals after completion of the 6-week observation period. The table 01 includes the best performers of the competition.

Figure 01 : Evaluation of the Kid Naturalist Journals

Table 01: Best performers of the programme

Category: Grade 1		
	Name of the winner	**School**
01	Muralitharan Akaran	St. John Bosco's Vidyalayam, Jaffna
02	W. Shanuki Shehansa	MR/Kudagalahena K.V.
03	Kavini Nihinsa Menon	Mahamaya Girls' College, Kandy
04	R. Rishika	J/ Holy Family Convent, Jaffna
05	Imalsha Mihisara	MR/Elamaldeniya K.V.
06	S. Kavinaya	J/ Holy Family Convent, Jaffna
07	R. Dironi	J/ Holy Family Convent, Jaffna
08	S.M. Tharushi Lakshani	R/Eththota Vidyalaya, Eththota, Gallella, Raththota
09	S. Sujalini	J/ Holy Family Convent, Jaffna
10	A.S. Marita	J/ Holy Family Convent, Jaffna

Category: Grade 2		
	Name of the winner	**School**
01	Nethya Palliyage	Girls' High School, Kandy
02	Sakila Gesara Dunukepotha	St. Anthonys Boys College
03	M.G. Suwahas Dewshan	MR/Diyadawa K.V.
04	Wageesha prabashwara bandara	St/sylvester's College -Kandy
05	J. Kasvini	J/ Holy Family Convent Jaffna
06	J.V.G. Thinuli Sehansa	MR/Rambukana Kodikaragoda K.V.
07	Methya Palliyage	K/Girls' High School, Kandy
08	D.G. Esandi Dahamsa	MR/Rambukana Kodikaragoda K.V.
09	T.M. Tasheni Nethusari	M/R Siyambalagoda West Primary School
10	T. Najanitha	J/ Holy Family Convent, Jaffna

Category: Grade 3		
	Name of the winner	**School**
01	H.B. Indeepa Geenuka.Hitibandara	CP/KOT/Delta Gamunupura M.V.
02	W.M. Denith Minruka Weerasinghe	Thurstan College, Colombo 07
03	Thesadi Naveethma Deshapriya	K/ Seethadevi B.M.V.
04	Sadiw Kithnuka.Vithanage	Thurstan College, Colombo 07
05	R. Sanjana	J/ Holy Family Convent, Jaffna

06	K.O.G. Jayami Malithya	MR/ Rambukana Kodikarahoda Primary Vidyalaya
07	H.B. Chandeepa Gethma Hitibandara	CP/KOT/Delta Gamunupura M.V.
08	N.H.H. Chamathkara Roosarani	CP/ Hangu Mathurata Central College
09	R.K.Thisum Thejan Nawarathna	CP/KOT/Delta Gamunupura M.V
10	G. Praharsha Kaushan Fonseka	Kingswood College, Kandy
10	D.E. Naduli Tamaya	MR/ Rambukana Kodikaragoda K.V

Category: Grade 4		
	Name of the winner	**School**
01	V.A. Themiya Ranumitha Samarawickrama	Kandy International School, Kandy
02	K. Rahen Seneth Perera	Thurstan College, Colombo 07
03	K. Swarnie Krishmina	Highlands National College, Hatton
04	A.V. Osandi Devduni	M/Morawaka Primary School
05	Shanthakumar Jayashwini	K/Girls' High School, Kandy
06	W.G. Sathsilu Wehara	CP/KOT/Delta Gamunupura M.V.
07	P.G. Iseli Sarya Gallage	Sangamiththa Balika Collage, Galle
08	T. Nethum Mihisara Ranasinghe	Thurstan College, Colombo 07
09	Thedasi Nadulya Kalupahana	G/ Sanghamiththa Balika Vidyalaya
10	Okitha Thanujitha Vidana Gamage	Dharmaraja College, Kandy
10	Ransilu Kaveeshwara Vanigasekara	MR/ Thalapekumbura Primary Vidyalaya

