ISBN: 978-93-88901-54-3

ADVANCES IN SCIENCE AND TECHNOLOGY

VOLUME V

Editor:
Dr. Bamalakshmi J
Prof. Aruna Devi M
Mrs. Ranjitha G
Dr. Geetha R
Mrs. Manimekalai S

Bhumi Publishing, India

First Edition: May 2023

Advances in Science and Technology Volume V

(ISBN: 978-93-88901-54-3)

Editors

Dr. Bamalakshmi J | **Prof. Aruna Devi M** | **Mrs. Ranjitha G**

Department of Community Health Nursing,

Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

Dr. Geetha R

Mother Teresa College of Nursing, Tamilnadu

Mrs. Manimekalai S

Sri Manakula Vinayagar Nursing College, Puducherry

Bhumi Publishing

2023

First Edition: May, 2023

ISBN: 978-93-88901-54-3

Published by:

Bhumi Publishing,

Nigave Khalasa, Kolhapur 416207, Maharashtra, India

Website: www.bhumipublishing.com

E-mail: bhumipublishing@gmail.com

Book Available online at:

https://www.bhumipublishing.com/book/

PREFACE

The pursuit of knowledge is an intrinsic characteristic of the human species. Throughout history, we have endeavored to unravel the mysteries of the universe, to understand the intricate workings of our world, and to harness the forces of nature for the betterment of our lives. Science and technology have been the driving forces behind our progress, leading us to astonishing discoveries and revolutionary inventions.

In this rapidly evolving era, where boundaries are constantly being pushed and new frontiers are being explored, it is imperative that we stay abreast of the latest advancements in science and technology. This book, "Advances in Science and Technology," serves as a comprehensive compilation of cutting-edge research and breakthrough innovations that are shaping our present and defining our future.

The chapters in this book are a testament to the spirit of curiosity and intellectual curiosity that drives scientific inquiry. From exploring the depths of the cosmos to delving into the intricacies of the human brain, from harnessing renewable energy sources to revolutionizing healthcare, each chapter presents a unique perspective and a fresh perspective on the forefront of knowledge.

Furthermore, this book also acknowledges the interconnectedness of science and technology with society. It recognizes the ethical implications of scientific advancements and explores the potential impact on our lives, economy, and environment. It underscores the need for responsible innovation, sustainable development, and equitable access to the benefits of scientific progress.

The book is a valuable resource for anyone who is interested in learning more about the latest advances in science and technology. It is also a valuable resource for students, researchers, and professionals in a variety of fields.

Finally, we will always remain a debtor to all our well-wishers for their blessings, without which this book would not have come into existence.

Editors

TABLE OF CONTENT

TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT

Bamalakshmi J, Roopamathy M, Aruna Devi M and Ranjitha G
Department of Community Health Nursing,
Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry
Corresponding author E-mail: bamalakshmiv@kgnc. Ac.in, roopamurugan96@gmail.com, arunatanushka@gmail.com, ranjithagunasekaran.gmrr@gmail.com

Abstract:

Getting the requisite technology and putting them in place is one of the biggest obstacles that nations, particularly developing ones, confront in achieving sustainable development. Although financial resources do play a role in access to technology, there are other factors at play as well. A lot of the time, institutional and legal frameworks create barriers to the creation, import/export, transfer, and application of technologies for sustainable development. Technology importability may be impacted by quotas and tariffs. In a similar vein, incentives might encourage the adoption of technology that squander water, energy, or other resources. Additionally, when choosing and implementing technologies, decision-makers need to take cultural norms into account. If things continue as they are, the contribution of science and technology to the construction of sustainability will have an increasing impact on people's lives.To lessen our impact on the environment, we must work to make such advancements more sustainable.

Key words: Sustainable development, technology

Introduction:

Sustainability is becoming a more essential concern for businesses of all sizes as the threat of climate change intensifies. However, not just corporations should be concerned about this issue. In reality, consumers who are most inclined to buy sustainable items are over 50%. While only 31% of customers will make an extra effort. Therefore, technology makes sustainability easier for us to live with. But it's also essential for preserving the ecosystem. Recent technological developments have increased the viability of sustainable living. The following are 10 ways that technology aids sustainability, from broad, long-term changes to little, everyday tweaks.

What is sustainable technology?

Innovation that takes into account natural resources and promotes economic and social growth is referred to as sustainable technology. These technologies aim to provide a sustainable product while substantially reducing dangers to the environment and ecology. Technology sustainability can be described in a few different ways:

- **Substitution:** The method encourages a switch in the production of the product from non-biodegradable to biodegradable ingredients. Renewable resources also take the place of non-renewable ones.
- **Prevention:** Through its use or manufacturing, the sustainable technology avoids deterioration, pollution, and other detrimental environmental effects.
- **Efficiency:** Regarding energy and resource usage, the technology is effective

Technology is the key to sustainability:

Technology plays a key role in enabling sustainability, whether it's expediting the transition to Net Zero or developing more sustainable value chains. According to a recent study, businesses who have the most complete sustainable technology plans perform better overall. Robotics, digital twins, and smart building systems are assisting businesses in increasing efficiency and reducing their carbon footprint. Utilities are now able to manage energy responsibly across entire grids thanks to cloud computing.

Sustainability is no simply a check-the-box activity but rather a social, economic, and environmental factor that affects nearly every part of our existence. For our kids, it is crucial to comprehend that there is no planet B and that achieving 360° sustainability is essential for everyone. People are paying more attention to social concerns and sustainability now than ever before. Businesses are being compelled to take action and adhere to sustainability guidelines. the question of technology's role in sustainable development is raised.

Technology help sustainability:

1. Internet of Things

The network of modern devices that are connected to the internet is known as the Internet of Things (IoT). The ability to keep an eye on all of your devices' behaviour is one of the main benefits of the IoT. Where it can help with sustainability is in this role.

Utilising IoT-capable gadgets can aid in reducing energy waste. Lights, air conditioners, and even heaters can be programmed to go off automatically after a certain period of time or to be turned off remotely while you're away. The IoT is also assisting businesses in tracking and thereby improving the lifecycle of their products.

2. Alternative Energy

Alternative energy is another way that technology supports sustainability. It is no longer simply for enterprises. Home solar energy systems used to be pricy and ineffective. They are, however, getting more and more affordable. Solar energy is a viable choice for many households today. If not as their main source of energy, then as a backup to help them become less reliant on energy corporations.

3. Energy Storage

Although batteries are nothing new, they are becoming much more effective. Due to difficulties with storing the energy they produce, energy sources like solar power have

historically been inefficient. Modern battery solutions, like Tesla's Powerwall, are enabling people and organisations to store and utilise power in a way that is far less wasteful.

4. Big Data Analytics

Big data serves a variety of purposes for enhancing sustainability in addition to being crucial to internet marketing. Thus, businesses are learning more about environmental issues through the gathering and analysis of vast data sets. Big data can be used by businesses to focus on areas where they can increase efficiency by looking at their energy usage.

5. Meat Alternatives

Animal agriculture is a further method in which technology aids sustainability. It makes up about 14.5% of all human emissions worldwide. As a result, cutting back on meat consumption can considerably minimise pollution, and technology can assist.

6. Hygiene Surveys

Conducting necessary health and safety surveys is becoming simpler thanks to technology. Businesses can evaluate their air quality, hygiene, and other environmental concerns quickly, safely, and correctly thanks to survey software like SMAR Touch. In turn, this information will enable them to lessen their negative environmental impact.

7. Interactive Mapping

In order to combat climate change, awareness-building is one of the most crucial elements. In order to help people in more temperate locations comprehend the severity and scope of climate change, interactive, compelling maps showing the regions most severely affected by global warming are needed.

8. Indoor Farming

Despite the fact that agriculture consumes a lot of land, it need not. An indoor farm actually uses considerably less land and is more effective than a traditional one. decreasing habitats for destruction as a result.

Therefore, indoor farms may produce seasonal foods all year long using climate control technologies. This adaptability can be crucial as the population grows. Agriculture will always be needed by people. Nevertheless, we are out of room.

9. Precision Agriculture

The use of technology in agriculture is not limited to indoor farms. Utilising technology to improve the accuracy and control of farming practises is known as precision agriculture. Farmers are using precision agriculture to maximise the yield of their crops. With greater accuracy, waste can be greatly reduced, and yields can rise.

10. Electric Vehicles

Older electric automobiles, like solar panels, were expensive and unreliable. But because to improvements in automotive technology, electric cars are now a fully viable choice. Electric

vehicles are becoming more economical as well as more efficient thanks to producers like Tesla and BMW. These technologies will only get more affordable and useful as time goes on.

Sustainability goals:

More than 70% of customers worldwide are willing to change their purchasing patterns, according to the most recent studies, in order to reduce their environmental impact. Businesses must offer services that benefit not only consumers but also the environment if they want to compete in today's cutthroat business environment. For instance, by 2050, it is predicted that global energy consumption will increase by almost 50%. Organisations and the general public are now placing a high importance on investing in green energy that is available, clean, inexpensive, and sustainable. Technology plays a part in sustainable development by assisting companies in achieving net-zero status as well as other environmental, social, and governance objectives. Leading businesses are already achieving sustainable targets thanks to technological accelerators. IoT, data analytics, and sensors, for instance, are making it easier to decarbonize business operations and solving issues by:

- **Networking and communicating:** Sharing information across networks, machines, and devices proficiently.
- **Monitoring and tracking:** Capturing Real-time data and reporting of operational performance within the connected devices.
- **Analyzing, improving, and forecasting:** Getting insights from data for improved decision-making on process efficiencies for the future.
- **Augmenting and automating:** Linking the digital and physical worlds with remote management and the construction of autonomous systems.

Following are the four ways technology can accelerate net-zero ambitions:

1. Process optimization and digitization:

Establishing sustainable business practises that consider stakeholder preferences and boost organisational resilience. accepting cutting-edge technology, such as cloud-native architectures for the data-driven process optimisation. Businesses are using it to achieve their emission reduction objectives. Moreover, they create new norms for the sector. Such actions have the potential to significantly reduce CO2 emissions.

2. Carbon data transparency:

Implementing technology-driven strategies to assist businesses with carbon accounting throughout the value chain Transparency at all organisational levels is facilitated by IoT and block chain-enabled sustainability solutions. All significant stakeholders have access to and visibility to data and advice, which promotes sound decision-making.

3. Circular products and services:

Creating reusable, sustainable products and services with no pollution. The application of novel product innovations and value chain solutions to improve offers is part of technology's role

in sustainable development. involving customers and gradually enhancing performance. Companies are now able to build thanks to such solutions. In the long run, promote zero-waste products while enhancing ROI and creating new revenue streams.

4. Data ecosystems and ventures:

Establishing cross-industry data-sharing platforms that make it possible to follow sustainability laws. Data ecosystems are offering priceless, open-source, and timely insights on how a good or service may affect society and the environment. All while enabling organisations to achieve their compliance and environmental goals.

Role of science and technology in building a sustainable future:

Discussions about the role of science and technology in creating sustainability are growing widespread. The necessity of science being able to provide a solution has increased due to the resources' ongoing depletion. At this point, it is absolutely essential that science and technology play a part in creating sustainable development to combat the problems caused by human-caused climate change.

❖ **Using Technology for Sustainability**

Today, technology has advanced dramatically across all fields. On the premise that technology may help them develop new or substitute sources for the resources that are running out, nations all over the world are developing models of sustainable growth. The other idea is that research may assist us in figuring out effective ways to utilise the remaining resources. In the past, end-of-pipe solutions were planned using science and technology. This suggests that reducing pollutants and cleaning up the environment were more important. However, this approach did not deal with the root causes of the issue. Soon, the emphasis turned to establishing "clean technologies" that alter the manufacturing process and result in goods that are less damaging to the environment overall.

❖ **Role of Science and Technology in Building Sustainability Development**

Now, it has become increasingly important to do in-depth research into the application of science in creating a sustainable future. A number of application programmes have emerged that seek to understand the place of science in sustainability. This is connected to the search for renewable and alternative energy sources to lessen pollution. Additionally, it helps prevent the further depletion of the limited resources.

❖ **Importance in Shaping Economic Sustainability**

In addition, sustainable agriculture and fisheries can be developed using research and technology. Hormone, antibiotic, and pesticide use can be restricted in order to produce food that is safe for ingestion. This helps keep the world's natural resources from becoming depleted. Therefore, research is essential to figuring out how to use science and technology to meet the needs of sustainable development. So a smart place to start would be to educate yourself on the

most recent advancements in sustainable sciences. Examine local businesses for examples of sustainable development, and share with others the importance of creating a sustainable future.

❖ **The Need for Technology in Business Development**

Trade and commerce are thriving in a variety of areas around the world because to technology. Entrepreneurs and stakeholders can more easily predict future trends, cater to the demands and preferences of dynamic business markets, and reduce risks in the business process with the help of technologically supported solutions. As a result, these solutions are streamlining the entire corporate process, which promotes productivity at its highest level. However, the fact that the majority of firms are making significant investments in technology to get an advantage over their competitors illustrates how crucial the adoption of tech-backed solutions is today. As a result, every organisation in today's world needs to be thinking technologically ahead.

❖ **Trends in Tech-Enabled Innovation**

We are aware that technology advancements will only quicken in the next years. The global view and roadmaps are currently being redefined by new-age technological start-ups. The good news is that sustainability, which has tended to be on the periphery of technological advancement, is gradually moving in that direction. We must recognise the value of sustainable technology in the post-covid era so that a little goes a long way. At 7.97 billion people, the human population is now growing at a rate of 1.1%. Therefore, it is imperative to create long-lasting technologically supported solutions to reduce the influence on the environment.

How does technology affect sustainability?

In order to achieve sustainable development, technology is essential. It is impossible to dispute the importance of technology in achieving the goals of sustainable development, whether they are social, economic, or environmental. Governments and others are very reluctant to make the political and social adjustments required to slow the development in output and consumption.

Here is when reliance on science and technology is relevant. The majority of nations are now utilising science and technology to find solutions to their current environmental issues and help them achieve a sustainable future.

Science and technology response to global threats:

To coordinate S&T policies across the federal government, President Clinton formed the National Science and Technology Council (NSTC) at the cabinet level in November 1993. The NSTC established nine R&D coordinating committees, including committees on international science, engineering, and technology; health, safety, and food R&D; and environment and natural resources research, in order to prepare coordinated R&D strategies and budget recommendations for achieving national goals.

The Committee on International Science, Engineering, and Technology (CISET) serves as an illustration of how these NSTC committees coordinate. One of CISET's objectives is to support post-Cold War U.S. foreign policy principles by using American leadership in science

and technology to address global concerns.In order to achieve this, CISET is focusing on three topics:

(1) International R&D for population stabilisation;

(2) R&D for global food security and nutrition; and

(3) Emerging and reemerging infectious diseases.

For instance, CISET is examining measures to improve the capability of global monitoring to identify and address infectious disease outbreaks.

Interagency programmes are coordinated by the NSTC Committee on Environment and Natural Resources Research (CENR), which also focuses environmental and natural resource R&D on issues that have an immediate impact on our economy and health. The CENR has urged a greater focus on analysing the socioeconomic processes driving environmental change, comprehending its effects, coming up with solutions for adaptation and mitigation, and carrying out integrated evaluations. Research on climatic variability and change, stratospheric ozone and ultraviolet radiation, sustainable ecosystem production, and environmental technology for pollution avoidance and remediation are only a few of the important ongoing endeavours.

Several government organisations participate in international S&T partnerships, many of which are intended to solve international security and foreign policy concerns while also supporting the home missions of the participating organisations. Several agency programmes that are important to achieving global stability are briefly described below:

The Department of State is responsible for coordinating American government positions on international environmental and science and technology policy and making sure that the country is collaborating with other governments to solve global concerns. The negotiation of agreements addressing concerns including stratospheric ozone layer depletion, climate change, trans-boundary air and water pollution, and resource degradation is the most significant means of achieving this. The conclusion of the Montreal Protocol on Depletion of the Stratospheric Ozone Layer in the late 1980s, for instance, was one of the most significant agreements of recent years. The world's nations have committed to taking action to stop producing chemicals that harm the ozone layer under the terms of this agreement.

The Department participates actively in worldwide initiatives to create cutting-edge technology that can solve global threats. The Department is in charge of more than 600 international S&T collaboration agreements, which give American scientists access to foreign innovations in fields like agriculture, health, energy efficiency, renewable energy, and environmental cleanup. The Department also assists in coordinating U.S. participation in important international science and technology initiatives, including the International Space Station and the global effort to track, comprehend, and assess the effects of the earth's climate on human activity.

There are five Sustainable Development Strategies that **USAID (the United States Agency for International Development)** has created. To varied degrees, they all use S&T to address the reasons that cause instability in developing nations. regulating global population expansion and safeguarding human health Numerous initiatives have been created to expand family planning choices, improve women's reproductive health, advance mother and child health, and slow the spread of HIV/AIDS in order to address these complicated issues. Research and development initiatives in support of these programmes have produced a number of cutting-edge innovations, including the creation of oral rehydration solutions, vitamin A therapies, HIV dipsticks, vaccine heat markers, single-dose syringes, and a revolutionary understanding of paediatric acute respiratory infections.This entails tackling present environmental and economic practises that are unsustainable and obstruct development while lowering long-term dangers to the global environment. Enhancing carbon sequestration analyses, assessing the environmental effects of various trade and macroeconomic policies, prospecting for biodiversity, reclaiming degraded areas, and better managing coastal ecosystems are some of the R&D initiatives. promoting broad-based economic expansion Concentrated efforts are made to enhance markets, increase economic possibilities for those who are less fortunate, and invest in individuals by enhancing their capacities and skills. Through study on labour markets, pension reform, and other policies, it is hoped to comprehend the barriers to economic growth in developing and transitional nations. Agriculture plays a vital part in the many emerging nations with agrarian economies, providing new and improved crop types and more environmentally friendly methods of production. Building democracy: R&D works to find locally appropriate means of ensuring that the population is informed and that civic societies are able to thrive in order to meet the objectives of facilitating the transition to and consolidation of democratic regimes around the world. Effective humanitarian aid is clearly dependent on technical systems that warn of approaching natural disasters and on S&T for solutions to crises caused by both natural and man-made causes.

The Agricultural Research Service (ARS) is still operated by the Department of Agriculture (USDA) in order to preserve a strong S&T foundation and seek technology transfer and commercialization. Agriculture must be transformed globally if improved nutrition and global food security are to be achieved. The product portfolio of ARS reflects the growing public interest in environmentally friendly consumption. These goods include bioplastics, natural food additives, paints, cosmetics, and biological control agents (to replace chemical pesticides). Since agriculture supplies a variety of raw materials for the food processing industry as well as other industries, the potential contribution of non-food agricultural products to global food security is a significant element of the ARS agenda. Value-added activities can be significant sources of income and employment, both on and off the farm, especially when they are connected to productivity advances. Food security can be improved via post-harvest processing, loss

avoidance, and a variety of additional income-generating activities. The USDA actively collaborates in these areas with American universities and foreign organisations. The creation of secure natural rubber latex for use in biomedical and other consumer goods applications is an illustration of an ARS technology that is suitable for rural economies. Millions of people suffer from rubber allergies, but ARS has created a non-allergenic rubber by employing a domestic plant species that is well suited to arid environments. This technology is currently being licenced.

The Department of Energy (DOE) is a significant science and technology organisation that promotes the creation and use of cutting-edge methods for using energy both locally and internationally. These strategies include a higher reliance on renewable energy sources as well as more effective use of conventional energy sources. On a global scale, DOE has been successful in forging partnerships with significant developing nations like China and India that allow for technology transfer to advance sustainable development and aid in the sluggish growth of carbon emissions. It is crucial to concentrate on developing nations because they are mostly responsible for the rise in global energy consumption and carbon emissions over the previous 20 years. The United States Initiative on Joint Implementation (USIJI) is also largely supported by DOE. Under the USIJI pilot programme, American organisations collaborate with their international counterparts to establish joint projects that would lower greenhouse gas emissions. Such initiatives not only provide a more cost-effective means of combating climate change and advancing sustainable development, but also have the potential to expand markets for local innovations. Joint implementation could encourage more technological collaboration, expanding access to energy-efficient and renewable energy technologies for developing nations, giving those nations more operational capabilities, and boosting export markets for developed nations.