Category: Grade 5		
	Name of the winner	**School**
01	D.A. Chathura Deshanjana Dharmarathne	CP/KOT/Delta Gamunupura M.V.
02	H.R.L. Sanuka Dewsithu	MR/ Deniyaya Madya Vidyalaya
03	L.Tyon Abhishka Perera	WP /Kalaniya Sobitha Vidyalaya
04	W.M. Sanuthi Ashvini Weerasekara	Vision International School Kandy
05	Yashodhara Damsaree Wikramarathna Siriwardhana	St. Joseph's Balika Maha Vidyalaya -Kegalle
06	Senula Insitha Vithanage	Thurstan College, Colombo 07
07	M.G.B.Y.C. Bandara	K/Mahanama Collage , Kandy
08	P.G. Sathusha Nimnada	CP/KOT/Delta Gamunupura M.V.
09	Dulithi Nethumsa Rodrigo	Sujatha Vidyalaya, Matara
10	B.A. Sanudika Sandasan Bandara	R/Kandangoda Primary College

Category: Grade 6		
	Name of the winner	**School**
01	T.G. Indumini Methma	MR/Kirilipana Kanitu Viduhala
02	M.I.M. Aathif	K/Ranabima Royal College
03	D.K. Basitha Thimath Rathnayake	K/Ranabima Royal College
04	J.G. Ashen Nethsara	MR/Kirilipana Kanitu Viduhala
05	W.K.J. Sithumi Seya	MR/Kirilipana Kanitu Viduhala
06	R.K.G.I. Udesh Bandara	K/Ranabima Royal College
07	D.L. Kemitha Suhas Liyanage	K/Ranabima Royal College
08	Mayuran Ajairaav	J/Thavady Hindu Tamil Mixed School
09	Kanishka Balakumar	V/Nelukkulam Kalaimahal M.V.
10	Aranya Ganeshatheva	J/Jaffna Hindu Ladies College

2) School Science Competitions

School science competitions are annually conducted by SCOD to popularize science among the school community. Accordingly, seven competitions under the theme "STEAM Education for a Better Future" were conducted in 2023.

The list of competitions is listed as follows.

1. Essay competition
2. Short science stories (fiction)
3. Digital storytelling
4. Song competition
5. Viridu competition
6. Role play competition
7. Poster competition

First round of the competitions, song, viridu and role play were conducted through recorded submissions and final round was conducted in person with performance on stage. Poster competition was conducted at the poster exhibition held at the National Science day programme. Table 02 indicates the winners of the competitions.

Table 02: Winners of the competitions

Essay Competition			
No.	**Name of the Student**	**School**	**Place**
Sinhala medium			
1	D.P.K.G. Tharushi Deumini Dasanayaka	CP/Denu/ Handessa Maha Vidyalaya, Daulagala, Peradeniya	1st
2	Nipun Dhananjaya Premarathna	Dharmaraja College, Kandy	2nd
3	W.G. Senugi Lehansa	Delta Gemunupura Maha Vidyalaya, Pussallawa	3rd
English medium			
1	Mohamed Nowzad Beena Dhaneen	KM/ Mahmud Ladies College (National School), Kalmunai	1st
2	Aaysha Mohideen	BADI-Udin Mahamud Girl's College, Kandy	2nd
3	Athiyya Jezee	BT/ St. Cecilla's Girls' College, Batticaloa	3rd
4	M.S. Shafa	British International College, Polgahawela	3rd

Tamil medium			
1	Paraniha Selvendradas	J/ Skandavarodaya College, Jaffna	1st
2	Thevasihamani Kasanthanan	Tk/ Sri Ramakrishna College, Akkaraipattu	2nd
3	S. Logalakshan	Tk/ Sri Ramakrishna College, Akkaraipattu	3rd

Short Science Stories (Fiction) Selected the best 05 Short Science Stories			
No	**Name of the Student**	**School**	**Place**
1	H.W.M. Randinee Vandanu Wijayasinghe	Mahamaya Girls' College, Kandy	Among best 5
2	Rubiga Arunthavam	J/ Vembadi Girls' High School	Among best 5
3	R.M. Charani Sipsandee	Jinaraja Girls' College, Gampola	Among best 5
4	Anthony Rupasinghe	Matale International School	Among best 5
5	Binal Yesandu Ekanayake	Matale International School	Among best 5