The Department of Health and Human Services (HHS) and the Public Health Service (PHS) (Centres for Disease Control and Prevention, Food and Drug Administration, Health Resources and Services Administration, Indian Health Service, National Institutes of Health, Substance Abuse and Mental Health Services Administration, Agency for Health Care Policy and Research, and The PHS agencies work with other nations (bilaterally and in multilateral organisations) to address global health concerns as well as domestic ones as an essential component of their domestic programmes.

The PHS agencies are conducting basic and applied research in important fields that are important to both domestic and international stability. These include, but are not limited to, HIV/AIDS and other newly developing and reemerging diseases, women's health and family planning, maternity and child health, environmental health, nutrition, substance misuse and demand reduction, as well as consumer security in relation to food, medications, and medical devices.

The CDC has created a prevention plan to address threats to public health posed by emerging infectious diseases in conjunction with health organisations and infectious disease

specialists at the local, national, and worldwide levels. The plan focuses on four areas: improved health information dissemination; capability for identification and control of novel, re-emerging, and drug-resistant infectious illnesses; integrated laboratory and epidemiological applied research.

In order to combat threats to global health, **the NIH's Fogarty worldwide Centre (FIC)** is dedicated to coordinating worldwide research efforts. The AIDS International Research and Training Programme, which is now sponsored by FIC, makes sure that there is a highly-trained cohort of investigators accessible in important regions of the world to collaborate with American scientists on HIV/AIDS and related infectious diseases. FIC launched two new programmes in FY95: one to advance environmental and occupational health sciences and the other to support population-related sciences. These initiatives, together with those of other federal agencies, are meant to strengthen regional and national capacities and, in turn, lessen the need for U.S. aid.

The food and drug administration (FAO) Strengthening national capacities to safeguard the security of food and medical supplies is one of the many underappreciated contributions made by the Food and Drug Administration. Some of the normal FDA tasks include risk assessment, regulatory review and product approval, investigative and monitoring activities, and applied research. The FDA collaborates with other governments and multilateral organisations to carry out its domestic consumer protection mandate by sharing its knowledge, guiding principles, policies, procedures, and regulations. Assistance to Russia to help strengthen that nation's infrastructure for quality control and regulation of pharmaceuticals and vaccines is a good example of international FDA collaboration with wider security implications.

In order to provide sustainable economic opportunities**, the National Oceanic and Atmospheric Administration (NOAA)** strives to safeguard and wisely manage the country's coastal and marine resources. It also makes an effort to describe and foresee changes to the environment of the planet. The United States has achieved important strides in resource management, environmental quality enhancement, and comprehension and prognostication of natural system behaviour. NOAA's duties include promoting environmental stewardship on a worldwide scale, safeguarding people and property, predicting environmental changes across time and space, and giving decision-makers accurate scientific data. International cooperation is necessary to carry out NOAA's mandate. The very nature of the oceans and the atmosphere necessitates global cooperation, including sharing the burden of observation and data collection and working together to understand and resolve issues like ozone depletion, natural disasters, climate change, natural disasters, and the mounting pressures on the oceans and coastal resources. The achievement of multinational initiatives to recognise, comprehend, and forecast climate fluctuations like El Nino is an illustration of this process. Periodic drought, flooding, and unexpectedly severe storms have a significant impact on the world's population in terms of

fatalities, life-threatening environmental emergencies, and social and economic effects on agricultural production, water management, energy supplies, and population migration.

No one country is equipped to provide all the observations required to meet its own demands, let alone those of the global community. In order to assist not only the United States but all of the world's nations, NOAA is working with its international partners to address observational shortcomings, correlate satellite and in situ data sets, and establish standard data formats and network interconnectivity.

The National Aeronautics and Space Administration (NASA) studies issues related to flight both inside and outside of the Earth's atmosphere and seeks peaceful space activities for the benefit of all people. NASA researchers and their international partners are doing extensive long-term monitoring of the planet Earth and studying it as a single, global environment from the unique vantage point of space. Determine how this environment changes and how humans contribute to those changes using data from the Mission to Planet Earth programme.

In the factories and labs of thirteen countries, the multinational Space Station, the largest multinational scientific and technological undertaking ever undertaken, is being constructed. With the construction of the Space Station, a permanent laboratory will be created in an environment where gravity, temperature, and pressure may be changed to conduct a wide range of scientific and engineering experiments that are not possible in ground-based labs. The Space Station will serve as a demonstration platform for cutting-edge technologies and a research facility for studies on cutting-edge industrial materials, communications technology, and medical devices and techniques.

The focus of NASA's life sciences research is on how gravity influences living systems. The outcomes are being applied to enhance human health and quality of life on Earth as well as to assure the safety and well-being of space astronauts. Insights into biotechnology, combustion science, gravitational physics, fluid physics, materials science, and other fields are provided by NASA's microgravity research programme, which sheds light on significant physical, chemical, and biological processes that are hidden by gravity on Earth.

The National Science Foundation (NSF) funds basic science and engineering studies by American researchers on a variety of natural and human phenomena that are strongly related to global stability and other challenges such as sustainable development. Research in the life sciences on ecology and biodiversity, environmental chemistry and biotechnology, and research in plant biology and plant biotechnology with agricultural applications are a few examples of the types of projects supported by the NSF.Fundamental biological studies into the causes of ailments and reproductive health; social science studies into the human influence on climate change; geosciences and structural engineering studies into earthquakes and other natural and man-made disasters; economic studies into the shift to market-based economies; political science

studies into the process of democratisation; studies into population growth and migration; and environmental engineering studies.

The NSF also actively participates in the upkeep of the global infrastructure for scientific and engineering research collaboration. This work ranges from bilateral research projects with foreign science and engineering organisations to support for multilateral initiatives and institutions like the International Council of Scientific Unions (ICSU), the Human Frontier Science Programme, and the International Institute for Applied Systems Analysis. The majority of these multilateral agreements feature substantial participation from poor nations.

Responsible ai for sustainable outcomes:

The way we think, live, work, and interact with one another and the outside world is fundamentally altering as a result of technology's role in sustainable development, such as AI. Such AI-enabled technologies can optimise business operations and processes. While businesses use AI to increase output and efficiency and reduce energy costs, training AI requires a lot of energy. Therefore, in order to maintain its efforts to reduce its environmental impact, an organisation must also consider reducing the carbon outputs of its AI/ML models. Organisations are, however, also utilising AI's power to minimise material dangers while also reducing their carbon footprints. The training of an AI model must be as energy and computationally efficient as possible in order to increase accuracy and performance. Businesses must conduct an efficiency vs. accuracy test to ascertain whether the resource used is appropriate from both a business and environmental perspective.

Conclusion:

Sustainable technology has become the backbone of many businesses and will continue to improve how business is done for many years to come. As a result, technology promotes sustainability in a number of ways. Utilising technology from the start is essential for leading businesses to succeed. Businesses are analysing, mitigating, or maximising their environmental effect through the use of cutting-edge technology like AI, IoT, or block chain. Technology's contribution to sustainable development is unquestionably a part of the solution, though.

References:

1. Venu Jaiganesh, Science and Technology for Sustainable Development in India Scenia, April 2013, International Journal of Chemical Engineering and Application, Vol 4, (No.2), 66-68
2. N. Davids and Y. Waghid, Teaching, Friendship and Humanity (Springer,. (Briefs in Citizenship Education for the 21st Century, 2020.
3. V. V. Zinchenko, V. V. Levkulych, V. V. Levkulych, and V. Y. Svyshcho, IOP Conf. Ser. Earth Environ. Sci. 635, (2021)
4. Comsats, Commission on Science and Technology for Sustainable Development in the South," vol. 2, pp. 1-88, Sep. 2003

5. Prof. Allam Ahmed, World Review of Science Technology and Sustainable Development, January 2004, DOI:10.1504/WRSTSD.2004.004852
6. Ajay K Singh, B. Jyoti Singh, Vijay Negi, International Journal of Technology Management and Sustainable Development, June 2020, 19(2):147-171, DOI:10.1386/tmsd_00020_1
7. Popkova EG, De Bernardi P, Tyurina YG, Sergi BS. A theory of digital technology advancement to address the grand challenges of sustainable development. Technology in Society. 2022 Feb 1;68:101831.
8. Imaz M, Sheinbaum C. Science and technology in the framework of the sustainable development goals. World Journal of Science, Technology and Sustainable Development. 2017 Jan 3.
9. Bag S, Gupta S, Kumar S. Industry 4.0 adoption and 10R advance manufacturing capabilities for sustainable development. International journal of production economics. 2021 Jan 1;231:107844.
10. Eilks I. Science education and education for sustainable development–justifications, models, practices and perspectives. Eurasia Journal of Mathematics, Science and Technology Education. 2015 Dec 16;11(1):149-58.
11. Niu D, Jiang D, Li F. Higher education for sustainable development in China. International Journal of Sustainability in Higher Education. 2010 Apr 13;11(2):153-62.
12. Makarewicz-Marcinkiewicz A. Strategies against technological exclusion: The contribution of the sustainable development concept to the process of economic inclusion of developing countries. PROBLEMY EKOROZWOJU–PROBLEMS OF SUSTAINABLE DEVELOPMENT. 2013 Jun 11;8(2):67-74.
13. Development in the South," vol. 2, pp. 1-88, Sep. 2003.

VIRTUAL REALITY OF EDUCATION IN INDIA THROUGH APPLICATION OF SCIENCE AND TECHNOLOGY

Bamalakshmi J[1], Priya.V[2], Roopamathy M[1], Aruna Devi M[1] and Ranjitha G[1]

[1]Department of Community Health Nursing,

Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

[2]Department of OBG Nursing, PSG College of Nursing Coimbatore Tamilnadu

Corresponding author E-mail: bamalakshmiv@kgnc. Ac.in, ezhilp43@gmail.com, roopamurugan96@gmail.com, arunatanushka@gmail.com, ranjithagunasekaran.gmrr@gmail.com

Abstract:

An individual can engage with a three-dimensional model or virtual environment created by a computer through virtual reality, or VR. A mix of technologies that are used to visualise and enable interaction with a virtual environment create virtual reality. In these environments, three-dimensional space is frequently represented. This space may be macroscopic or microscopic, based on genuine physical principles of dynamics or on fictitious dynamics. VR is perfectly suited for learning effectively, and researchers are attempting to explain its efficacy in terms of the benefits provided by learning through experiences.

Keywords: Virtual Reality, Science, Technology, Education.

Introduction:

In today's classroom, students are frequently expected to understand difficult or esoteric ideas or to grasp events and scenarios that don't exist anymore. In order to achieve this, metaphor and analogy are frequently used teaching strategies, particularly in the sciences. We depict an event or an abstract concept in terms of observable reality by utilising an analogy. In other words, we connect ideas to actual events. The information from the experience is used to build a mental model of the idea, which forms the basis of knowledge. However, Jaron Lanier, the creator of VPL Research, started creating goggles, gloves, and other gadgets in the middle of the 1980s, which is when the phrase "virtual reality" first entered common usage. When He referred to it as virtual reality, it was. However, engineers were creating mimicked worlds far before that. Virtual reality is the creation of simulations through computer technology that can be viewed in 360 degrees. For virtual reality to give users a seamless and engaging experience, frame rate and latency are crucial. Reduce actual resource use while ensuring consistency in operating. VR can be customised and used in many different industries, including education. VR restricts interactions with others and experiences. The things we do have a tendency to become habits. Students with learning difficulties can learn about their surroundings through virtual reality. We must spend money on expensive equipment that could strain our finances, such as VR headsets. In this case, students can even do their assignments remotely or at home.

Virtual reality:

Virtual reality is the creation of simulated environments through computer technology that can be viewed in 360 degrees. Virtual reality provides an immersive experience by immersing the user in a virtual environment, in contrast to traditional interfaces. A VR headset is utilised to create this immersion; one can get one by visiting the OISE library, for instance. Oculus Rift, Samsung Gear VR, HTC Vive, Google Daydream View, and Google Cardboard are further notable VR headsets.

There are many different sorts of VR implementations, and we've included 4 typical ones below:

1. Stereoscopic or monocular desktop VR
2. Wide-screen, immersive VR (HMD)
3. Cooperative Systems 3.
4. Gneration or mixed reality

As the name suggests, desktop virtual reality (VR) involves the user sitting in front of a desktop computer monitor and interacting with the screen using a computer mouse. In immersive systems, the visualisation display, which typically takes the shape of a helmet worn on the head, entirely blocks the users' field of vision. Collaboration between two or more human-controlled avatars may take place through desktop-based or immersive systems. Second Life (www.secondlife.com) is a collaborative system that was recently and most successfully implemented. Additionally, efforts are being made to use collaborative systems' power for research. In mixed reality systems, computer generated content is superimposed over the real world, which can be viewed either directly or through a camera.

Key applications of virtual reality:

Schools:

There are two types of VR applications used in schools and colleges: those where teachers use pre-made applications (such as Cell Biology, Virtual Gorilla Exhibit, Maxwell World, Atom World, Newton World, Greek Villa) and those where students create their own virtual worlds to test theories (such as Virtual Stage and Wetland Ecology). Applications that have already been created include a virtual environment, supporting software, and hardware where students must complete a task. Previous implementations include Maxwell World, one of three science programmes named Science Space created by Dede and colleagues for kids between the ages of 9 and 15 (Dede, et al., 1996). Students can set electrical charges, see the resulting electromagnetic field, and engage with it at Maxwell World to learn about electrostatic forces and electric fields. Axes are utilised in the small-scale VR application Maxwell World, which occupies a 1 metre cube and serves as a frame of reference. A HMD is utilised to portray the space in stereo, and menus are employed for interaction. Pauling World is used to teach atomic

and molecular structure, and Newton World, another component of Science Space, similarly instructs pupils about forces in Newtonian Mechanics.

A reconstruction of a Hellenic House—modeled using information from excavations—made up the virtual environment. Tasks for solving problems were included in the teaching components. The Institute for the Visualisation of History, which sells QTVR and VRML models of restored landmarks like the Acropolis in Athens, is another organisation with experience in the subject of cultural heritage. In order to swiftly create virtual world models and the interaction settings in which they may be used, the Virtual Reality Modelling Language (VRML) was used. X3D, a web-based standard that can be used in World Wide Web VR applications, has since supplanted this in use.

Entertainment:

A number of research projects have developed VR systems for 'edutainment' in the form of electronic museums, The Exploratorium has just been transferred to Second Life (SL), a sizable, multiuser, three-dimensional online virtual world. The Exploratorium is a public scientific museum dedicated to educating science through interactive exhibits. Because it is displayed as a desktop system via a web browser and features numerous people interacting in the same place, we refer to this as a collaborative environment. Using keyboard navigation controls, you enter this world as an avatar (a representation of yourself) and explore its features and surroundings. Users can participate in extreme sports or the video game scene without getting up from the couch. Messini, a historic city in the South West Peloponnese that was built in 369 BC, served as the chosen site for CREATE. CREATE concentrated on the Doric temple's architectural complex within this site because, despite its poor preservation, it has a wealth of documentation that helped with the virtual reconstruction.

Training:

Training is the last use case for VR in education that we'll discuss. Because training typically involves teaching specialised knowledge related to manual tasks rather than general knowledge, we might think of training as a distinct type of education. Tasks that are unsafe or impractical to do in real life can be trained in a safe setting using virtual reality (VR). The general sectors of transportation, medical, engineering, and military & security have all benefited from VR training.

(i) Transportation

The early uses of VR technology were in flight simulators. It's almost as old as flying itself that pilots have been trained on'simulators' that are grounded. A 180-degree field of vision, authentic instrument panels, and motion platforms with up to 6 degrees of freedom (translation and rotation) are all features of contemporary VR flight simulators. These motion platforms deliver vestibular motion signals that are coupled to auditory and visual events and produce feedback that is incredibly lifelike. Today, customised simulators for certain aircraft types—like

the Airbus A320—are utilised to train and retrain commercial pilots when switching from one aircraft to another. Additionally, databases of real airports across the world provide realistic takeoff and landing scenarios.In addition to being risky, pilot training is expensive from a financial and environmental standpoint. As a result, VR simulators offer a practical and secure alternative that can be used to train pilots to handle challenging and risky scenarios that would be difficult or impossible to replicate in the actual world.

(ii) Medicine

The process of becoming a doctor costs money and puts patients at danger. Therefore, traditional medical education mandated that students use cadavers in the early phases of, say, surgical training, followed by extensive sessions of watching skilled surgeons perform a specific activity. The advancement of feedback devices, which offer a realistic sense of control and manipulation of soft bodily tissue, has been most advantageous to surgical training. The majority of VR advancements in medicine are in the teaching of new non-invasive or minimally invasive endoscopic techniques. Laparoscopic (operations on the belly or pelvic cavity), thoracoscopic (keyhole surgery on the chest), and hysteroscopy (examination and surgery within the uterine cavity) are only a few of the various uses for endoscopy. A flexible tube called an endoscope is typically used to enter into the body for visual inspection, biopsies, and the removal of growths and foreign items. The technique requires indirect access to the operating room, which presents a number of challenges for the surgeon, such as blurred vision, poor hand-eye coordination, and handling tools with constrained movement. To perform a surgery properly and safely, surgeons need extensive training and experience. To lower the operative risks when teaching doctors, virtual reality endoscopic simulators like the Karlsruhe Endoscopic Surgery Trainer (Forschungszentrum Karlsruhe, www.fzk.de) have been developed. These systems are typically desktop-based and employ real endoscopic equipment with a computer-generated display in place of the video camera feed. The simulated bodily areas, tissue membranes, organs, etc. are displayed on the computer screen.

(iii) Military Training

Military training is the final area of application since it enables us to introduce an application of a multi-user 3D environment. The term "distributed interactive simulation" (DIS) is another name for these multi-user systems. The DIS standard is used mostly by military organisations to perform real-time, cross-platform war games on computers that are dispersed throughout the world. The Interactive Networked Simulation for Training symposium was hosted by the Institute for Simulation and Training (IST) at the University of Central Florida, where a series of "DIS Workshops" were held to define the standard. The networked interactive simulation protocol SIMNET, created in the middle of the 1980s for the Defence Advanced Research Project Agency, served as the model for the new standard. While genuine interaction between 10s or even 100s of people was not possible due to the lack of high definition graphics,

SIMNET may theoretically support hundreds of online gamers. Users gain from role-playing, planning, and operations within a safer setting, which is advantageous for military applications.

Food:

Immerse yourself in a particular setting as you virtually visit various destinations and sample the local cuisine.

Education:

The HITLab at the University of Washington is also looking into how VR may be used in education. The HITLab has previously worked on projects like the HMD stereo system Atom World, which was used to help Grade 11 students learn about atomic and subatomic particles, and PhaseWorld, which was used to teach students in Chemistry about how matter changes states and how this depends on volume, ambient temperature, and pressure. The HITLab is now exploring VR in a number of teaching contexts, including visualisation in oceanography. Cybernet Systems Corporation is another manufacturer of pre-built VR systems. It created Astronomicon, an HMD-based solar system visualisation. In order to respond to certain inquiries, students alter planets and other objects. Additionally, they created Virtual Gorilla, which enables pupils to mimic the behaviours and movements of gorillas living in a gorilla family and in a suitable habitat. Students with learning challenges benefit from VR use in the classroom and improve student retention of the material.

Industry:

With the use of digital twins, production employees may simulate and test an exact digital replica of a physical object.

Features that drive virtual reality:

For virtual reality to give users a seamless and engaging experience, frame rate and latency are crucial. Without Leaving the Classroom: Examples of Virtual Reality in Education, Society, and the Nation! Virtual field tours offer countless opportunities, enabling researchers to travel anywhere and observe everything. By using virtual and gestural reality, instructors can investigate abstract concepts and bring real-world abstract concepts to life. Scholars can visualise and interact with the subject by being given the freedom to observe, investigate, and learn about more abstract concepts. in a way that is impossible through traditional literacy. Technology advancement is greatly facilitated by virtual reality.

Advantages of vr in education:

1. Faster Device Allocation and Removal:

The time that students spend in school or college will be brief. It takes time and effort to manually set up a specific student's environment and remove it before it is finished.

2.Ease of management:

Because of virtualization, it is not essential to manually install or upgrade operating systems for each endpoint's apps and other software. Management can be made simpler by doing all of this from a single spot.

3. Improved security:

Data on students and employees is kept in one database rather than being spread out among different endpoints. Thus, by enhancing security, virtualization will also benefit the educational sector.