Digital Story Telling			
No	**Name of the Student**	**School**	**Place**
1	Yaneth Ranabahu	Thurstan College	1st Place
2	Nethuni Himanga Gamage	St. Joseph Balika Maha Vidyalaya, Gampola	Appreciation
3	Thewmali Piyadasa	Sirimavo Bandaranaike Vidyalaya	Commendation

Song Competition			
No	**Name of the student/ teacher**	**School**	**Place**
1	H.A. Deep Anchitha Ms A. Abayasiriwardena (Lyrics Writer)	CO/ Rajasinghe Maha Vidyalaya, Colombo 9	1st
2	Mansoor Fathima Hasna Haroon Fathima Hishma Samsudeen Arashad Shams Aariff (Lyrics Writer)	KM/AK/ Akkaraipattu Muslim Central College, Akkaraipattu	2nd
3	M.M.D. Eina Saawangi I.M. Washitha Harshana Mrs. Dhammika Chandralatha (Lyrics Writer)	Harischandra College, Negombo	2nd
4	P.D. Duleema Indeewaree L.W.P. Thisari Sandasiluni Mrs M.S.K. Marasinghe (Lyrics Writer)	Royal Central College, Polonnaruwa.	3rd

Viridu Competition			
No	**Names of the student/ teacher**	**School of the Student**	**Place**
1	Atheek Ahamad Mr A.L. Ansar (Lyrics Writer)	Maccan Markar National School, Eravur, Batticaloa	1st
2	Heshan Athapaththu Hirushan Wijesinghe Heshan Athapaththu Hirushan Wijesinghe (Lyrics Writers)	Thoranakada Dharmaraja Vidyalaya, Eheliyagoda	2nd
3	Hashini Sansala Dinuka Dilshan Vidana Pathirana Hashini Sansala (Lyrics Writer)	Alapaladeniya National School	3rd
4	Duleema Indeewari Thisani Sandasiluni Mrs. K.A. Thamara Priyadarshani (Lyrics Writer)	Royal College, Polonnaruwa	3rd

Role Play Competition			
No	**Name of The Student**	**School of The Student**	**Place**
1	M.P. Praharshana Undugodage	Royal Central College, Polonnaruwa	1st
2	K.A. Nadin Thathsara	Thurstan College, Colombo 07	2nd
3	Y.G. Bindya Induvari Wijesinghe	St. Joseph Balika Maha Vidyalaya, Gampola	3rd

Poster Competition			
No	**Name of The Student**	**School of The Student**	**Place**
Grade 13			
1	A.G.W. Yasami Thenuwara	Royal Central College, Polonnaruwa	1st
2	S.G.W.D. Induwara	Royal Central College, Polonnaruwa	2nd
3	M. Sheba Simirna	WP/ C/ St. Annes Girls' M.V., Colombo 13	3rd
Grade 12			
1	Tharusha Shehan Amarathunga	Royal Central College, Polonnaruwa	1st
2	S.S. Sasmitha Weerasundara	Thurstan College, Colombo 07	2nd
3	A. Chathushki Nayanathara Dissanayaka	KG/St. Joseph's Balika M.V., Kegalle	3rd
Grade 11			
1	D.G. Upeksha Indeewari Abesinghe	Royal Central College, Polonnaruwa	1st
2	G.P.G.M. Kalhara	Thoranakada Dharmaraja Vidyalaya	2nd