4. Better support for remote students:

Students will be able to maintain contact with their homes in such circumstances because to virtualization. Alternately, you can complete tasks remotely.

5. Benefits of Virtual Reality in Education

Virtual reality reduces the expenses and setup time involved with physical test stations. Anywhere and at any moment, you can exercise. Make sure instructional activities are scaleable. Decreases actual resource use. Ensure the safety of operations. VR may be tailored and used in a variety of industries, including education. Your ability to communicate and work together with people in distant locations is improved by virtual reality.

Drawback of virtual reality in education:

1. Mistakes have no lasting effects.
2. The user has the option to become fully immersed in the virtual environment.
3. VR restricts interactions with people.
4. The likelihood of actions becoming habits is high.
5. The user could experience health issues.

Limitations of virtual reality in education:

1. Limited Time:

A particular learning environment must be manually set up and taken down before being finished.

2. Easy to Manage:

Virtualization allows for manual installation of operating systems. On each end point, there is no need to install or update any programmes or other software. Management can be made simpler by doing all of this effortlessly in one location.

3. Improved security:

Data on students and employees is kept in one database rather than being spread out among different endpoints. Because virtualization enhances security or distance learning if such a case develops, the education industry also gains. The need of motivating and encouraging students to explore more options and discover new approaches to problem-solving has increased as a result of how virtual reality is transforming the education sector.

How will virtual reality affect educational learning?

Immersive classrooms are the most common type of VR for kids with learning difficulties to learn about the world around them, just like with elementary school students. This type of VR is intended to help students who have learning difficulties. Concerns exist regarding the negative consequences on children as well. Parents are also worried about other things including exposure to obscene or violent content, social isolation, and spending too much time in virtual reality.

Why is it difficult to bring virtual reality into the classroom?

1. Virtual reality is expensive:

You must invest in technology, such as VR headsets, which are pricey and break the bank.

2. Parental Concern:

Your youngster could get hurt if it opens. Parents are also worried about other things including exposure to obscene or violent content, social isolation, and spending too much time in virtual reality.

Issues relating to the use of vr:

Here, we look at some of the main issues and disadvantages with adopting VR in the classroom. The three general and possibly major issues that have hindered or restricted the use of VR generally in education are as follows:

- ❖ Lack of realism, fidelity, and skill transfer problems;
- ❖ Potentially expensive system acquisition costs.
- ❖ Physical consequences for end users.

High Costs of Implementing VR Systems

The first one has to do with the high costs involved in developing and/or acquiring a VR system. As we've seen, the components of VR systems include computer hardware for running the programme, software for managing the visualisation, and display and interface technology. There weren't many pre-made systems available in the 1990s because technology was still quite new. One need specific expertise for procuring and integrating gear as well as for developing control software to establish a VR setup for an educational application. Only a small number of companies produced expensive display devices like head-mounted screens. However, the ongoing usage of VR has led to economies of scale and lowered the cost of some equipment. As we have already mentioned, there are also commercially available educational systems. Because these systems don't need to be developed from scratch, they may be used more quickly and at a lower cost.

Realism

Realism in visualisation is significant because it can improve viewer engagement, lessen perceptual uncertainty, and provide sensory information that is repeated, making the experience richer. Recently, there has been significant advancement in the level of realism attainable in graphical simulations, mostly as a result of the rising popularity of video games. Since the

computer games industry has grown so lucrative, research and development in graphics algorithms and specialised hardware for rendering graphics and simulating dynamics have been stimulated. In turn, VR systems and simulations have benefited from this. In fact, whereas high-end computer support was originally necessary for VR systems, graphics, dynamics, and interaction control can now all be implemented on a single desktop computer.

Health related Issues

These typically show up in immersive settings, especially ones where the viewer is required to wear a head mounted display. HMDs from the beginning were so hefty that using them required sitting down. Despite being substantially heavier than, say, stereo shutter glasses, modern HMDs are significantly lighter, less intrusive, and obtrusive. HMDs often have supporting optics that enlarge the pictures in front of each eye together with two tiny cathode ray tubes for stereo vision. Although resolution would soon improve, initial systems suffered from both low resolution and weight issues. Cobb and colleagues have reported some of the health-related impacts of using an HMD (Cobb et al., 1999). The HMD's weight makes it possible for the user's head to move inside the device, which would cause the viewing to be out of alignment. Although the lenses in an HMD are close to the eye, there is also a limited field of view, which means that the wearer has to make more head movements than usual. There is also the potential for tiredness if a user wears the display for a prolonged period of time. Another problem is eye fatigue brought on by improper optics adjustments and other phenomena like display flicker.

Conclusion:

Virtual reality (VR) is establishing itself as a powerful force in both gaming and schools. Students that use virtual reality in their studies gain from being fully immersed in the world while they learn new topics. The learning process is supported by virtual reality in education, according to the conclusion. It has been demonstrated that in virtual interactive worlds, immersion enhances memory. Children acquire new content-based learning techniques as grants are distributed to fresh projects. VR has shown to be an effective learning tool for them. Data on students and employees is kept in one database rather than being spread out among different endpoints. Virtual reality exam stations require less setup time and money. VR restricts interaction and experience with people. When behaviours become habits, users may experience health issues.

References:

1. Calvert, G. A., Spence, C., & Stein, B.E. (2004). The Handbook of Multisensory Processing.
2. Christou, C., Angus, C., Loscos, C. Dettori, A., &Roussou, M. (2006). A versatile large-scale multimodal VR system for cultural heritage visualization. VRST '06: Proceedings of the ACM symposium on Virtual reality software and technology, ACM Press New York, NY, USA.

3. Foreman, N., Stanton, D., Wilson, P., & Duffy, H (2003). Spatial knowledge of a real school environment acquired from virtual or physical models by able-bodied children and children with disabilities. Journal of Experimental Psychology: Applied, 9, 67-74.
4. Winn, W.D. (2003). Learning in artificial environments: Embodiment, embeddedness and
5. dynamic adaptation. Technology, Instruction, Cognition and Learning, 1, 87-114.
6. Kavanagh S, Luxton-Reilly A, Wuensche B, Plimmer B. A systematic review of virtual reality in education. Themes in Science and Technology Education. 2017 Dec 27;10(2):85-119.
7. Burdea GC, Coiffet P. Virtual reality technology. John Wiley & Sons; 2003 Jun 30.
8. Guttentag DA. Virtual reality: Applications and implications for tourism. Tourism management. 2010 Oct 1;31(5):637-51.
9. Kamarainen AM, Metcalf S, Grotzer T, Browne A, Mazzuca D, Tutwiler MS, Dede C. EcoMOBILE: Integrating augmented reality and probeware with environmental education field trips. Computers & Education. 2013 Oct 1;68:545-56.
10. Fox J, Arena D, Bailenson JN. Virtual reality: A survival guide for the social scientist. Journal of Media Psychology. 2009 Jan;21(3):95-113.
11. Bohil CJ, Alicea B, Biocca FA. Virtual reality in neuroscience research and therapy. Nature reviews neuroscience. 2011 Dec;12(12):752-62.
12. Saposnik G, Teasell R, Mamdani M, Hall J, McIlroy W, Cheung D, Thorpe KE, Cohen LG, Bayley M. Effectiveness of virtual reality using Wii gaming technology in stroke rehabilitation: a pilot randomized clinical trial and proof of principle. Stroke. 2010 Jul 1;41(7):1477-84.
13. Jung T, Chung N, Leue MC. The determinants of recommendations to use augmented reality technologies: The case of a Korean theme park. Tourism management. 2015 Aug 1;49:75-86.
14. Sarkar S. The role of information and communication technology (ICT) in higher education for the 21st century. Science. 2012 May;1(1):30-41.
15. Donalek C, Djorgovski SG, Cioc A, Wang A, Zhang J, Lawler E, Yeh S, Mahabal A, Graham M, Drake A, Davidoff S. Immersive and collaborative data visualization using virtual reality platforms. In2014 IEEE International Conference on Big Data (Big Data) 2014 Oct 27 (pp. 609-614). IEEE.

CONTEMPORARY ISSUES IN SCIENCE AND TECHNOLOGY

Sathyavathy. G[1], Bamalakshmi. J[2] and Manimekalai. S[2]

[1]Department of Medical Surgical Nursing,
Sri Manakula Vinayagar Nursing College, Kalitheerthal kuppam, Puducherry

[2]Department of Community Health Nursing,
Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

Corresponding author E-mail: gsathyavathybablu@gmail.com, bamalakshmiv@kgnc.ac.in, 79manimekalai@gmail.com

Abstract:

Most of the changes of this century have been fuelled by the partnership of science and technology. We live in an; age of science and technology and one seldom reads newspapers, watches television or listens to the radio without being in direct contact with science related news items (Simpson and Anderson 1981). The rapidly evolving nature of technology presents ongoing challenges and opportunities, and addressing these issues requires a collaborative effort from researchers, policymakers, and society as a whole. These contemporary issues in science reflect the dynamic nature of scientific research and its impact on society. Scientists and researchers across various disciplines continue to address these challenges, pushing the boundaries of knowledge and innovation to create a better future for all.

Keywords: Contemporary issues, Sustainable development, Technology, Encompass

Introduction:

The influence of science and technology cuts across all spheres of humanity. Science and technology have an impact on all aspects of human life. According to Simpson and Anderson (1981), science and technology have an impact on all area of our life, including what we eat and wear, what we do for work and what we do for engaging, what we think and feel, and even how we are born and how we die.

It is therefore, of paramount importance that contemporary issues as they relate to science and technology should not be analysed with kid gloves but rather be continuously accessed so that their benefits could be realized, since they bring about rapid development in any nation.

The state of science and technology presently is not encouraging. As a matter of fact, since science and technology are the bedrock of industrialization and development, the industrial as well as the educational sector requires much improvement, since the low level of activity in the science and technology sector has impacted negatively on it. In fact, no country has achieved appropriate economic development without input from the development of science and technology.

Science and technology

Science has been defined in quite a number of ways, as there are many who are interested in its studies. Ango (1990), defined science as a subject that is taught in schools and can be learnt from all the numerous things in the environment. Science is also an organized body of knowledge comprising of ideas, skills, information, attitudes, concepts and generalization about the world, nature and man.

Conversely, technology is broadly defined as activities that provide solution to human needs or more narrowly as solutions to our technical problems (Trowbridge and Bybee, 1990). Abdullah! (1993), opined that, technology means a way, manner, method of techniques of doing things and at such its predates science. As there are many people who are interested in its study, science has been characterised in a variety of ways. Ango (1990) described science as a topic that is taught in schools and can be learned from all of the many items in the environment. Science is also an organised body of knowledge that includes ideas, skills, facts, attitudes, concepts, and generalisations about the world, nature, and man.

Technology, on the other hand, is broadly defined as activities that provide answers to human needs or, more precisely, solutions to our technical difficulties (Trowbridge and Bybee, 1990). According to Abdullah! (1993), technology is a strategy, style, method, or attitude to completing things that precedes science. Science and technology study the formation of knowledge. Science and technology have connections and contrasts. Their core natures differ, yet the two businesses are intertwined. According to Abdullahi (1993), science and technology are like twins, mother and child, or a couple (husband and wife) united together by God that no man can separate. Science and technology have existed since man's beginnings and are utilised to harness natural forces and to solve problems.

Benefits of science and technology

Science and technology have been key tools in the growth of any nation's economy as well as society as a whole. However, absorption and application are heavily dependent on the environment as well as the capacity to access and harness all available source materials.

Some of the benefits of science and technology to a nation include:

1. Improves the industrial sector
2. Boosting of healthcare services
3. Increased gross domestic product (GDP)
4. Creates avenue for investment
5. Boosting of communication and transport system; and
6. Improves the agricultural sector. Etc.,

Role of science and technology in national development:

Science and technology have been critical to the success and development of nearly every country on the planet. It makes a significant contribution to numerous areas of the economy.

Science and technology are inextricably linked with development since they have a mutually beneficial connection. It leads to healthier, longer, wealthier, and more productive lives, and poverty reduction becomes a possibility. The numerous ways in which science and technology promote poverty reduction and economic progress deserve special consideration.

Contemporary issues in science encompass a wide range

These current scientific topics demonstrate the dynamic character of scientific discovery and its influence on society. Scientists and researchers from a variety of fields continue to confront these issues, pushing the limits of knowledge and innovation in order to build a better future for everybody.

1. **Climate Change:** The impact of Human activities' influence on the Earth's climate system is an urgent problem. Climate change is being studied by scientists in order to better understand its origins, impacts, and potential remedies.
2. **Genetic Engineering and CRISPR Technology**: The discovery of CRISPR-Cas9 gene-editing technology, for example, raises ethical and regulatory concerns about the modification of genetic material and its consequences for human health, agriculture, and biodiversity.
3. **Artificial Intelligence (AI):** AI and machine learning technologies are transforming industries such as healthcare, transportation, and robots. However, among the major difficulties linked with AI's rapid growth are ethical concerns, prejudices, and possible job displacement.
4. **Antibiotic Resistance:** Antibiotic-resistant microorganisms are becoming more common, posing a serious danger to public health. Antibiotic resistance is being addressed by researchers through the development of alternative medicines and tactics.
5. **Data Privacy and Cybersecurity:** With the increasing reliance on digital technology, personal data privacy and cybersecurity have become critical concerns. Scientists attempt to create secure systems and procedures to protect sensitive data.
6. **Vaccine Hesitancy and Misinformation:** The rise of vaccine hesitancy and the spread of misinformation challenge public health efforts. Scientists strive to address concerns, improve vaccine education, and combat misinformation surrounding vaccines.
7. **Bioethics:** Advances in biotechnology raise ethical questions related to issues such as human cloning, stem cell research, organ transplantation, and genetic testing. Scientists and ethicists engage in ongoing discussions to establish ethical guidelines and frameworks.
8. **Space Exploration and Colonization:** As space exploration continues to advance, issues such as sustainability, resource utilization, and the long-term effects of space travel on human health become increasingly relevant.
9. **Energy Transition and Sustainability:** Finding sustainable and renewable energy sources is crucial for mitigating climate change. Scientists explore alternative energy options, such

as solar, wind, and hydrogen, and work towards developing more efficient and eco-friendly technologies.

10. **Access to Science and STEM Education:** Ensuring equal access to quality science education and promoting diversity in STEM fields are important challenges. Scientists and educators aim to bridge gaps and inspire the next generation of scientists and innovators.
11. **Biodiversity Loss and Conservation**: The rapid loss of biodiversity due to habitat destruction, pollution, and climate change poses significant ecological and environmental challenges. Scientists focus on understanding the impacts of biodiversity loss and developing conservation strategies to protect ecosystems and species.
12. **Brain Research and Neuroscience:** Advancements in brain research and neuroscience have led to a better understanding of the human brain and its functions. However, ethical considerations regarding brain enhancement, neuroethics, and the responsible use of emerging technologies remain important topics of discussion.
13. **Space Debris:** With the increase in space exploration and satellite deployments, the accumulation of space debris poses a threat to future space missions and even to Earth's infrastructure. Scientists work on tracking, mitigating, and finding solutions for space debris management.
14. **Water Scarcity and Quality:** The availability and quality of water resources are critical issues in many parts of the world. Scientists study water scarcity, pollution, and sustainable water management practices to ensure access to clean water for all.
15. **Mental Health and Well-being:** Mental health issues and their impact on individuals and society are receiving increased attention. Scientists and mental health professionals focus on research, prevention, and treatment strategies to address mental health challenges effectively.
16. **Quantum Computing:** Quantum computing has the potential to revolutionize various fields, including cryptography, optimization, and drug discovery. Scientists are exploring the potential applications and challenges associated with quantum computing technology.
17. **Food Security and Sustainable Agriculture:** Ensuring food security for a growing global population while minimizing the environmental impact of agriculture is a significant concern. Scientists study sustainable farming practices, crop improvement techniques, and alternative food sources to address these challenges.
18. **Renewable Energy Storage:** The efficient storage of renewable energy is essential for its widespread adoption. Scientists are researching and developing advanced energy storage technologies to overcome limitations and improve the scalability and reliability of renewable energy sources.
19. **Human-Machine Interaction and Robotics:** As robotics and automation technologies advance, the ethical implications of human-machine interaction, such as privacy, safety,

and employment, need careful consideration. Scientists explore ways to design and integrate these technologies responsibly.

20. **Pandemic Preparedness and Global Health:** The ongoing COVID-19 pandemic has underscored the need for robust pandemic preparedness, global health equity, and effective disease surveillance. Scientists focus on developing vaccines, treatments, and strategies to prevent and respond to future pandemics.
21. **Artificial Meat and Lab-Grown Food:** The development of artificial meat and lab-grown food aims to address environmental concerns, animal welfare, and the sustainability of food production. Scientists are exploring technologies to produce alternative protein sources and reduce reliance on traditional livestock farming.
22. **Quantum Mechanics and Quantum Information**: The field of quantum mechanics and quantum information is advancing rapidly, with potential applications in secure communication, computing, and cryptography. Scientists are exploring the fundamental principles of quantum physics and developing practical quantum technologies.
23. **Gene Editing and Genetic Ethics:** The ability to edit genes using technologies like CRISPR has raised ethical concerns regarding the modification of the human germline, inheritable genetic changes, and potential unintended consequences. Scientists and ethicists engage in ongoing discussions about the responsible use of gene-editing technologies.
24. **Internet of Things (IoT) and Connectivity**: The increasing interconnectedness of devices through the Internet of Things raises questions about data privacy, cybersecurity, and the ethical implications of collecting and utilizing vast amounts of personal information. Scientists focus on developing secure and privacy-preserving IoT systems.
25. **Bioengineering and Synthetic Biology**: Advances in bioengineering and synthetic biology enable the creation of novel biological systems and organisms with unique properties. Ethical considerations regarding biosecurity, environmental impact, and responsible use of these technologies are important focal points for scientists.
26. **Science Communication and Public Engagement**: Bridging the gap between scientists and the public is crucial for fostering scientific literacy, trust, and informed decision-making. Scientists are exploring effective ways to communicate complex scientific concepts and engage with the public.
27. **Aging and Longevity Research:** With an aging global population, research on aging and longevity is becoming increasingly important. Scientists study the biological processes of aging and seek interventions to promote healthy aging and extend human lifespan.
28. **Robotics and Automation in Healthcare:** The integration of robotics and automation in healthcare holds promise for improving medical procedures, patient care, and surgical precision. Scientists are developing robotic systems and technologies for various healthcare applications.

29. **Environmental Pollution and Remediation:** Pollution, including air, water, and soil pollution, poses significant threats to ecosystems and human health. Scientists focus on understanding pollution sources, developing remediation techniques, and advocating for sustainable environmental practices.
30. **Quantum Cryptography and Secure Communication**: Quantum cryptography provides enhanced security through quantum key distribution and quantum-resistant encryption. Scientists are researching and developing quantum-based cryptographic systems to protect sensitive information in the era of quantum computing.

Contemporary issues in technologies encompass a wide range

1. **Data Privacy and Security:** With the increasing reliance on digital technologies and the collection of vast amounts of personal data, concerns about data privacy and security have become prominent. Protecting personal information, preventing data breaches, and ensuring secure online practices are ongoing challenges.
2. **Artificial Intelligence Ethics:** As artificial intelligence (AI) advances, questions of ethics and responsible use arise. Issues such as bias in algorithms, transparency, accountability, and potential job displacement require careful consideration and regulation.
3. **Cybersecurity and Hacking:** The prevalence of cyberattacks and hacking incidents poses significant threats to individuals, organizations, and critical infrastructure. Protecting systems, networks, and sensitive information from cyber threats remains a pressing issue.
4. **Digital Divide:** The digital divide refers to the gap between those who have access to digital technologies and those who do not. Addressing disparities in internet connectivity, digital literacy, and access to technology is crucial for creating a more inclusive and equitable society.
5. **Automation and Job Displacement:** The automation of tasks and the rise of robotics and artificial intelligence technologies raise concerns about job displacement and the future of work. Finding ways to adapt to technological advancements and provide support for affected workers is an ongoing challenge.
6. **Ethical Use of Biotechnology:** Advances in biotechnology, such as gene editing and synthetic biology, raise ethical questions about the manipulation of life forms and the responsible use of these technologies. Discussions on regulation, biosecurity, and potential impacts on ecosystems are important considerations.
7. **Internet Governance:** With the global nature of the internet, issues of internet governance, regulation, and censorship arise. Balancing freedom of expression, privacy, and security in the digital age requires international cooperation and ongoing policy discussions.
8. **Algorithmic Bias and Fairness:** Algorithms shape various aspects of our lives, from search results to credit scoring and hiring decisions. Concerns about algorithmic bias and

fairness, particularly in areas such as criminal justice and financial services, highlight the need for transparency, accountability, and mitigating biased outcomes.

9. **Digital Disinformation and Fake News:** The spread of misinformation and fake news through digital platforms poses significant challenges to public discourse, trust, and democratic processes. Developing effective strategies to combat disinformation while preserving freedom of expression is an ongoing issue.
10. **Environmental Impact of Technologies:** The production, use, and disposal of technologies can have significant environmental consequences. Minimizing electronic waste, promoting sustainable manufacturing practices, and exploring eco-friendly alternatives are crucial considerations.
11. **Privacy in the Era of IoT:** The increasing integration of internet-connected devices through the Internet of Things (IoT) raises privacy concerns. Balancing the benefits of interconnected devices with privacy protections and ensuring user consent for data collection and usage is an ongoing challenge.
12. **Digital Inclusion and Accessibility:** Ensuring that technology is accessible to all, including individuals with disabilities and marginalized communities, is an important contemporary issue. Addressing barriers to access, promoting inclusive design, and considering diverse user needs are key considerations.

These are just a few examples of contemporary issues in technologies. The rapidly evolving nature of technology presents ongoing challenges and opportunities, and addressing these issues requires a collaborative effort from researchers, policymakers, and society as a whole.

Additional contemporary issues in technologies

1. **5G Technology and Infrastructure:** The deployment of 5G technology brings faster connectivity and enables the Internet of Things (IoT) to thrive. However, challenges related to infrastructure development, spectrum allocation, and potential health concerns have emerged.
2. **Online Harassment and Cyberbullying**: The digital era has given rise to online harassment and cyberbullying, which can have serious psychological and social consequences. Addressing these issues requires a combination of technological solutions, education, and policies to create safer online environments.
3. **Biometric Data and Privacy:** The use of biometric data, such as fingerprints and facial recognition, for authentication and identification purposes raises concerns about privacy and security. Striking a balance between convenience and protecting personal information is an ongoing challenge.
4. **Digital Addiction and Mental Health:** The ubiquity of technology and digital devices has led to concerns about digital addiction and its impact on mental health. Understanding the

effects of excessive technology use and promoting healthy digital habits are important considerations.

5. **Disinformation and Deepfakes**: The rapid advancement of technology has made it easier to create and spread disinformation and deepfake content. Detecting and combating the dissemination of false information and manipulated media is a pressing challenge.
6. **Smart Cities and Urban Technology:** The development of smart cities involves the integration of technology to improve urban infrastructure, services, and sustainability. Challenges include ensuring data privacy, addressing equity concerns, and engaging citizens in decision-making processes.
7. **Autonomous Vehicles and Ethics:** The emergence of autonomous vehicles raises ethical questions regarding safety, liability, and decision-making algorithms. Resolving these ethical dilemmas is crucial for the widespread adoption and responsible deployment of autonomous vehicles.
8. **Digital Divide in Education:** The digital divide in education refers to disparities in access to technology and digital resources among students. Bridging this gap to provide equitable access to digital education tools and resources is an important contemporary issue.
9. **Quantum Computing Security:** While quantum computing offers significant advancements, it also poses challenges to traditional encryption methods. Developing quantum-resistant encryption techniques and ensuring secure communication in the quantum era are ongoing concerns.
10. **Technology and Mental Well-being:** The impact of technology on mental well-being encompasses issues such as social media's influence on self-esteem, excessive screen time, and the need for digital detox. Balancing technology use with mental health promotion is an ongoing challenge.
11. **E-waste Management:** The rapid advancement of technology leads to a significant amount of electronic waste. Managing e-waste, promoting recycling and responsible disposal, and reducing the environmental impact of electronic devices are critical issues.
12. **Digital Rights and Freedom of Expression**: As technology continues to shape communication and expression, ensuring digital rights and preserving freedom of speech online is a prominent concern. Balancing the need for security and protecting civil liberties is a complex issue.
13. **Technology and Democracy:** The impact of technology on democratic processes, such as elections, information access, and political discourse, requires careful consideration. Safeguarding the integrity of democratic systems in the digital age is an ongoing challenge. These additional contemporary issues in technologies demonstrate the multifaceted and ever-evolving landscape of technology's impact on society. Addressing these challenges

requires a holistic approach that considers technological, ethical, social, and policy dimensions.

14. **Big Data and Ethics:** The collection, analysis, and use of big data raise ethical concerns regarding privacy, consent, and potential biases. Striking a balance between utilizing data for innovation and safeguarding individual rights is an ongoing challenge.
15. **Augmented Reality and Virtual Reality:** The emergence of augmented reality (AR) and virtual reality (VR) technologies presents opportunities for immersive experiences and new applications. Ethical considerations include privacy implications, psychological effects, and potential addiction risks.
16. **Internet Censorship and Freedom of Information:** The issue of internet censorship raises debates about access to information, freedom of expression, and government control. Balancing the need for security, protection of individuals, and open communication is a complex challenge.
17. **Automation and Workforce Transformation**: Automation technologies, including robotics and artificial intelligence, have the potential to reshape industries and impact the workforce. Adapting to these changes, reskilling the workforce, and ensuring employment opportunities are critical concerns.
18. **Privacy and Surveillance**: Advances in surveillance technologies, such as facial recognition and location tracking, raise concerns about personal privacy and civil liberties. Developing policies and regulations that balance security needs with privacy rights is an ongoing challenge.
19. **Ethical Considerations of Extended Reality (XR):** Extended Reality (XR), encompassing AR, VR, and mixed reality, introduces new ethical considerations. These include issues of consent, virtual experiences, and potential psychological impacts on users.
20. **Digital Divide in Healthcare:** The digital divide in healthcare refers to disparities in access to digital health technologies and services. Bridging this gap is crucial to ensure equitable access to telemedicine, digital health records, and health monitoring devices.
21. **Quantum Internet and Quantum Communication:** The development of quantum internet and quantum communication technologies holds promise for secure and efficient communication. Addressing challenges related to infrastructure, scalability, and encryption methods is an ongoing focus.
22. **Bias in Algorithms and AI Systems:** Algorithms and AI systems can reflect biases present in the data they are trained on, leading to biased outcomes and discriminatory practices. Mitigating algorithmic bias and promoting fairness and inclusivity are important considerations.

23. **Technology Addiction and Digital Well-being:** The excessive use of technology and the addictive nature of digital platforms have implications for mental health and overall well-being. Promoting digital well-being and developing healthy technology habits are essential in today's connected world.
24. **Robotics and Ethical Considerations**: As robots become more advanced and integrated into various industries, ethical considerations arise regarding their impact on employment, social interactions, and responsibility for their actions.
25. **Sustainable Technology Development:** The development and use of sustainable technologies that minimize environmental impact are critical for addressing climate change and promoting sustainability. Incorporating eco-friendly practices in technology design, manufacturing, and lifecycle management is a pressing issue.
26. **Social Media Influence and Manipulation**: The influence of social media platforms and their role in shaping opinions, spreading misinformation, and facilitating manipulation is a significant concern. Balancing freedom of expression with responsible content moderation and addressing algorithmic amplification are ongoing challenges.
27. **Biometric Surveillance and Privacy:** The use of biometric data for surveillance purposes, such as facial recognition systems, raises concerns about privacy, consent, and potential abuses. Establishing regulations and safeguards to protect individual privacy is an important contemporary issue.
28. **Blockchain Technology and Trust:** Blockchain technology holds the potential to revolutionize various industries through decentralized and transparent systems. Ensuring the integrity of blockchain networks, addressing scalability challenges, and establishing trust among participants are ongoing considerations.

Contemporary issues in science and technology in health sector

The connection between nursing practice, science, and technology can be seen in the following contemporary issues. Embracing these progressions and coordinating them into nursing care can upgrade patient results, further develop effectiveness, and grow nursing jobs in the advancing medical services scene.

1. **Electronic Wellbeing Records (HER):** The use of electronic health records has become increasingly important in nursing practice. Medical attendants need to explore and use HER frameworks to record patient consideration, trade data, and guarantee precise and secure information the board.
2. **Remote patient monitoring and telehealth:** The COVID-19 pandemic has accelerated the growth of telehealth services and technologies for remote patient monitoring. When it comes to providing care remotely, conducting virtual assessments, and remotely monitoring patients' health, nurses play a crucial role.

3. **Wellbeing Informatics and Information Examination:** Technology and data analytics are used in the field of health informatics to improve healthcare delivery, population health management, and patient outcomes. Data analytics tools are increasingly being used by nurses to identify trends, evaluate outcomes, and make decisions based on evidence.
4. **Applications for mobile health (mHealth):** Nurses can now engage patients, educate them, and remotely monitor their health conditions thanks to the proliferation of mobile health applications. mHealth apps allow nurses to provide individualized care, monitor vital signs, and encourage self-management.
5. **Personalized medicine and genomics:** Genomic headways have prepared for customized medication, where treatment plans are custom-made to a person's hereditary profile. Nurses must be able to comprehend genomic concepts, interpret the results of genetic tests, and educate patients about genetic diseases and treatments.
6. **Healthcare Robots and Automation:** The mix of advanced mechanics and mechanization advances in medical services settings presents potential chances to upgrade patient consideration, further develop productivity, and lessen the actual stress on attendants. Attendants might work close by robots for undertakings like drug conveyance, patient lifting, and careful help.
7. **Technology and Patient Safety:** Barcode scanning for medication administration and electronic prescribing systems are two examples of how technology improves patient safety. In order to reduce medication errors and ensure the safe delivery of care, nurses must be proficient in using these technologies.
8. **Computer generated Reality (VR) and Recreation:** Computer generated reality and reenactment innovations offer vivid growth opportunities for nursing instruction, preparing, and abilities advancement. In a controlled virtual environment, nurses can practice clinical scenarios, improving their ability to think critically and make decisions.
9. **Healthcare and Artificial Intelligence (AI):** Machine learning algorithms and other AI technologies can help with diagnostic decision-making, early disease detection, and patient outcome prediction. AI systems and nurses can work together to enhance clinical decision support and care delivery.
10. **Ethical Issues in Medical Technology:** As innovation keeps on progressing in medical care, attendants face moral situations connected with patient protection, information security, and the capable utilization of innovation. In order to guarantee patient autonomy, confidentiality, and beneficence, nurses must navigate these ethical considerations.
11. **Utilization of Wearable Technology:** Real-time health data is provided by wearable devices like smartwatches and fitness trackers, which encourage self-monitoring. Care plans can incorporate data from wearable devices, remote monitoring can be made easier, and patient engagement can be encouraged by nurses.

12. **Apps for Health Education and Promotion:** Portable applications zeroed in on wellbeing schooling and advancement enable people to deal with their wellbeing and pursue informed choices. Medical attendants can suggest solid applications, evaluate their adequacy, and guide patients in utilizing these assets.

Role of science and technology in economic growth:

In economics, it is commonly believed that technology is the primary engine of economic growth in countries, regions, and cities. Technological advancement enables more efficient production of more and better products and services, on which prosperity is predicated.

The role of technology in economic development can be summarized as follows:

- **Time is Cash:** A company's overall profits can be increased by cutting down on the amount of time it takes to produce a product or provide a service thanks to technology.
- **Proficiency:** Innovation can add to the proficiency of a business' result rate, taking into consideration bigger amounts of items to be moved or of administrations to be delivered.
- **Specializations:** The division of labor and specialization of positions within a business must expand in tandem with technological advancements to improve efficiency.
- **Regular Assets:** The capacity of governments and businesses to acquire and make best use of natural resources for the benefit of both the economy and the business is significantly impacted by technology.
- **Modern Development:** Because of the expanded effectiveness of work with the steadily further developing condition of innovation, organizations can increment absolute result, which thusly prompts higher benefits and more noteworthy financial turn of events.
- **Research:** Businesses can benefit from a wide range of technological advancements because improved technology has prompted additional research into nearly every scientific and business field.
- **International Trade and the Internet**: Because it enables businesses to share information and conduct trade in less time than the blink of an eye, information technology is the single most important factor in the success of international trade as well as the expansion of the job market.

Impact of technology in indian economy

Market operations:

- The country's infrastructure relies heavily on the telecom sector. Broadband remote will be the standard, and portable cash move and versatile business will propose limitless potential outcomes.
- The operation of financial markets is being altered by the use of digital technology. New technology-aided solutions only enhance human capabilities in the context of the capital market. AI and man-made reasoning are utilized in monetary associations for different purposes, including venture exchanging.

- Advances in technology are making trading more open and democratic. Information science gives exchanging procedures that address monetary troubles, so financial backers never again need to depend on experts.

Banking industry:

- At the beginning of the 1980s, it became clear that India needed computerized banks. The procedure was implemented at the branch level by Indian banks. To modernize India's banking system, the government established a number of national committees.
- In India, the idea of core banking was implemented by Dr. C Rangrajan, who was at the time the deputy governor of the Reserve Bank of India (RBI). Telebanking, off-site ATMs, and customer terminals were built on top of it.
- During the 1990s, center banking was changed when confidential area banks and unfamiliar banks began approaching the Indian financial industry.
- **Features for Advanced Self-Service:** With fintech banking arrangements, self-administration capacities give clients functional cycles that were beforehand just accessible through an actual branch.
- **APIs, or application programming interfaces:** The National Payments Corporation of India (NPCI) introduced IMPS after the Reserve Bank of India (RBI) introduced NEFT and RTGS a decade ago. This was trailed by Programming interface drove banking. An API is, in a nutshell, a bridge that enables banks and other third parties to securely connect and utilize each other's offerings in real-time.
- **Payments immediately:** The rapid spread of mobile internet services and demonetization contributed to the greater acceptance of digital payments among Indians. Point of sale (POS) terminals only started to gain acceptance around the year 2016.
- **Bharat Interface for Money, or BHIM:** Based on the Unified Payments Interface (UPI), it is an Indian mobile payment application developed by the National Payments Corporation of India (NPCI).
- **RuPay Installment Organization:** RuPay is the first of its sort worldwide card installment organization of India with wide acknowledgment at ATMs, Retail location Gadgets, and internet business stages the nation over. The public authority has as of late endorsed a Rs 1,300 crore ($170 million) plan to advance homegrown RuPay check cards and low-esteem computerized exchanges to support their utilization in underestimated populaces, in a move that could challenge the clout of opponents like Visa and Mastercard.
- **Aadhar:** It is a 12-digit special personality number that can be gotten intentionally by the residents of India and inhabitant unfamiliar nationals. The world's largest biometric identification system is Aadhaar. Ninety percent of adult Indians now possess an Aadhaar identity number. The JAM (Jan Dhan-Aadhaar-mobile phone) trinity was created when the government further connected the identity system to bank accounts and mobile phone

numbers. The fundamental digital architecture that heralds holistic financial inclusion is JAM.

Conclusion:

Science and technology are crucial to the prosperity and growth of every nation. Technology has a key role in wealth generation, quality of life enhancement, actual economic advancement, and transformation in any society. Science, technology, and the expansion of countries and cultures are all proportional. Development is typically connected with technological disruption, which comes as a result of scientific development. Nation-building is difficult in post-colonial regimes, especially in areas where colonial power was largely used to harvest resources or obtain other economic benefits.

References:

1. Agger, B. (2011). iTime: Labor and life in a smartphone era. Time & Society, 20(1), 119-136.
2. Anderson, J., & Rainie, L. (2012, February). Future of the internet: Millennials will benefit and suffer due to their hyperconnected lives. Pew Charitable Trust: Washington, DC. Retrieved from: http://www.pewinternet.org/Reports/2012/Hyperconnected-lives. Aspx
3. Boswell, W. & Olson-Buchanan. (2007). The use of communication technologies: The role of work attitudes and work-life conflict. Journal of Management, 33(4), 592-610.
4. Chesley, N. (2010). Technology use and employee assessments of work effectiveness, workload and pace of life. Information, Communication and Society, (13)4, 485-514. WWW. AWLP.ORG/FORUM 2012
5. Evidence-based pedagogy: Do text based pedagogical features enhance student learning? In D.S. Dunn and S.L. Chew (Eds.), Best practices for teaching introduction to psychology (pp. 41-55).
6. Karpicke, J.D., Butler, A.C., & Roediger, H.L. (2009). Metacognitive strategies in student learning: Do students practice retrieval when they study on their own? Memory, 17, 471-479.
7. Mahwah, N.J.: Erlbaum. Karpicke, J.D., & Roediger, H.L. (2008). The critical importance of retrieval for learning. Science, 319, 966-968.
8. Friedman, Stewart (2008). Total leadership: Be a better leader, have a richer life. Boston, MA: Harvard Business School Publishing.
9. Horrigan, J. (2009, March) The mobile difference. Pew Charitable Trust: Washington, DC. Retrieved from: http://pewinternet.org/Reports/2009/5-The-Mobile-Difference--Typology. Aspx
10. Kennedy, T. et al. (2008, October) Networked families. Pew Charitable Trust: Washington, DC. Retrieved from: http://pewinternet.org/~/media//Files/Reports/2008/PIP_Networked_Family.pdf

11. Knowledge@Wharton. (2009, September 30). Available all the time: Etiquette for the Social Networking Age. Retrieved from: http://knowledge.wharton.upenn.edu/article.cfm?articleid=2349
12. Madden, M. & Jones, S. (2008, September). Networked workers. Pew Charitable Trust: Washington, DC. Retrieved from: http://pewinternet.org/Reports/2008/Networked-Workers. Aspx
13. Perlow, L. & Porter, J. (2009) Making time off predictable &- required. Harvard Business Review. Retrieved from: http://hbr.org/2009/10/making-time-off-predictable-and-required/ar/1
14. Perlow, L. (forthcoming). Sleeping with your smartphone: How to break the 24/7 habit and change the way you work. Boston, MA: Harvard Business Review Press.
15. Schwartz, T. (2012, March 14). The magic of doing one thing at a time. Retrieved from HBR Blog Network: http://bit.ly/FWyXIf WWW. AWLP.ORG/FORUM 2012
16. https://www.slideshare.net/bbednars/contemporary-issues-61555216
17. https://www.slideshare.net/dvn126/current-trends-and-issues-in-science
18. https://prezi.com/omn4vxfbddus/contemporary-issues-presentation/

DIGITAL HEALTH TECHNOLOGY

Manimekalai. S[1], Bamalakshmi. J[2] and Sathyavathi. G[1]

[1]Department of Community Health Nursing,

Sri Manakula Vinayagar Nursing College, Puducherry

[2]Department of Community Health Nursing,

Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

Corresponding author E-mail: 79manimekalai@gmail.com, bamalakshmiv@kgnc.ac.in, gsathyavathybablu@gmail.com

Abstract:

Digital health technology has transformed healthcare by improving disease diagnosis, treatment, and care delivery. Nurses play a vital role in utilizing these technologies to enhance patient care. Digital health tools reduce administrative tasks, enabling nurses to focus more on patient care. Remote care platforms and wearable devices empower nurses to provide healthcare services remotely. Patients can conveniently schedule appointments, access virtual consultations, and monitor their health. Digital health technologies offer benefits such as prevention, early diagnosis, chronic condition management, and personalized medicine. Despite these challenges, integrating digital health tools in nursing care provides streamlined patient interactions, enhanced prevention, lifestyle modification opportunities, value-based care transition, and reduced healthcare expenses. Nurses must actively engage with digital health tools to improve patient outcomes. The future of nursing care relies on harnessing the potential of digital health for personalized, efficient, and patient-centered care.