3	U.S. Poornima	Royal Central College, Polonnaruwa	3rd
4	U.G. Chathumini Kaushalya	Royal Central College, Polonnaruwa	3rd
Grade 10			
1	K.D.N. Sanvidu	Royal Central College, Polonnaruwa	1st
2	A.G. Nethmina Thejan	Royal Central College, Polonnaruwa	2nd
3	W.H.M. Chameesha Avindi	CP/ HG/ Mathurata M.V	3rd
Grade 09			
1	Hasith Sasmitha De Silva	Thurstan College, Colombo 07	1st
2	D.M.M. Hashara Dissanayeke	Royal Central College, Polonnaruwa	2nd
3	D.M.P. Wathsala Dissanayeke	Royal Central College, Polonnaruwa	3rd
4	U. Harish	C/ St Anthony's Boys'M.V., Colombo	3rd
Grade 8			
1	B. Savishka	St. Annes Girl's M.V.	1st
2	R.M Raya Raihan	Mercy Education Institute	2nd
3	M.R.F. Riffath Rasha	School of Excellence	3rd
Grade 7			
1	M. Jinulakshaya	Tk/Sri Ramakrishna College, Akkaraipattu	1st
2	S. Thaboorshaan	Tk/Sri Ramakrishna College, Akkaraipattu	2nd
3	K. Sharmithan	Tk/Sri Ramakrishna College, Akkaraipattu	3rd
Grade 6			
1	R. Kiruthigan	Tk/Sri Ramakrishna College, Akkaraipattu	1st
2	P. Kiriththika	Tk/Sri Ramakrishna College, Akkaraipattu	2nd
3	S. Sujasthikan	Tk/Sri Ramakrishna College, Akkaraipattu	3rd

Figure 02 : Poster Competition

Figure 03 : Role Play Competition

Figure 04 : Song Competition

Figure 05 : Viridu Competition

3) Winners of the of the NSF Award for Teachers in Promoting Science 2024

The NSF felicitates the best performed Science Teachers and Science Societies to give recognition for their contribution towards popularization of science and promoting science education among school community to popularize science among the school community. Further, this also become a motivation to get their fullest engagement to promote science education beyond school curriculum. These awards include one Lifetime award (01), Commendation awards (max 02) and Appreciation awards.

Table 03: Details of the Winners

	Award	Name of the teacher	Name of the school
1	Teachers' Award	Ms N.D.C. Sagarika Gunathilake	CP/K Ranabima Royal College
2	Commendation	Ms S.I.W. Samaranayake	Royal College Polonnaruwa
3	Appriciation	Ms Chamari Tharangika Colambage	Kg/St Mary's College, Kegalle

Winners of the Star ratings for the best performed Science Societies 2024

The NSF felicitates the best performed School Science Societies under the NSF School Science Society Network by evaluating their performance on the respective year by giving "Star Ratings". The awards will be given to the Schools Science Societies that received 5-3-stars at the evaluation. The school, Teacher in-charge of the Science Society, President and Secretary of the School were awarded certificates at the Ceremony.

Table 04: Details of the Winners

Award	School	Teacher in charge of Star Rating Competition	Principal	President	Secretary
5 Stars	WP/Ng/ Harishchandra National College, Negombo	Ms. A.T. Nelka Munasinghe	Mr. U.G.V.D. Siriwardhana	K.G.K. Nethsara Daham Amarasinghe	K. Binari Nimhara
5 Stars	Royal College Polonnaruwa	Ms. S.I.W. Samaranayake	Mr. I.K.K.R Wijayawansa	M.P.P. Undugodage	M.A. Yenara Methuki
4 Stars	ST/PD/ Paddirippu National School	Ms. S. Thevakumar	Mr.T. Janenthirarajah	S.P. Moga-napratha	S.S. Shanuja
4 Stars	Thurstan College	Ms. Upeksha Abeysekara Mr. W.A. Dushantha	Mr. W.A.P.J Wickramasinghe	Janith Bandara	Sajan Mihiranga
3 Stars	CP/HK/ Mathurata M.V	Ms. R.M. Ajantha Menike	Mr. M.G.N. Bandara	R.M. Tharusha Lakshan	M.I. Rashimika Dissanayake

Apeksha Herath
Scientific Officer
National Science Foundation

What have you learnt from the Vidurava 2024 January - June Q_1 Issue? Scan your own memory!

1] STEAM is Everywhere: Embracing the Interdisciplinary Future

True or False?