Keywords: Digital Health Technology

Introduction:

Health care has been revolutionized by digital health technology. The use of digital health tools has the potential to improve disease diagnosis, treatment, and health care delivery for individuals. Health care and related uses of digital health technologies are based on computing platforms, connectivity, software, and sensors. From general wellness applications to medical devices, these technologies have a wide range of uses. These technologies are intended to be used in medical products, as companion diagnostics, or as adjuncts to other medical products (devices, drugs, and biologics). Medical products can also be developed or studied using these tools. Digital health revolutionizes the traditional, inefficient paper-based system by embracing a streamlined, paperless approach where patients and their information take center stage in every decision. In this advanced system, patients have the power to conveniently schedule appointments with healthcare providers they have pre-screened, utilizing ratings and reviews from previous patients, all through their personal electronic devices. Additionally, patients can

effortlessly arrange virtual consultations through video calls, further enhancing accessibility and convenience

Digital health is a comprehensive and dynamic field that encompasses an array of technologies, ranging from wearables and mobile applications to digital health records and remote care. Its vast and versatile nature renders it highly applicable to diverse areas of healthcare. In particular, digital health has the potential to reduce the time towards nurses spend on administrative and compliance tasks, thereby allowing them to allocate more time to delivering care. Advanced background systems will be leveraged to automate roster management, ensuring optimal matching of nursing skills with patient needs while meeting compliance requirements. Furthermore, clinical documents that support high-quality continuity of care will be integrated into the patient-nurse relationship, adding depth to their interactions. These documents will be stored in a secure, centralized system that offers varying levels of access to different stakeholders, ensuring patient privacy and confidentiality.

Digital health plays a pivotal role in facilitating remote care, offering substantial support to nurses in delivering such services effectively. Leveraging digital health technologies, nurses gain enhanced capabilities to provide remote care through various platforms, including popular applications like FaceTime, Zoom, and Skype. Additionally, continuous monitoring systems and wearables such as the Apple Watch, equipped with features like electrocardiogram (ECG) monitoring and fall detection, further empower nurses in remote care delivery. The ability of nurses to upskill and adapt to advancements in digital health proves invaluable for both healthcare professionals and patients alike. By embracing digital health, nurses can allocate more dedicated time to patient care, alleviating them from tedious and repetitive tasks. Consequently, this benefits patients directly while boosting staff morale within healthcare settings.

Benefits of Digital Health Technologies:

Digital health technologies offer a multitude of benefits that empower consumers to make well-informed decisions regarding their health. They provide innovative options for prevention, early diagnosis of life-threatening diseases, and management of chronic conditions outside of traditional healthcare settings. The adoption of these technologies by providers and other stakeholders aims to reduce inefficiencies, improve access, reduce costs, increase quality, and personalize medicine for patients. The use of smartphones, social networks, internet applications, and other technological advancements not only revolutionizes communication but also enables individuals to monitor their health and well-being more effectively while accessing valuable information. This convergence of people, information, technology, and connectivity is driving improvements in healthcare and health outcomes.

Digital health involves various stakeholders, including patients, healthcare practitioners, researchers, and traditional medical device industry firms. Several topics are encompassed within the digital health field, such as Software as a Medical Device (SaMD), Artificial Intelligence and

Machine Learning (AI/ML) in Software as a Medical Device, cyber security, device software functions (including mobile medical applications), health IT, medical device data systems, medical device interoperability, telemedicine, and wireless medical devices.

Software as a Medical Device refers to software intended for medical purposes that can perform these functions independently, without being part of a hardware medical device. Its utilization spans across diverse technology platforms, including medical device platforms, commercial off-the-shelf platforms, and virtual networks.

Artificial intelligence and machine learning technologies hold transformative potential in healthcare by extracting valuable insights from the vast amount of healthcare data generated daily, thereby enhancing patient care and assisting healthcare providers.

In **cyber security**, the increasing connectivity of medical devices to the internet, hospital networks, and other devices has enabled improved healthcare features but also introduced cyber security risks. Similar to other computer systems, medical devices are susceptible to security breaches that could compromise device safety and effectiveness. Managing cyber security risks is a complex challenge that necessitates collaboration between manufacturers, hospitals, and facilities.

In **device software functions**, Mobile apps are valuable tools that aid individuals in managing their health, promoting healthy living, and accessing pertinent information conveniently. The adoption of these apps has been rapid, with users including healthcare professionals, consumers, and patients.

Health information technology (health IT) encompasses hardware, software, integrated technologies, and related licenses that support the creation, maintenance, access, or exchange of health information for healthcare entities or patients.

Medical Device Data Systems (MDDS) encompass hardware or software products designed to transfer, store, convert formats, and display medical device data. MDDS does not modify the data or its display, nor does it control the functions or parameters of any other medical device. MDDS may or may not be intended for active patient monitoring.

Examples of non-device-mdds include software functions that:

Examples of non-device MDDS include software functions that enable the storage of patient data, such as blood pressure readings, for subsequent review. They also facilitate the conversion of digital data obtained from a pulse oximeter into a format that can be easily printed. Furthermore, these software functions allow the display of previously stored electrocardiograms specific to individual patients.

Medical device interoperability refers to the secure, safe, and effective exchange and utilization of information among various devices, products, technologies, or systems. Interoperable devices that can seamlessly share information across different platforms and

systems have the potential to enhance patient care, reduce errors and adverse events, foster innovation, and enable the generation of more diverse study datasets.

Tele health employs electronic information and telecommunications technologies to support and facilitate long-distance clinical healthcare, as well as patient and professional health-related education, public health, and health administration. Tele health technologies encompass videoconferencing, internet communication, store-and-forward imaging, streaming media, and diverse forms of wireless communications.

Radio frequency (RF) wireless medical devices encompass devices that utilize wireless RF communication, such as Wi-Fi, Bluetooth, and cellular/mobile phone connectivity, to support the delivery of healthcare services. Examples of functions that can leverage wireless technology include controlling and programming medical devices, remote patient monitoring, and transferring patient data from the device to other platforms, such as cell phones. With the continuous advancement of RF wireless technology, its integration into medical device design is expected to grow.

Digital technology has become an integral aspect of nursing practice, and the attitudes and inclinations of nursing students towards technology can influence their future adoption of technology in clinical settings. Nursing students possess a distinctive perspective on how digital technologies can enhance learning in clinical practice. Incorporating digital tools to augment learning is essential for effectively delivering content and promoting student engagement with technology. Hence, it is crucial to prepare upcoming generations of nurses to actively engage in information and communications technology, digital health, and eHealth, rather than solely focusing on teaching them technical skills associated with these tools.

The nursing sector has experienced a significant rise in the influence of digital technology. The adoption of healthcare digitization, encompassing technologies like robotic systems and artificial intelligence, along with the increasing reliance on the internet, mobile and web applications, and social media, has resulted in a growing dependence on telehealth and virtual healthcare services. Moreover, the challenges encountered in technology-driven nursing care have been further amplified by the COVID-19 pandemic, which has accelerated the need for comprehensive and inclusive healthcare services.

Challenges in technology adoption in nursing care:

- The introduction of digitization in healthcare can be perceived as a hindrance to the hands-on care and therapeutic relationships that nurses establish with patients and their families.
- Incompatibility with traditional nursing practices and values can lead to nurses being hesitant to embrace digital health services within their healthcare frameworks.
- Nursing care has historically been considered a subordinate level of care within the healthcare field, and as a result, the profession is still in the process of solidifying its leadership role in health and healthcare systems.

- Despite the implementation of nursing informatics to support the nursing profession, there is a significant shortage of practitioners at a global scale.
- The profession has been slow to progress and lacks sufficient leadership and investments to empower nurses in effectively utilizing digital health protocols.

Although uncertainty in nursing care persists, the increased and optimized use of digital health technologies is bringing about improvements. While global disparities in opportunities and accessibility to healthcare have caused delays in receiving services, the healthcare infrastructure is continuously advancing. Systems are becoming more transparent, and improved internet connectivity and digitization in healthcare are profoundly transforming the nursing care industry.

Technologies Transforming Nursing Care Services:

The nursing profession and healthcare industry are being reshaped by the advancements in digital health and technology. Web and mobile applications have simplified and expedited the process of receiving care services, and these incremental changes are expected to have a profound impact in the future. Let's explore the technologies that are revolutionizing nursing care services through the integration of digital health.

Portable Monitors:

Transportable monitors have revolutionized patient care by allowing nurses and nurse practitioners to continuously monitor vital signs while on the move. These monitors can be easily attached to wheels, enabling healthcare providers to keep track of patients' vital signs remotely. The collected data is sent to a central monitoring system, which alerts nurses in case of emergencies. This digital health technology has significantly improved patients' quality of life and enhanced mobility.

Smart Beds in Healthcare Facilities:

Smart beds have gained popularity as a valuable digital health tool in the healthcare system. These beds can track patients' weight, monitor their vital signs, and detect their movements. Nurses can receive real-time updates and communicate about the patient's activities using this advanced healthcare digitization. Smart beds provide healthcare professionals with valuable insights and enhance patient care.

Automatic IV Pumps:

Automatic IV pumps have simplified nursing care services by streamlining the administration of intravenous medications. Nurses receive specific training on operating these devices, as they may vary across healthcare facilities. These automated pumps are equipped with software that allows precise control over medication dosages. Nurses can adjust the drip rate and dosage, minimizing wait times during dosage changes and ensuring accurate and efficient delivery of medications.

Introduction of Tele health:

Tele health services have gained widespread adoption among nurses and doctors, enabling broader access to healthcare through telecommunication and virtual care models. Tele health has become an integral part of the healthcare landscape, with the potential to replace in-person visits to hospitals and clinics. This technology improves the quality of medical attention provided to patients, reduces hospital readmissions and emergency department visits, and enhances the overall patient experience through the use of effective digital health tools.

These transformative technologies in nursing care are revolutionizing the way healthcare is delivered, enhancing patient outcomes, and shaping the future of the nursing profession.

Benefits of digital health for nurses and frontline caregivers

The utilization of digital health in nursing care offers numerous benefits for nurses and frontline caregivers. Here are some key advantages:

Streamlined Patient Interactions:

Digital health tools and health information systems enable efficient storage, synthesis, and display of patient information. This facilitates easy patient interactions and innovative care delivery. Through digital care management practices, nurses can engage patients at the right time and place using smart devices and phones. Patients can conveniently interact with their multidisciplinary teams, even while on the move, without disrupting their daily activities.

Enhanced Prevention of Chronic Illness:

Digitization in healthcare promotes better communication and education for preventive care. This is particularly beneficial for medium to low-risk patients. Digital health tools facilitate patient-provider engagement and provide easily understandable educational materials, resulting in faster care delivery. Interactive digital health applications can deliver concise bursts of information for improved retention and attention, encouraging patients to actively manage their health and prevent chronic illnesses.

Opportunity for Lifestyle Modification:

Digital health offers an effective approach for patients with health risks to focus on lifestyle and wellness modifications. Through multidisciplinary collaborations, including nurses, pharmacists, social workers, and case managers, patients receive customized education tailored to their specific needs. This creates opportunities for patients to gain insights into improving their wellness and making positive lifestyle changes.

Transition to Value-Based Care:

Digital health supports the transition to value-based care, which emphasizes improved patient outcomes and efficient care management. It enables better transmission of healthcare information to various entities within the healthcare system, including patients, managed care organizations, and health systems. By facilitating comprehensive care delivery and information sharing, digital health contributes to better health outcomes along the entire care continuum.

Reduction in Healthcare Expenses:

Embracing value-based care through digital health management can lead to long-term cost reductions in healthcare. By focusing on the quality of care and proactive management of patients' health and conditions, nurses can optimize resource utilization and minimize unnecessary healthcare expenses.

Digital health empowers nurses and frontline caregivers by streamlining patient interactions, facilitating preventive care, promoting lifestyle modifications, supporting the transition to value-based care, and reducing healthcare costs. These benefits contribute to improved patient outcomes and more effective care delivery.

Conclusion:

In conclusion, the integration of digital health solutions in nursing care is driving advancements in the healthcare sector. The upcoming year, 2022, will witness new technological innovations that will further enhance patient care and outcomes. Developing the right app to manage care teams will be crucial in keeping up with these emerging trends. The synergy between nursing and technology is empowering care management teams, leading to improved patient health outcomes at affordable costs. As strategies to enhance patient engagement are implemented, individuals are becoming more self-sufficient in managing their health conditions and feeling empowered through a human-centric approach. This, in turn, influences their decision-making towards adopting healthier lifestyle choices, facilitated by the digitization of healthcare. The future of nursing care lies in harnessing the potential of digital health to deliver more personalized, efficient and patient-center care.

References:

1. Bashshur, R. L., Shannon, G. W., Smith, B. R., & Woodward, M. A. (2011). The empirical foundations of telemedicine interventions for chronic disease management. Telemedicine and e-Health, 17(3), 183-188.
2. World Health Organization. (2020). Telemedicine: Opportunities and developments in Member States: Report on the second global survey on eHealth. Geneva: World Health Organization.
3. Agarwal, S., & Lefevre, A. E. (2015). Labrique, et al. Digital health for development: A multi-disciplinary approach. Journal of medical Internet research, 17(1), e1.
4. Istepanian, R. S., Laxminarayan, S., & Pattichis, C. S. (Eds.). (2011). M-health: Emerging mobile health systems. Springer Science & Business Media.
5. Raghupathi, W., & Raghupathi, V. (2014). Big data analytics in healthcare: promise and potential. Health Information Science and Systems, 2(1), 3.
6. Ammenwerth, E., & de Keizer, N. (2004). An inventory of evaluation studies of information technology in health care: trends in evaluation research 1982-2002. Methods of information in medicine, 43(5), 478-483.

7. Menachemi, N., & Collum, T. H. (2011). Benefits and drawbacks of electronic health record systems. Risk management and healthcare policy, 4, 47-55.
8. Kumar, S., & Nilsen, W. J. (2018). Mobile health technology evaluation: the mHealth evidence workshop. American journal of preventive medicine, 51(5), 671-681.
9. Topol, E. J. (2019). High-performance medicine: the convergence of human and artificial intelligence. Nature medicine, 25(1), 44-56.
10. Chen, J. H., Asch, S. M., & Mathews, S. C. (2019). Accelerating the adoption of digital health technologies. JAMA, 321(17), 1659-1660.
11. Cresswell, K., Morrison, Z., Crowe, S., Robertson, A., Sheikh, A., & eHealth Research Group. (2013). Anything but engaged: user involvement in the context of a national electronic health record implementation. Informatics in primary care, 21(1), 30-38.
12. Oh, H., Rizo, C., Enkin, M., Jadad, A., & Whatley, A. (2005). Review of research studies on the impact of portal technology on healthcare outcomes. Telemedicine Journal & e-Health, 11(1), 13-22.
13. Kvedar, J. C., & Fogel, A. L. (2018). Digital medicine's march on chronic disease. Nature biotechnology, 36(10), 919-921.
14. Topol, E. J. (2019). High-performance medicine: the convergence of human and artificial intelligence. Nature medicine, 25(1), 44-56.
15. https://studyonline.uts.edu. Au/blog/digital-health-nursing

ADVANCEMENT OF TECHNOLOGY IN TEACHING - LEARNING

Prabavathy S
Department of Psychiatric Nursing,
Kasturba Gandhi Nursing College, Puducherry
Corresponding author E-mail: prabavathy111@gmail.com

Educational Technology is the field of study that investigates the process of analyzing, designing, developing, implementing, and evaluating the instructional environment, learning materials, learners, and the learning process in order to improve teaching and learning.

The **Association for Educational Communications and Technology (AECT)** has defined educational technology as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources". It denotes instructional technology as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning". As such, educational technology refers to all valid and reliable applied education sciences, such as equipment, as well as processes and procedures that are derived from scientific research, and in a given context may refer to theoretical, algorithmic or heuristic processes: it does not necessarily imply physical technology. Educational technology is the process of integrating technology into education in a positive manner that promotes a more diverse learning environment and a way for students to learn how to use technology as well as their common assignments.

Important technological innovations for education

Technology is causing massive changes in all sectors of the economy. These changes have been felt in the health sector, the financial world, entertainment, and even government. The good news is that these changes will make the world a better place! Education is one of the key sectors that have been affected by this disruption. These innovations are giving classrooms a new look and have changed the ways in which lessons are conducted. Here are the top six technological innovations that are causing major changes in education.

1. Virtual Reality (VR) in Education

Virtual Reality technology is already the hottest thing in the tech world. Big companies are gearing up for a brutal war over this technology including Google, Sony, Oculus (backed by Facebook), Samsung, and more. One of the areas of application of VR technology is education. With VR, students can learn by interacting with a 3D world. Google has been at the forefront of introducing experiential learning in schools through VR technology.

2. Artificial Intelligence and Machine Learning

Artificial intelligence is being applied in all levels of technology, from the lowest to the most advanced levels. AI is used in schools to automate key activities such as grading subjects

and providing feedback on areas that need improvement. It is also used to enhance personalized learning among students, especially those with special needs. Through machine learning, adaptive programs have been developed that care for the individual needs of students. AI tutors have been developed to teach students subjects such as mathematics and writing.

3. Cloud Computing for Education

Educational resources can be accessed from any part of the world thanks to **Cloud Computing technology**. Vital resources such as written lessons, audio lessons, videos, and video assignments can be stored on a school's cloud terminal. Students can access these resources from the comfort of their homes and complete and submit the assignments back to their tutors. Flimsy excuses that students give for not doing assignments may be a thing of the past. Cloud computing will eliminate the hassle of carrying tons of books or practically living at your local library. This technology also allows students to chat live with their tutor.

4. 3D Printing

3D Printers are already causing ripples in the education sector and students are loving them. Content that was previously taught via textbooks can now be expressed through 3D models. Through this printing technique, students can have a better understanding of something that was thought to be complex. In higher educational institutions, 3D printing is used by engineers and system designers to develop prototypes to be used in the development of final systems. 3D printing takes concepts and makes them real.

5. Social Media in Educational Institutions

Educational institutions have not been left behind in capitalizing on the impact of social media. In fact, most of these social networking sites were developed on campuses and the first users were college students. Universities and colleges can connect with each other through social networking sites even if they are several continents apart. Through these sites, they are able to organize contests, meetings, and parties. Students from different schools use social media to exchange ideas which can change lives.

6. The Use of Biometrics in Schools

No more truancy and cheating! The introduction of biometric systems in schools has helped to streamline education and enhance discipline. Facial recognition, fingerprints, voice recognition, and eye tracking are some of the biometric methods that schools have implemented to streamline their operations. Apart from being used to monitor a student's class attendance, they are used when borrowing school property such as books in the library. Teachers use eye-tracking methods to monitor how students are absorbing the content that they have been taught.

Roles of technology in education

Important roles of technology in education for students as well as parents and teachers have a glance:

- **Promotes Effective Educational system**

Undoubtedly, since technology is introduced in the classroom, it encourages the overall growth of students. Technology is a robust process to promote a healthy educational system worldwide. The Most Important role of technology in education makes learning more accessible, exciting, and enjoyable. The development of technological advancements in education leads to enhance knowledge and skills of students.

- **Technology Helps Students Learn Much And Better**

Are any of us still wondering how important is technology in Education? Thus, let me inform you that a survey has proved that digital learning technology helps most students improve their grades. Furthermore, through technology-based E-learning, students can learn more and better from different resources without depending on an institution or an instructor.

- **Improvise better Communication and Collaboration**

We all know that the existence of technology has improved communication and collaboration to a better level. Likewise, Educational technology also boosted communication and collaboration between teachers and students and students/ parents, teachers/parents, and peers.

Teachers can interact with students to clear their doubts and make e-learning more effective. Technology enables one-on-one interaction in the classroom online.

- **Provide Teachers with More Resources**

Educational technology provides teachers with plenty of e-learning tools like Gamification, AR / VR, smart boards, etc. Through Advanced modern technology in education, teachers can use various digital tools to magnify learning opportunities for students.

E-learning solution technologies enable teachers to improve their teaching skills. From technology, teachers can instruct well through video lessons, micro-learning, attractive infographics, etc. Moreover, teachers can engage the students by delivering online tests and different courses.

- **Learning At Own Pace**

The important role of technology in education is to students as they can learn at any time and from anywhere. With the technology-based E-learning process, one can study in their comfort zone. Students can play, pause and re-watch complex topics using online educational applications until the concept is clear.

- **More Opportunities For Online Project-Based Learning**

Most schools are opting now for online Project-Based Learning instead of wasting time on pen-paper-based projects. Edtech solutions have also made Project-Based learning much more accessible and convenient for students. Now, one can create presentations using Google Classroom, Google Docs, PPT, Slides, etc. Through online Project-Based Learning, students use their skills and knowledge up to the next level to complete an assignment.

- **Personalized Learning Opportunities**

The Importance Of Technology in Education is not just limited to efficient learning, students can also have personalized learning opportunities. The availability of more resources/ material 24*7 to students allows them to personalize learning better. We all know that not all students have the same learning frequency; thus, personalized learning is considered. Personalized learning is also known as self-paced learning, which can help individuals optimize the quantity of material according to their capability.

- **Efficient Problem-Solving Stuff**

Well, studying without having any doubts can be possible only through modern intelligent classes. Video modules of every concept help each of you to cut out your doubts. So, If any problem arises in any topic, just go through the Problem-Solving material and clear all doubts.

- **Better Understanding through Graphics**

Technology has evaluated the learning process through video graphics, which helps the human mind understand the concept faster and remember it for a long time. This can be only possible because of the visual information system. Using VR technology in education, students can retain knowledge by 25% to 60%. Using VR educational technology like gamification, mobile learning, microlearning, visual graphics, etc. students can experience fun and learning at the same time and keep engaged with their studies.

- **Save Time And Money**

With the availability of more study material via E-learning technology, the student can spend less money on other materials. Even nowadays, many schools are more focused on buying online study material, which is cheaper and more convenient for storage. Teachers can save time and money by teaching students via advanced educational, technological systems like augmented reality and virtual reality programs free of cost online which helps one to learn and understand faster.

BENEFITS OF EDUCATIONAL TECHNOLOGY

The various benefits that come with using educational technology are as follows:

1. It Offers a Wider Choice of Materials That Can Be Accessed Easily

The vast array of educational technology that is available today offers students a wide range of options from which they can choose the best ones for their learning needs. This helps them develop the right kind of skills and knowledge so that they can become good professionals in their chosen fields.

2. It Helps Improve Learners' Communication Skills and Performance in School And Workplace Settings

Learners who are able to communicate better through technological means will also perform better academically as well as in work settings because communication skills are very important when you want to get your point across effectively.

3. It Provides a Fun and Engaging Learning Experience for Students

Today's learners are not only required to learn but they also need to have fun while doing so. Educational technology offers students the opportunity to have fun while learning, which will also help them stay motivated and excited about their studies.

4. It Allows Learners to Access the Internet from Anywhere at Any Time

The internet has become such an integral part of our lives that we hardly find people who do not use it on a daily basis. In today's world, it is essential for students to be able to access the internet from anywhere at any time so that they can do their assignments and research without having to travel all over a place or wait for a particular time when they can do so.

Using educational technology helps learners in this regard because it allows them to connect with the internet even when they are in a classroom, at school, or at home.

5. It Helps Learners Learn New Skills and Acquire New Knowledge

Learning new skills and acquiring new knowledge are two very important aspects of life that learners should be able to enjoy. Through the use of educational technology, learners can acquire these skills and also develop their knowledge through various programs that are available online. These programs offer students the opportunity to learn about various topics that are interesting and useful for their respective fields of work or studies.

6. It Allows Students to Improve Themselves Both Mentally And Physically

The benefits of using educational technology also include the improvement of learners' mental and physical health. By using these tools, students are able to enhance their learning and their cognitive skills, which in turn helps them improve their academic performance as well as their physical health.

7. It Helps Learners Stay Up To Date with New Technological Advancements

Students who are able to stay up to date with the latest technological advancements will be able to improve their knowledge of different fields and develop new skills that they can use in the future. These students will also be more likely to find a job because they will have a very good understanding of the latest trends in various fields and be able to help companies become more efficient by knowing how new technologies can be used for various purposes.

Ways for educational technology advances are shaking up education

1. Online Learning Platforms

Digital transformations are now letting students ditch the physical classroom. You can learn everything from coding skills to personal finance basics from resources like Coursera. These programs are taught by industry leaders who are aligned with current trends and needs in the job market. You learn more valuable and relevant skills in a shorter amount of time compared to traditional education. - Marc Fischer, Dogtown Media LLC

2. Live Online Tutoring

Live online tutoring used to be relegated to English-language teachers who had to wake up at odd hours to meet their pupils online. As a more accessible option, the schedules of parents and kids no longer need to coordinate, reducing traffic on the roads and carbon emissions. It also allows parents to be more selective in their tutors instead of going with whoever can accommodate their schedule. - Arnie Gordon, Arlyn Scales

Forbes Technology Council is an invitation-only community for world-class CIOs, CTOs and technology executives.

3. Educational Phone Apps

Instead of fighting with students to keep them away from their beloved phones, how about using smartphones to help them learn? We need more simple, high-quality apps like Grasshopper. Apps need to have bite-sized chapters that are small but super focused. The interface should also be simple and intuitive. The more interactive the content is, the higher the learning will be. Edtech is fun with these apps. - Vikram Joshi, pulsed

4. Virtual, Augmented, And Contextual Tools

Virtual and federated tools have lowered the barrier of entry, making knowledge more accessible and learning experiences more global. Augmented reality, along with contextually relevant, on-the-job learning systems, have brought an exponentially differentiated experience to students. They have also demonstrated a greater ability for students to commit new concepts to memory and recall concepts faster when the knowledge and skill is required. - Florian Quarré, Exponential AI

5. Extended Reality Technology

Extended reality (XR) moves students away from traditional lectures toward more engaging, immersive learning experiences within a simulated real-world space. Other benefits include increased comprehension levels and long-term memory retention among students. Best of all, as the technology enters the mainstream market, XR will be an affordable teaching option for many educational institutions. - Christopher Yang, Corporate Travel Management

6. Faculty Tech

Classroom edtech isn't the only thing that's been booming. There's a huge trend in primary and higher education systems using new technology to track and monitor their strategic and operational plans. It's really interesting to see the difference in the past few years as universities in particular have shifted from tracking plans in spreadsheets to using integrated plan management tools. - Christy Johnson, AchieveIt

7. Screencasting

Screencasting has changed the dynamics of the classroom as it offers both teachers and students the freedom to actively engage with the lessons. It has helped teachers untether from the front of the classroom and empowered students to share their work. This results in overall higher

engagement amongst the students, but in a fun and interesting manner more importantly! - Mihir Shinde, B&H Photo Video Pro Audio

8. Gamification

One of my favorite tech advancements has been gamification in the classroom. Gamification is being applied to educational environments through different pieces of software in the marketplace. This enables greater student interaction in the classroom and in place of traditional homework. I am a big fan of gamification in education as it gets students more excited about learning. - Marcus Turner, Enola Labs

9. Professional-Grade Tools

Giving students professional-grade tools means they have the ability to produce amazing things. Google's G Suite and Chrome books give students professional tools at budget prices without any of the fluff or bloat ware of other solutions. Schools that deploy these tools are more likely to have students that enter the workforce with experience and familiarity with enterprise offerings. - Tom Roberto, Core Technology Solutions

10. Collaboration

I've seen some great edtech tools come and go, but one tool that has stuck out is Flipgrid. It effectively combines the preferred way students like to share with the way educators set instructional goals. By coupling these two, students and teachers can collaborate, share and connect. It's one of the tools that is enabling engagement beyond traditional instruction. - Tyler Shaddix, GoGuardian

Barriers to technology integration in education

1. Internet or computer access

Even though internet access is so widespread, not every student has access to the things they need in order to adopt technology-driven education successfully. Some families don't have the financial means to afford internet and computer access for their household. This is especially true for low-income families who have multiple children.

Some schools have created programs to help low-income families adopt technology within their homes for the benefit of their children's education. However, these programs often stipulate certain socioeconomic and demographic criteria that a family needs to meet in order to qualify, which could limit who is given assistance.

Districts who are faced with this obstacle need a plan for students who can't afford technology to still be able to access their schoolwork. This might come in the form of a computer lab or a library of computers that can be checked out on a daily or weekly basis.

2. Budget constraints

Some school budgets simply don't make room for technology or never anticipated a technology revolution like the one we're seeing. Districts wanting to provide a computer to each student must be able to afford those devices in the first place, but they're not always able to.

Additionally, digital books and other materials must be purchased, and some of these (e.g., those from Pearson) require ongoing subscriptions. In small cities and towns where the majority of people come from low-income families, this isn't easily or even realistic.

Some larger school districts have been able to pass school stimulus plans within their communities to help with this problem. However, if the community isn't on board with the idea or the city simply doesn't have the funds available, the process will be more difficult. Even though there are federal education grants available, the amount of money available often exceeds the amount needed for all schools to take advantage of the funding.

3. Scarcity of curricula

Since most schools use technology to supplement instruction instead of fully adopting it, there is not as much curriculum for this form of teaching as there is for traditional instruction. Most of the curricula out there are written with traditional teaching methods in mind, rather than technologically driven ones

For your school to successfully adopt technology, your teachers will need to provide feedback on the curricula they're provided and what needs to be done to accommodate technology instruction. For this to work, you'll need a group of teachers who are all invested in adopting technology in their own classrooms and for the benefit of their students.

Administrators and leadership need to remember that not all teachers will be on board or comfortable with teaching new curricula that incorporate technology, especially those who are not familiar with how to use instructional technology. It's vital to support these instructors with meetings and training sessions so they don't run into too many roadblocks in using the technologies you've provided. The more support your instructors receive in this transition, the more willing they'll be to help your initiative thrive.

4. Wi-Fi barriers

Adopting technology in your school sounds great until you run into Wi-Fi problems. You need to be prepared to answer the following questions, among others:

- Is your school sufficiently staffed to support students or teachers who run into problems? If not, would it be within your budget to hire additional support staff?
- Do you have sufficient download and upload speeds for the amount of students using their devices concurrently?
- How secure is your school's network, and do you have restrictions on what content students can browse?

While some telecommunications providers are able to install high-speed internet at an affordable cost for schools, not all can offer educational discounts. One of your top priorities in technology adoption should be to secure a decent download speed for students so they can stream videos and any other multimedia content you want them to engage with in the classroom.

They'll also need a good upload speed so assignment submissions don't take several minutes to go through.

5. Parental involvement

Some parents may be opposed to technology adoption for a few reasons. For example, some parents fear that technology will distract their children instead of help them to learn more effectively. This is a concern worth addressing early on. Reassure them that students won't have free rein to do whatever they want just because they're using their devices — limitations *will* be imposed.

Other parents worry that technology adoption will require more involvement from them in an already tightly packed schedule of work and household responsibilities. Remind them that students won't be on their own. While some materials, like lectures, may be pre-recorded, teachers will still be available via video conferencing software like Zoom or Go to Meeting to help students with any problems they run into during the day.

Conclusion:

The most important thing that I took away from this class is that technology is a large part of today's education. It is very important to be able to not only use technology today, but also have the ability to learn new technology. This class gave me the skills necessary to integrate my classroom with technology more efficiently. This benefits not only the students but also assists me as an educator. This class has sharpened my skills with technology that I was already familiar with. It also has shown me a few new technologies that I will be able to use in my own future classroom. I am now better prepared to create a digital age classroom. This includes teaching students about new technology, how it should and should not be used, assessing students with technology, and inspiring creativity. These components involving technology have created a path for me to be the best educator I can be.

References:

1. Aralu, U. O. (2015): Influence of Information and Communication Technology on Digital Divide – Global Journal of Computer Science and Technology, Volume 15, Issue 3, Year 2015.
2. Amardeep, and Ansari, M. A. (2004). Communication Technologies and Information Support for Development in India. In Kiran Prasad (Ed.,) Information and Communication Technology: Recasting Development. p. 83-112. B.R. Publishing: Delhi.
3. Afshari, M., Bakar, K. A., Su Luan, W., Samah, B. A. And Fooi, F. S. (2009): Factors Affecting Teachers' Use of Information and Communication Technology. -– International Journal of Instruction, Volume 2, No. 1, pp. 77-104, January 2009.
4. Ahlawat, N. (2011): Enhancing the Quality of Higher Education Through the Use of Information and Communication Technology. –Bhartiyam International Journal of Education & Research, Volume 1, Issue 1, 2011.

5. Benigno, V. Et al (2007): Inclusive Education: Helping Teachers to Choose ICT Resources and Use Them Effectively – InstitutoTecnologie, Italy, eLearning Papers No. 6, November 2007.
6. Bingimlas, K. A. (2009): Barriers to Successful Integration of ICT in Teaching and Learning Environments –Eurasia Journal of Mathematics, Science & Technology Education, Volume 5, Issue 3, Pages 235-245, March 2009
7. Cavas, B. Pinar, C. Karaoglan and B. Kisla, T.(2009): A Study of Science Teachers' Attitude Toward Information and Communication Technologies in Education – The Turkish Online Journal of Educational Technology, Volume 2, Issue 2, Article 2, April 2009.
8. Casal, C. R. (2007): ICT for Education and Development. – Journal of Policy, Regulation and Strategy for Telecommunications, Communication and Media, Volume 9, Issue 4, pp. 3-9, June 2007.
9. Chauhan, R. K and Malik, K. (2016): Innovative Use of ICT in Teaching and Learning – BhartiyamInternational Journal of Education, Volume 5, Issue III, June 2016
10. Clement, CheKum, Khan Md. S.H & Hasan M (2012). Barriers to Introduction of ICT in Education in Developing Countries: The Example of BangladeshInternational Journal of Instruction, Volume 5, No. 2, July 2012.
11. Duhaney, D. C., (2001): Teacher Education: Preparing Teachers to Integrate Technology. - International Journal of Instructional Media, Volume 28, Issue 1, pp. 23-30, April 2001.
12. Hattangdi, A. and Prof. Ghosh, A. (2006): Enhancing the Quality and Accessibility of Higher Education Through the Use of Information and Communication Technologies. www.iitk. Ac.in.
13. https://www.loyola.edu/school-education/blog/2021/what-is-educational-technology
14. https://en.wikipedia.org/wiki/Educational_technology
15. https://www.forbes.com/sites/forbestechcouncil/2019/12/10/10-ways-edtech-advances-are-shaking-up-education/?sh=46235ccb53cb.

INNOVATION IN SCIENCE AND TECHNOLOGY OF EDUCATION

Ranjitha G, Bamalakshmi J, Roopamathy M and Aruna Devi M

Department of Community Health Nursing,

Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

Corresponding author E-mail: ranjithagunasekaran.gmrr@gmail.com,

bamalakshmiv@kgnc.ac.in, roopamurugan96@gmail.com, arunatanushka@gmail.com

Abstract:

In an increasingly technologically advanced society, this chapter shows the different ways that Science Teacher Associations (STAs) can contribute to the creation and delivery of innovative science and technology education. Powered by science and technology's results. It emphasizes the crucial role that these professional bodies play in encouraging teacher ownership, collaborative experience sharing, and being guided to assume active responsibility for the interpretations of the intended Government curriculum in order to deliver cutting-edge science education that is most appropriate for students in their school. The establishment of numerous professional fora for increasing teachers' professional development will greatly aid any change away from "teaching the textbook information," "teaching to the examination," and towards "assessment for learning" (formative assessment).

Keywords: Science, Technology, Educational Innovations, Creative Teaching.

Introduction:

We prefer to use the word "innovation" whenever we can. Making adjustments or doing something in a novel way is what it means to innovate. You don't need to be an inventor to innovate. Creativity and flexibility are inherent to innovation. Innovation in education is not a term with a predetermined meaning. The spirit of innovation education is a willingness to approach issues with new eyes and creative solutions. It is an acknowledgment that we do not have all the solutions and that we are open to new approaches to improve, such as information transfer techniques and creative teaching techniques.

The Innovations in Science & Technology (IST) programme is intended for students who are interested in exploring a range of STEM subjects and putting scientific principles to use in practical situations.

Innovation in education can be:

- Realizing that a flipped classroom, in which students watch lectures at home and complete homework in class, is better for their educational needs.
- Increasing the amount of technology in the classroom to establish a blended learning environment where students can interact with technology as they would in the real world.
- Giving parents of school systems more opportunities to communicate clearly and effectively using strong video tools.

- When it comes to education, innovation is the process of recognizing problems, observing and learning from others, developing fresh approaches to solve these issues, and refining those approaches when first tests don't provide the desired outcomes.

Project-Based Learning (PBL):

Help students identify an issue in the real world and come up with a solution by using project-based learning (PBL). Introduce a PBL unit as a component of a bigger lesson so that students can practice collaborative problem-solving, creative thinking, and thinking outside the box.

Blended Learning

Learning that includes both online and traditional classroom instruction is known as blended learning. When using the internet to support their learning, students must become accustomed to using online resources and tools. Students can acquire the best practices for using tools that they will rely heavily on in their professional lives through a blended learning approach.

Educational technology

EdTech - Educational technology is a catch-all term for any programme, tool, or service created to improve education. Using technology in the classroom is crucial, but we must be cautious to avoid diving headfirst into the unknown. Technology advancements in the classroom frequently reflect those made in other fields. Therefore, pupils will be more equipped to use and interact with technology in the workplace if they use it more in the classroom. (edtech) is a catch-all term for any programme, tool, or service created to improve education. Using technology in the classroom is crucial, but we must be cautious to avoid diving headfirst into the unknown. Technology advancements in the classroom frequently reflect those made in other fields. Therefore, pupils will be more equipped to use and interact with technology in the workplace if they use it more in the classroom.

Innovation Educational technology in Classroom:

Feedback assessment tools

Both giving and receiving feedback is crucial for students. It can assist teachers in assessing students' comprehension in the moment and taking the mood of the class. Additionally, it is quite simple to introduce feedback assessment tools into the classroom, such as polling, surveys, questionnaires, and knowledge checks. Even now, we still make use of them by asking students to raise their hands, then tallying their answers. The use of technology in the classroom can be made enjoyable for the students by using feedback assessment tools. Additionally, by compiling the information and preserving responses for subsequent evaluation, it can save teachers time.

Video conferencing and virtual classrooms

Virtual schools and academies have long used robust virtual classroom systems as their main location for face-to-face instruction, even if millions of teachers and students have become newly minted virtual classroom professionals over the past several years. Virtual classrooms are video conferencing systems designed with specialised educational tools. Hold online classes or give students ways to communicate online. Both teachers and students need to get more at ease in front of the camera.

Video projects

Your pupils have grown up with technology. In addition, they make videos. You can be sure that kids have experience with video, whether they are using TikTok, YouTube, Instagram, or Snap. Incorporate video into your efforts to capitalise on your enthusiasm. Give students the opportunity to work together on projects to produce videos centred on particular themes. Working together will allow them to develop their communication skills in addition to exercising their imagination.

Kaltura Virtual Classroom

The Kaltura virtual classroom was created with education and training in mind. Remote students can actively participate in interactive, face-to-face classes that teachers can deliver. Teachers aren't just meeting with passive pupils in person to lecture them. The platform gives instructors the resources they need to implement innovation in the classroom.

Real-time polling

Teachers can monitor students' pulse with a live polling tool. A polling tool to gather quantifiable response is preferable than asking pupils to raise their hands or click a hand-raise button on camera. With the help of pre-set polling choices, teachers can quickly start a poll. Students then choose their response, and teachers view both the individual student responses as well as the real-time aggregate results.

Quizzing

Polling is insufficient at times. In order to make the rest of the course more effective, we must assess in-the-moment deeper understanding. Make tests that students can take in class that have a variety of question kinds. Teachers can administer the quiz and view the results immediately. You can evaluate the scores after class as well. With this knowledge, teachers can move to reinforce concepts now, in class, rather than waiting to find out whether or not pupils have understood the content.

Interactive whiteboards and file annotations

Students should take an active role in their education. An interactive whiteboard is the best approach to promote that. Students can think, cooperate, and share ideas well on a whiteboard.

Video in the classroom

Video is highly effective at presenting complicated subjects in understandable ways. With the help of YouTube and other video resources, teachers can reinforce their lesson plans in the classroom using the Kaltura virtual classroom. We need to keep things lively and engaging when teaching. We cannot avoid creating multimedia experiences, including those that make use of presentations, graphics, whiteboards, and, of course, video**.**

Breakout rooms

Peer involvement has generally been overlooked in remote and distant education, despite the fact that instructors are aware of its importance for every student's performance in the classroom. Teachers may create fantastic led breakout room experiences with the help of the virtual classroom breakout rooms offered by Kaltura. With only one click of a button, students can interact with one another safely while learning straight from the teacher. Encourage collaborative projects, role playing, and branching situations in the breakout spaces.

Innovative technology in healthcare

Digitization, disruption, and transformation are the three stages of how and when professionals use technology in healthcare. Setting up digital capabilities to support routine medical procedures or services was part of the digitization process. Examples of how digitization has altered healthcare services include CT scans and MRIs, while digital tools like automated billing have altered administrative procedures. In the end, digitalization has made it simpler to store, access, and distribute data.