1. The acronym "STEM" stands for Science, Technology, Engineering, and Mathematics
2. STEAM education promotes collaboration and encourages students to work together across disciplines, fostering a spirit of innovation and creative problem-solving.
3. STEAM concepts lightly ingrained in our day-to-day lives, influencing various aspects of our routines and activities.
4. By integrating STEAM into the Sri Lankan school system, students will be equipped with the skills necessary to navigate a rapidly changing world.

2] STEAM to School

True or False?

1. STEAM learning approach emphasizes about the application of knowledge and skills practically.
2. STEAM Education facilitates creativity and innovative ideas.
3. It is important to pay more attention to popularize innovation associations that are already active in some schools.
4. When assessing students engage in STEAM Education, it is important to use a variety of assessment tools.

3] Writing from 2025

True or False?

1. The Aesthetic Education scheme in the schools of this country is built on the four columns of basic subjects of music, drama, theatre and dance.
2. Time is ripe for experts in the field of education to focus their attention and carryout analytical studies on specific aesthetic subjects.
3. The variations of the sound is what brought by the nature of the helper.
4. Problem based learning etc., are essentials which are used whenever possible.
5. Evaluation is compounded through the meaning - teaching process and by compressed assessment.

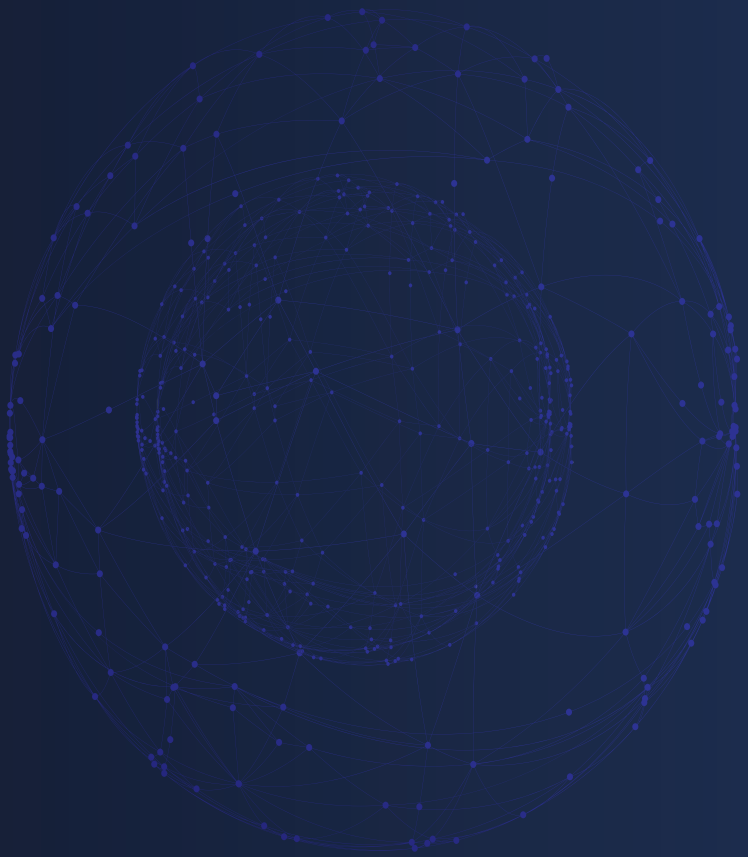
4] Integrating Aesthetic with STEM

True or False?

1. STEAM reflects an integration of the subjects of Science, Technology, Engineering, Arts and Mathematics.
2. An integrated education method such as would undoubtedly be more successfully and fruitful in moulding citizens.
3. It is necessary to investigate in depth how teaching of aesthetic subject can contribute to intervene in the STEAM education scheme.
4. It is not possible to show how the string instruments produce variations in sound.
5. There are istances where drama as a subject of aesthetics have been successfully integrated with lessons in mathematics.

Answers

01) 1. False, 2. True, 3. False, 4. False
02) 1. False, 2. True, 3. True, 4. False
03) 1. True, 2. True, 3. False, 4. False, 5. True
04) 1. True, 2. True, 3. True, 4. False, 5. False



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