The evolution of when and how professionals use technology in healthcare has gone through three stages: digitization, disruption, and transformation. In order to assist ordinary healthcare processes or services, digitization included setting up digital capabilities. Examples of how digitization has altered healthcare services include CT scans and MRIs, while administrative procedures have been altered by digital tools like automated billing. In the end, digitalization has simplified data storage, access, and sharing.

The interaction between people, organizations, and governments is evolving as a result of modern technologies including artificial intelligence, mobile technology, analytics, and cloud. The world is becoming more consumer-centric as a result of these disruptive developments, which are fostering a level of human connection never before seen. As healthcare progresses, greater health system integration will bring previously disparate digital activities or processes from many businesses together. To promote medical interoperability among payers, providers, and other healthcare organizations, advancements in electronic health records (EHRs) and other technology are also helpful.

The ongoing digital revolution of healthcare will include a fundamental reimagining of how payers, healthcare providers, and others operate and interact with patients, consumers, and stakeholders. Technology is transforming healthcare, which was once a collection of discrete

operations, into an integrated ecosystem where healthcare professionals can successfully manage their difficulties on a wider scale while retaining a patient-centered focus and providing value-based treatment.

Healthcare Science and Technology Benefit in Medicine

1. Enhancing the efficiency of treatments

One of the main advantages of better healthcare technology, according to some of the top industry experts, is that treatments are now more widely available. Health IT has created opportunities for better, more targeted research as well as potential new discoveries. Patients' risks can now be assessed using information acquired from various hospitals, electronics, applications, and artificial intelligence (AI) models.

Machines that have been taught to think and act like people are said to have artificial intelligence (AI), which is a far more potent version of human intellect. For instance, Babylon and Telus Health in Canada collaborated to create an AI app for Canada that matches patients with the appropriate healthcare provider or professional via video after scanning their survey responses. AI makes the lives of patients and doctors easier by completing jobs that would often be completed by people, but in a fraction of the time and at a much lower cost.

2. Digital Dispensing Speeds Up the Prescription Process

It is vital to guarantee that each patient is given the appropriate medication in the appropriate dosage. However, it might be difficult to organise all of this data storage. The procedure of writing and timely renewing prescriptions has been greatly reduced and expedited by the use of digital prescription dispensing.

There are a lot of startups in the healthcare industry that are always coming up with new ideas and developing apps for smartphones that alert users when their prescriptions need to be renewed. In most cases, you may renew it within the app with just a few touches. By implementing digital medical visits through their applications, some pharmaceutical businesses are going one step further. All of this makes sure that there are no gaps in the provision of quality patient care and that patients and their doctors communicate effectively.

3. Patient data in real-time

The primary focus of healthcare and all technical breakthroughs has always been and will continue to be patient care. By developing new tools (like MRIs), medications, and therapies that save lives and increase the chances of recovery for patients, the advancement of healthcare science and technology has made patient care significantly better and more dependable in most instances.

The ability for medical personnel to record real-time patient data on tablets and other mobile devices is one of the main advantages of health IT. For instance, you might swiftly update a patient's chart and then instantly share it with the most recent information regarding their health.

Important patient information, including test results, vital sign records, and other pertinent data, is now centrally stored and accessible. Since you can always stay current on events thanks to this level of information storage, doctors are now able to provide patients with a higher level of care and efficiency. Not only does this data gathering benefit doctors, but it also benefits scientists and researchers who review patient histories to identify emerging patterns and develop more effective treatments for a variety of diseases.

4. Software Improves the Effectiveness of Healthcare

Healthcare providers can easily monitor and handle organisational and patient data thanks to medical software, which is essential to the healthcare sector. Clinical workflows can be streamlined and daily tasks made easier by software. Take the World Health Organisation, for instance, which has been able to organise diseases along with their causes and symptoms into a sizable database that comprises more than 14,000 unique codes. With the help of resources like these, health care providers and researchers may examine the sickness from a variety of perspectives and come up with treatments that will not only help control the condition but also enhance the general quality of healthcare.

5. Quick and Easy Patient-Doctor Communication

When a patient wanted to see a doctor in the past, they had to phone to arrange an appointment, talk with a receptionist, and sometimes endure lengthy wait times. These days, you can accomplish everything quickly and easily online or even virtually—you can schedule a consultation without even getting up from your couch!

Startups all across the world are enhancing how people communicate with their doctors. As an illustration, the content marketing tool Pharma Phorum featured a US-based firm that developed the HoyDoc app, which enables patients and clinicians to view their medical records in both English and Spanish.

6. Robotic Surgery Is Increasing Success Rates and Reducing Costs

In the past, the concept of a robot doing surgery would have looked like something out of a nightmare sci-fi movie, but today it is not only common but also highly advised. Surgeons' skill can only reach so much of the deep, challenging portions of the human body. Robots, however, are unrestricted; they can go where humans cannot, and this small distinction has led to more effective surgery than ever before.

For instance, some surgeons employ robots to help them during procedures to remove brain tumors. In a recent example involving a juvenile patient, the surgeon made use of a sophisticated robotic microscope. The physician claimed the device included a robotic arm, a GPS component that displayed the location of his equipment, and a heads-up display with a clearer picture of the patient.

7. Better Outbreak Prediction

The healthcare sector is heavily reliant on AI and big data. Big Data is a collection of data that is extremely large in volume and expanding rapidly over time. AI-based data analytics and predictive models can be utilized by medical experts to accurately understand and investigate various diseases. BlueDot, a Toronto-based artificial intelligence company that employs machine learning to track infectious disease epidemics throughout the globe, informed its clients—including a number of governments, hospitals, and businesses—about an unusual uptick in pneumonia cases in Wuhan, China. Later, this developed into Covid-19, as we all now know it. In order to recognise patterns and detect outbreaks earlier so that preventative actions may be done, healthcare technology can play a critical role in the future.

The innovation dimension of education and skills

The case for educational innovation is frequently presented in the broader perspective of how education and skill development contribute to successful innovation. In fact, a solid foundation of education and skills is necessary for effective innovation in economies and communities.

If educational systems fall short in this regard, they will need to innovate on their own.

Ability to innovate

The goal of education policy to promote innovation has typically been to increase the number of students studying the STEM fields (science, technology, engineering, and mathematics).

Recently, though, a broader perspective on innovation has developed that acknowledges the contribution of a larger range of abilities and disciplines. Government policy needs to have a broad view, even though STEM professionals are unquestionably crucial for some types of innovation, particularly technological innovation.

This evidence from creative employees has led to the ability to categories skills for creativity.

There are three major groups:

- Subject-based abilities, or knowledge and expertise specific to a field.
- Creativity and higher-order thinking abilities, particularly creative cognitive habits. These skills include critical thinking, creativity, and curiosity.
- Social and behavioral abilities, such as the capacity for collaboration, self-assurance, leadership, and persuasion.

The suggested management adjustments comprise:

- Boost its physical presence to work in tandem with others doing development-related research, technology, and innovation.
- Plan and organise its investments in research, technology, and innovation.

- Promote the adaptability needed to respond to shifting opportunities in science, technology, and innovation in order to meet its future labour needs.
- Increase the rewards for incorporating learning and calculated risk-taking into the project's planning and execution.
- Utilize the agency's robust evaluation policy to create science, technology, and innovation programmes that are sustainable.

Conclusion:

Humanity has developed a vast array of technologies and scientific discoveries that have aided in the creation and advancement of civilizations throughout history, boosted economic expansion, raised living standards for most people, promoted cultural advancement, and had a significant impact on thought, religion, and a variety of other human endeavors. Science and technology have a significant and wide-ranging impact on contemporary society, having an impact on a variety of fields including politics, diplomacy, defense, the economy, medical, transportation, agriculture, and many more. Science and technology's products are present in every aspect of our existence.

References:

1. Ananiadou, K. and M. Claro (2009), "21st century skills and competences for new millennium learners in OECD countries", OECD Education Working Papers, No. 41, OECD Publishing,.
2. Avvisati, F., G. Jacotin and S. Vincent-Lancrin (2013), "Educating higher education students for innovative economies: What international data tell us", Tuning Journal for Higher Education, Vol. 1/1, pp. 223-240.
3. Barret, D. (1998), The Paradox Process: Creative Business Solutions Where You Least Expect to Find Them,AMACOM, New York.
4. Cerna, L. (2014), "Innovation, governance and reform in education", CERI Conference background paper,3-5 November 2014.
5. Damanpour, C. and S. Gopalakrishnan (1998), "Theories of organizational structure and innovation adoption: The role of environmental change", Journal of Engineering and Technology Management,Vol. 15/1, pp. 1-24.
6. Dumont, H., D. Istance and F. Benavides (eds.) (2010), The Nature of Learning. Using Research to Inspire Practice, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264086487-en.
7. European Ambassadors for Creativity and Innovation (2009), Manifesto, European Union,www.create2009.europa.eu/fileadmin/Content/Downloads/PDF/Manifesto/manifesto.en.pdf.
8. Angrist, J. and V. Lavy (2002), "New evidence on classroom computers and pupil learning", Economic Journal, Vol. 112/482, pp. 735-765.

9. Avvisati, F., S. Hennessy, R.B. Kozma and S. Vincent-Lancrin (2013), "Review of the Italian strategy for digital schools", OECD Education Working Papers, No. 90, OECD Publishing, Paris,http://dx.doi.org/10.1787/5k487ntdbr44-en.
10. Barrera-Osorio, F. and L.L. Linden (2009), "The use and misuse of computers in education : Evidence from a randomized experiment in Colombia", World Bank Policy Research Working Paper Series,No. 4836, World Bank, Washington, DC.
11. Beuermann, D.W., J. Cristia, S. Cueto, O. Malamud and Y. Cruz-Aguayo (2015), "One laptop per child at home: Short-term impacts from a randomized experiment in Peru", American Economic Journal:Applied Economics, Vol. 7/2, pp. 53-80.
12. Bulman, G. and R.W. Fairlie (forthcoming), "Technology and education: Computers, software, and the Internet", in R. Hanushek, S. Machin and L. Woessmann (eds.), Handbook of the Economics of Education,Vol. 5, North Holland, Amsterdam.
13. Cristia, J., A. Czerwonko and P. Garofalo (2014), "Does technology in schools affect repetition, dropout and enrollment? Evidence from Peru", IDB Working Paper Series, No. IDB-WP-477, Research Department,Inter-American Development Bank.
14. Fairlie, R.W. and J. Robinson (2013), "Experimental evidence on the effects of home computers on academic achievement among schoolchildren", American Economic Journal: Applied Economics,Vol. 5/3, pp. 211-240.
15. Leuven, E., M. Lindahl, H. Oosterbeek and D. Webbink (2007), "The effect of extra funding for disadvantaged
16. pupils on achievement", The Review of Economics and Statistics, Vol. 89/4, pp. 721-736.

MODERN USAGE OF TECHNOLOGY IN SCIENCE TEACHING

Aruna Devi M, Bamalakshmi J, Ranjitha G and Roopamathy M
Department of Community Health Nursing,
Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry
Corresponding author E-mail: arunatanushka@gmail.com,
ranjithagunasekaran.gmrr@gmail.com, bamalakshmiv@kgnc.ac.in,
roopamurugan96@gmail.com

Abstract:

Technologies can also be used by teachers to engage and instruct kids with learning or cognitive difficulties. Interactive computer or tablet-based education is beneficial for tactile and visual learners. Recorded materials or text-to-speech programmes, as well as voice dictation software, can help auditory learners. Aside from being vital in science education, utilizing current technology can help every pupil participate in learning, this may lead to motivation to study science in greater depth. One of the most important things today's instructors have to do is instill a love of science, an in-depth understanding of science, and an ability to communicate using technology. Competence, or perhaps excellence, in these areas will help students perform and achieve in school, their careers, and their personal life. In this paper, we begin with an introduction to the overall subject of modern usage of technology in science teaching, then move on to the different types of technology used in science education and applications in various facets of our lives.

Introduction:

Technology is all around us. That cannot be denied or ignored. Pupils nowadays are more technologically aware than many teachers, and they are almost always more skilled at using specific technology than their parents. Teachers have previously battled with how to deal with technology distractions in the classroom. Cell phones, MP3 players, tablets, and other devices find their way into schools, preventing students from focusing on the lessons and making the most of their time in the classroom.

After a few years of attempting to prohibit cell phones and other electronic gadgets from schools, educators began to rethink their perspectives and devise strategies to incorporate technology into the classroom in a good and instructional manner. There are numerous methods to use technology to improve science, English, maths, and other subjects. Especially in the science classroom, technological integration can be important to pique students' interest, keep them engaged, and encourage participation in activities. It can also be used to conduct tests, present lectures, and do other things. Here are the most effective ways we've discovered to use technology to improve science instruction.

What Exactly is Technology?

Technology is the art of making things. The term comes from the methodical study and treatment of an art or craft. Technology, as we know it, is a relatively new concept. However, every creation or development of tools or equipment is a technological advancement, from the wheel to the chalkboard to the mechanized oil rig to the vehicle.

What role does technology play in science education?

Aside between the reality that technology is both a process and an outcome of science, technical advancements provide the tools utilized in various sorts of scientific inquiry and experimentation, ranging from centrifuges used for fluid separation to computers with systems utilized in the study of quantum physics.

It is vital to use current technology while teaching pupils the scientific process of inquiry and problem-solving. Students will need to use field-appropriate tools to investigate problems, design and conduct experiments, and analyze results.

Numerous recent innovations can be used effectively by science teachers in the classroom. Although computer software and tablet apps have obvious applications in classroom activities, the technology embedded in automated cameras, LCDs, and experiment monitoring systems can also help to science education.

Display Educational and Interactive Videos

Even in today's technologically advanced environment, students get thrilled about seeing films in class. Perhaps you discovered a video on YouTube that explains and displays how the planets spin around the sun, or perhaps you discovered a movie that presents the breakdown of a cell in a fascinating way.

When students are enthusiastic about the platform from which they are learning, they are considerably more likely to be interested in the topic. Some movies are even interactive, allowing you to stop to ask kids a question, or have those record responses or journal their thoughts on a certain issue. If your pupils have access to a computer in the classroom, you may have them explore a science-based website with instructional videos or watch scientific films as a class.

Podcasts should be listened to.

Breaking up the routine can also help with student engagement. If your students are accustomed to hearing you lecture, have them listen to a podcast on occasion. This will provide them with a different method of learning information, and they may be excited to get a break from your lecturing.

There are innumerable science-based podcasts accessible, and they cover everything from the basic scientific ideas taught in early elementary school to the most sophisticated scientific concepts appreciated by even expert scientists. Make it a Friday treat for your kids

to listen to one of the most popular science-based podcast available, or contain them in your normal in-class activities.

Play Lesson Games

The pupils will have the opportunity to use interactive lesson activities with a TCI a membership that can help them recognize everything that you've been teaching. They are enjoyable and interesting, and they assist pupils in determining their level of understanding of specific ideas. You can have your students work independently on lesson games from our science curriculum, or you can construct your own lesson games to undertake a whole-class review of a specific unit or idea. Jeopardy, bingo, and other interactive science games can be played with technology to make them more dynamic, enjoyable, and reusable.

Apps for Classroom Management

This one applies to almost any class, but it may keep students focused and on task without requiring much work from you, which is always a plus. Some apps can detect the volume in a classroom and react when it becomes too loud, some allow your students to check-in or submit exit tickets via technology, and yet others will simply provide timers or other daily items you would need as a science teacher.

While you could achieve these things without applications, using technology to enhance scientific teaching is a terrific way to get your kids on board with even the most basic concepts. Students adore applications that alert them when they are being excessively loud, and they are incredibly efficient at reducing unnecessary noise.

You can also have in-depth talks with your students about how these apps function, what goes into designing them, and any ideas they have for classroom management apps that science teachers might value.

Utilize Smartphone and Tablet Apps

While this is in the same category as using applications in the classroom, it involves letting your students use their own devices. That may be a frightening concept for some scientific teachers, but it is more likely to get pupils enthused about what they are doing and keep them engaged throughout a class.

There are numerous instructional apps that your students can download onto their own devices, and when you set up a virtual classroom or class account, you can see all of their activity on that app.

This might be a fun way to spend the last five minutes of class, an extra credit assignment, or something your students must do each week. You can make them complete any number of classes or exercises, or you're able to make them spend a certain number of minutes on the app in a given amount of time.

If you allow students to use personal devices in the classroom, you'll need to find a mechanism to control their use, but after you've established ground rules, these apps can be really valuable.

Take a virtual field trip.

Numerous locations provide virtual field tours for children and others who do not live near their establishment. Essentially, these places give you a tour of their facilities, complete with educational content that would be presented by a tour guide if you visited the area in person.

While this isn't as thrilling as a real outdoor trip, it is an excellent means to incorporate new information into your classroom in a fun and entertaining way. Students will enjoy seeing new places and learning about new things from the comfort of their science classrooms thanks to virtual field trips.

Use Surveys and Polls to Get Student Feedback

It is beneficial to have your pupils reply to you throughout class, although this can be difficult at times. Some students refuse to respond because they don't know the correct response or fear of looking stupid in front of their peers, while others are too quiet or indifferent to speak up.

Using technology-based surveys or polling apps will require all students to reply, enhancing understanding and providing you with the opportunity to clarify anything that is unclear.

Most of these applications allow students to send responses directly to you, thus ensuring that you can see who reacted in which way but the other students cannot, providing for some anonymity, which is a significant bonus. Most survey programmes allow you to add questions about anything, from whether they comprehend the topic to what activities they prefer to what they did over the weekend.

These apps are extremely valuable for scientific teachers wants to use technology to enhance the teaching of science, but they are useful to all teachers.

References:

1. Beege M, Schneider S, Nebel S, Rey GD. Look into my eyes! Exploring the effect of addressing in educational videos. Learning and Instruction. 2017 Jun 1;49:113-20.
2. Benkada C, Moccozet L. Enriched interactive videos for teaching and learning. In2017 21st International Conference Information Visualisation (IV) 2017 Jul 11 (pp. 344-349). IEEE.
3. Boss S, Krauss J. Reinventing project-based learning: Your field guide to real-world projects in the digital age. International Society for Technology in Education; 2022 Aug 29.

4. Charsky D, Ressler W. "Games are made for fun": Lessons on the effects of concept maps in the classroom use of computer games. Computers & Education. 2011 Apr 1;56(3):604-15.
5. Cheng YH, Chen YC. Enhancing classroom management through parental involvement by using social networking apps. South African Journal of Education. 2018 Dec 1;38(Supplement 2):s1-4.
6. Dieck-Assad G, Hinojosa-Olivares JM, Colomer-Farrarnos J. Study of the effectiveness of interactive videos in applied electronics courses. International Journal on Interactive Design and Manufacturing (IJIDeM). 2020 Sep;14:983-1001.
7. Godwin-Jones R. Mobile apps for language learning.
8. Gonulal T. Improving listening skills with extensive listening using podcasts and vodcasts. International Journal of Contemporary Educational Research. 2020 Jun;7(1):311-20.
9. Han I. Immersive virtual field trips and elementary students' perceptions. British Journal of Educational Technology. 2021 Jan;52(1):179-95.
10. Koch J. Science stories: Science methods for elementary and middle school teachers. Cengage Learning; 2013 Apr 12.
11. Kortum P, Sorber M. Measuring the usability of mobile applications for phones and tablets. International Journal of Human-Computer Interaction. 2015 Aug 3;31(8):518-29.
12. Oliver RM, Reschly DJ. Effective Classroom Management: Teacher Preparation and Professional Development. TQ Connection Issue Paper. National comprehensive center for teacher quality. 2007 Dec.
13. Peacock JG, Grande JP. An online app platform enhances collaborative medical student group learning and classroom management. Medical teacher. 2016 Feb 1;38(2):174-80.
14. Richtberg S, Girwidz R. Learning physics with interactive videos–possibilities, perception, and challenges. InJournal of Physics: Conference Series 2019 Aug 1 (Vol. 1287, No. 1, p. 012057). IOP Publishing.
15. Saeedakhtar A, Haqju R, Rouhi A. The impact of collaborative listening to podcasts on high school learners' listening comprehension and vocabulary learning. System. 2021 Oct 1;101:102588.

ROLE OF DIGITAL TECHNOLOGY IN EDUCATION

Roopamathy M, Bamalakshmi J, Ranjitha G and Aruna Devi M

Department of Community Health Nursing,

Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

Corresponding author E-mail: roopamurugan96@gmail.com, bamalakshmiv@kgnc.ac.in, ranjithagunasekaran.gmrr@gmail.com, arunatanushka@gmail.com

Abstract:

Digital classroom technology refers to a variety of programmes and tools designed to assist students with specific accessibility requirements. Using technology in the classroom is the most efficient way to lessen the amount of monotonous, time-consuming tasks a teacher must complete. Applications for educational technology may save a significant amount of time and effort by fully or partially automating routine tasks like attendance tracking and performance monitoring. Students are taught how to utilize technology strategically and responsibly, which aids in decision-making and the development of self-discipline. Technology in the classroom aids in preparing students for lifetime learning. These technologies give users access to a virtual world and the freedom to obtain digital information in accordance with their preferred learning methods. Students can learn at their own pace thanks to digital content development technologies that tailor teaching and learning.

Keywords: Digital technology, education

Introduction:

The introduction of new technology-assisted learning tools such as mobile devices, smart boards, MOOCs, tablets, laptops, simulations, dynamic visualizations, and virtual laboratories have revolutionized education in schools and institutions. The Internet of Things (IoT) is shown to be one of the most cost-effective techniques of training young brains. It is also a robust method for integrating a world-class learning experience for everybody. Educational technology enterprises are continually attempting to provide unique ways to extend access to education for individuals who cannot obtain suitable educational facilities. Social media has advanced significantly as a tool for education. Large numbers of teachers and students use social media as a vital piece of the overall e-learning experience. These days, it serves as a vital forum for the exchange of knowledge about important subjects. Social media platforms are a great resource for creating networking opportunities to build social activities and maybe new jobs in addition to the capacity to share information anytime, anywhere.

Digital technologies in education

Traditional classroom lessons don't offer a quick learning environment, quick evaluations, or more engagement. In contrast, technology and digital learning tools fill this gap. Traditional

learning approaches just cannot compete with some of the efficiencies that these technologies offer. Given the growing popularity of smartphones and other wireless technology devices among the general public, it only makes sense for educational institutions like schools to make effective use of them by integrating technology into the classroom. The versatility and non-intrusive nature of modern technology do, in fact, make learning more enticing to the younger generation. It could be a difficult strategy to implement at first, though, as traditional teachers are reluctant to use modern technology and gadgets in the classroom because they see them as a distraction rather than a clever learning tool. Students can better prepare for class by using an online calendar that shows the times of classes, assignments, field trips, guest speakers, exams and semester breaks. Smartphones and clicker devices, which are student response systems, offer a quick and Simple method for teachers to assess how quickly students grasp the material being presented and whether further explanation is needed.

The usage of pesticides and water will be drastically reduced thanks to the influence of digital technologies on agricultural operations, which will shortly change farming in wealthy nations. COVID-19 Lockdown, quarantine, and pandemic are three terms that have very recently entered our vocabulary. The coronavirus epidemic's devastation has been widely publicized. Digital technologies are at least helping to keep the educational system afloat throughout this crisis. Learning is taking place in the comfort of the student's home.

Students benefit from an engaging learning experience when technology is used in the classroom, which helps them focus on the material longer. The use of computers, projectors, and other cutting-edge technology in the classroom can make learning interesting and fun for the kids. By creating assignments in class that include technology resources, oral presentations, and group participation, instructors may make learning more dynamic and interesting for students. Participation can go beyond just verbal exchanges.

The importance of digital tools in education

The use of digital technologies has already become necessary as a result of the globalisation of education. For teaching, resource sharing, assessment, and managing the daily operations of academic institutions, online platforms were accessible. However, these platforms were utilised proactively. The institutes were compelled to switch to an online teaching model by the COVID-19 Pandemic in order to maintain the educational system. Developed nations were prepared to handle this issue.

But developing nations made a lot of effort to fulfil this criteria. In this crucial period, digital technologies have emerged as education's rescuer. The need for international integration in the educational system is highlighted by the current global crisis. Digital technologies aid in the development of skills like problem-solving, thinking structure building, and process comprehension that will be necessary for students to perform in a professional capacity. Additionally, they are getting ready for a more uncertain and dynamic future where technology

will be indispensable. The learned traits and skills of students will be crucial to their success in the workplace. Digital learning tools and educational materials enhance the classroom environment and add interest to the teaching-learning process. Additionally, they provide every educational institution more flexibility and freedom to tailor the curriculum to the needs of each student.

If technology is employed in the classroom, kids might become more interested in what they are studying. Electronic devices are increasingly widely used by children, so introducing them into the classroom would surely help to pique their interest and increase their level of participation. Students benefit from an exciting learning experience when technology is used in the classroom, which helps them focus on the material longer. The use of computers, projectors, and other cutting-edge technology in the classroom can make learning interesting and fun for the kids. By creating assignments in class that involve technology resources, oral presentations, and group interaction, student learning can become more dynamic and engaging. Participation can go beyond just verbal exchanges.

Students can take a more active role and take control of the process while using computers and other technology alongside digital tools. In this approach, the teacher acts as a mentor and has the power to validate learning effectiveness. Learners can get the necessary data from the plethora of digital resources or contribute their own material. Wikis, podcasts, blogs, and other web 2.0 technologies help learners create content, collaborate with others, evaluate each other's work, and progress towards co-learning. Digital technology make it simple to use learning-enhancing classroom strategies like gamification or flipped classrooms. Learning landscapes have developed as a didactic tool that combines several methodologies and enables the presentation of unique itineraries to each learner.

Digital classroom

Digital classrooms are those that instruct students utilizing electronic tools or platforms including social media, multimedia, and mobile phones. The use of digital technology in education has improved or changed the current educational landscape. A learning technique called "digital learning" uses technology to cover the full curriculum and gives pupils the opportunity to pick things up quickly. The sole objective of the digital classroom is teaching with technology. Students make use of technical or internet-connected devices including Chromebooks, laptops, and tablets. The majority of the curriculum is presented to students online through an engaging and interactive interface, so they don't need to take notes on what the teacher has taught. Despite its various elements, communication is at its core in education.

Education, despite its various elements, is basically a form of communication. New communication channels have emerged as a result of the internet, expanding the alternatives for the dissemination and accessibility of educational material. These media outlets and online

spaces aid in the facilitation of learning. Various features of a digital classroom are shown in Fig. 1.

In order to help students learn more effectively, educational websites and apps are employed in digital classrooms. A digital classroom must have both feedback loops and technology. For students to get feedback from their lecturers in real time, feedback loops are crucial. Teachers can give feedback based on a variety of variables, including the student, lesson, group, etc., by using feedback loops. PPTs, videos, online training, e-learning, and other digital tools are being used in the teaching-learning process.

As a result, learning in the classroom is becoming more interactive. By leveraging online resources and digital classrooms, students can now learn a wide range of subjects on their own. In classrooms, models, graphs, and colour charts are used to illustrate the best lessons taught. However, they are currently viewed as outdated approaches to teaching. There are now more educational opportunities available in the classroom than just reading books, writing on the chalkboard to illustrate concepts, and taking notes.

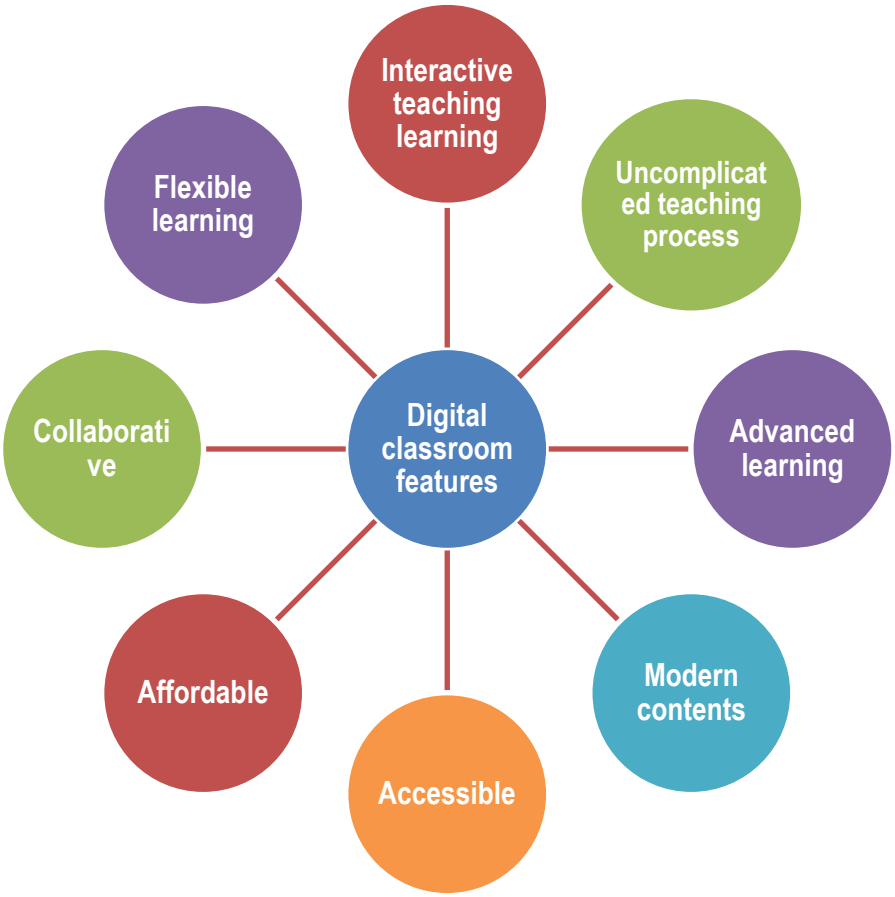

Figure 1: Represents the digital classroom features

In order to educate kids outside of the classroom, technology has continued to be crucial. Digital learning encourages creativity and provides pupils a sense of accomplishment, which motivates them to learn more by straying from the norm. It is impressive that all countries have

been able to embrace remote learning techniques using a combination of online, radio, television, and mobile platforms. These make information easy to obtain, easy to remember, easier to save, and easier to show; education has become more participatory; they also make knowledge exchange easier and promote interest in learning. The important ways that digital technologies are used in education are covered in Table 1.

Table 1: Determines the roles of digital technologies in education

S.No	Roles of digital technologies in education	Description
1.	Increase the efficiency of teaching	Utilizing innovative technical tools that promote better planning, simple and practical learning, quick assessments, better resources, new skills, etc. can increase teaching productivity.
2.	Establish online libraries	Online libraries have removed the need for physical space and promoted communication between students, professors, and researchers from around the world thanks to technological improvements. Subject experts have gathered in online forums to debate certain subjects and assess the curricula, teaching style, and assessment techniques.
3.	Encourage distance education	In actuality, distant learning education has benefited from technology innovation. All learning tools are readily available, and it makes it simple for students to communicate with their instructors. By utilising technology and learning tools like social learning platforms, teachers may easily create and manage groups.
4.	Encourage the teaching of students with special needs	The amount of assistive technology that is available to aid students with physical or learning difficulties in swiftly absorbing topics and actively participating in their classrooms is encouraging. For the visually impaired, cutting-edge technologies include speech recognition, screen-reading software, Braille displays, and text-to-speech programmes. For the hearing impaired, closed-captioning software, sound amplifiers, and video conferencing programmes make it easier to read lips and use sign language.

5.	Set up a virtual classroom	Different learning management systems (LMS) have emerged as a result of digital technology in education. These LSMs have encouraged the use of virtual classrooms where instructors can communicate with students in real-time, exchange resources, provide lectures, evaluate their learning, gather feedback, and respond to their inquiries.
6.	Increase your knowledge and comprehension	To ensure that students succeed both individually and collectively, technologies work to increase knowledge, comprehension, and skills. Through engaging and educational materials, teachers can foster students' natural curiosity and enquisitiveness, which has been related to better academic results.
7.	Development of inclusive learning environments	Every student, regardless of skill level, has an equal opportunity to learn in the same setting thanks to an inclusive learning environment. Technology tools such as virtual classrooms, video, augmented reality, robots, and others make the classroom engaging and provide inclusive learning settings that encourage collaboration and inquiry while enabling teachers to gather information on student performance.
8.	Fostering cooperation and communication	Two essential qualities that aid in the development of a successful professional are teamwork and communication abilities. Digital technologies are crucial to the development of these abilities.
9.	Overcoming educational obstacles	Utilising internet tools, students collaborate to address ongoing educational difficulties. Hackathons have proven to be an effective way to solve a variety of difficult issues. Students can express themselves and work together on projects by exchanging ideas.
10.	Increased availability of instructional resources	It is now feasible to access instructional resources seven days a week, at any time. Students could easily access the resources whenever it was convenient for them thanks to cloud storage, video recordings of lectures, and the availability of soft copies of the notes. Even parents can use these tools to evaluate the calibre of the lectures and notes.

11.	Encouraging kids to complete the curriculum	The most direct method of supporting pupils is through computer-assisted learning, which also aids teachers in finishing the curriculum. In a classroom, students have diverse starting points for learning, and teachers are frequently motivated to teach to the highest strata, leaving many pupils behind. Such pupils were able to finish their coursework thanks to these tools.
12.	Transform the creative approach to education	Despite the evolution of the education sector, digital technology has changed how students learn in the classroom. Students are given digital literacy lessons and urged to bring laptops to class so they may rapidly access a range of resources. Through educational applications and initiatives, students are encouraged to discover information in novel and interesting ways. Teachers can introduce and reinforce subject knowledge while modifying their teaching strategies by using interactive whiteboards and classroom clickers. Instead of producing actual report cards to send home once a term, reporting and assignment management have undergone significant change. Using specific learning management systems, teachers can now assign, collect, and mark work while keeping students' parents updated on their progress.
13.	Arithmetic classes	Students can listen to math lessons while using digital tools to type, scribble, or dictate their responses. Digital technology will be used as the school year and the years go on to make maths practise more accessible to all kids, regardless of ability or learning environment. Additionally, these tools provide students a variety of opportunities to study for or demonstrate their arithmetic abilities. Today's pupils are quite different from those for whom the educational system was designed because the learning environment is more dynamic than it has ever been. To meet the rising expectations of contemporary digital learners, classrooms are being renovated and remade in a variety of ways as technology advances.

14.	Quick learning and teaching	Globally, COVID-19 has increased the importance of technology in the lives of billions of kids. Regardless, the educational institution needs digital technology to succeed in this difficult era. Learning resources on the internet are now widely accessible. The AI system has also considerably improved learning. A student's strengths and shortcomings can be determined by intelligence on its own. To guarantee that every student achieves their greatest potential, they have a personalised learning strategy. They may perhaps even be more gratifying than traditional education. The world has been jolted by the coronavirus, and people are gradually getting used to it. The Pandemic has forced office personnel to work remotely.
15.	Minimize the necessity of a chalkboard	Nowadays, the best class is the one with the most cutting-edge technologies. In recent years, there has been a tremendous increase in the usage of technology in urban schools. Videos, online classes, and PowerPoint presentations have taken the place of blackboards. Today, all educational institutions use technology in some capacity. In certain schools, the use of digital classrooms has resulted in the digitization of the entire educational system. More and more areas of today's world are going digital thanks to the development of the internet, mobile phones, mobile apps, tablets, computers, and other gadgets. In many schools and institutions, digital education is replacing traditional instruction in the classroom.

With the development of technology today, teachers must become proficient with a variety of tools, including smartphones and tablet computers, or risk being left behind. To make sure that their lessons are relevant, interesting, and up to date, teachers must take advantage of all online resources. Gaming on a computer and watching animated films are just two examples of technology. The benefits depend on how parents, instructors, and students use technology to enhance education. Students become more interested in learning when technology is employed successfully for educational purposes. An important factor in the accessibility and quick adoption of digital learning has been the development of e-learning systems that are compatible with new smart devices like phones and tablets.

As they increase their use of virtual classrooms, e-learning platforms, and online assessments, schools and educational institutions are realizing the benefits of comprehensive student and instructor performance data.

Barriers with using digital technologies in the classroom

There are certain challenges with using and implementing educational technology. Concerns about excessive screen time, the effectiveness of instructors' use of technology, and technology equity issues are also brought up. The COVID-19 issue has increased the importance of the content. Teachers must create and comment on online educational content, especially encouraging pupils to examine a subject from a variety of perspectives. Additionally, while some students excel in online learning environments, others suffer for a variety of reasons, such as a lack of support. For instance, a student who has previously experienced pain in face-to-face situations would suffer significantly more now. These individuals might have depended on services that are no longer offered. However, in countries where it has not traditionally been the norm, online education may provide challenges for teachers.

The learning crisis has a number of well-known causes. The poor caliber of instruction is one important aspect. Teachers usually lack subject knowledge and have limited training. There are technological solutions to this, and they might be useful for both teacher training and student instruction. Technologies may offer in-person instruction alone or in conjunction with online instruction. There is evidence that instructors need greater incentives as well. They are capable of teaching but lack the drive to do so. Although education has always taken place outside of the traditional classroom, the magnitude and shifting conditions of digital and remote environments require a great amount of adaptation, planning, support, and participation.

Aware learning and teaching may benefit from limited or no contact with students, rethinking engagement, reaching, and teaching ways, appropriately addressing a variety of specific requirements, motivating students, managing conflicting time demands, and adapting to restrictive environments.

Conclusion

The digital classroom integrates technology into education by teaching students using electronic tools and software. Through the use of computers and the Internet, a conventional classroom can be converted into a digital classroom. With the use of technology and high-tech tools, students may learn more effectively and monitor their progress. These technologies will be successfully incorporated into education in the next years to improve students' performance and the digital learning environment. In order to make long-term decisions in sectors such as climate change, air and water security, biodiversity protection, catastrophe resilience, etc., modern technology have proved crucial in the management and analysis of complex data. These innovations take into account natural resources while also fostering societal and economic development. These seek to create a long-lasting product while drastically reducing environmental and ecological risks. These innovations lessen environmental damage, pollution, and other adverse effects.

References:

1. Keengwe J, Bhargava M. Mobile learning and integration of mobile technologies in education. Education and Information Technologies. 2014 Dec;19:737-46.

2. Dreimane S, Upenieks R. Intersection of serious games and learning motivation for medical education: A literature review. International Journal of Smart Education and Urban Society (IJSEUS). 2020 Jul 1;11(3):42-51.
3. Rogers PL. Barriers to adopting emerging technologies in education. Journal of educational computing research. 2000 Jun;22(4):455-72.
4. Haddad WD, Draxler A. The dynamics of technologies for education. Technologies for Education Potentials, Parameters, and Prospects, ed. by Wadi D. Haddad and Alexandra Draxler. 2002:2-17.
5. Irawan C, RWW ET. Developing instructional media mobile learning based android to improve learning outcomes. JPBM (Jurnal Pendidikan Bisnis dan Manajemen). 2018 Nov 1;4(3):107-13.
6. Vakaliuk TA, Spirin OM, Lobanchykova NM, Martseva LA, Novitska IV, Kontsedailo VV. Features of distance learning of cloud technologies for the organization educational process in quarantine. InJournal of physics: Conference series 2021 Mar 1 (Vol. 1840, No. 1, p. 012051).
7. Cavas B, Cavas P, Karaoglan B, Kisla T. A Study on Science Teachers' Attitudes Toward Information and Communications Technologies in Education. Online Submission. 2009 Apr;8(2).
8. Biletska IO, Paladieva AF, Avchinnikova HD, Kazak YY. The use of modern technologies by foreign language teachers: developing digital skills. Linguistics and Culture Review. 2021 Jul 15;5(S2):16-27.
9. Kostopoulos G, Kotsiantis S. Exploiting semi-supervised learning in the education field: A critical survey. Advances in Machine Learning/Deep Learning-based Technologies: Selected Papers in Honour of Professor Nikolaos G. Bourbakis–Vol. 2. 2022:79-94.
10. Akbaba-Altun S. Complexity of integrating computer technologies into education in Turkey. Journal of Educational Technology & Society. 2006 Jan 1;9(1):176-87.
11. Mikre F. The roles of information communication technologies in education: Review article with emphasis to the computer and internet. Ethiopian Journal of Education and Sciences. 2011;6(2):109-26.
12. Bilotta E, Bertacchini F, Gabriele L, Giglio S, Pantano PS, Romita T. Industry 4.0 technologies in tourism education: Nurturing students to think with technology. Journal of Hospitality, Leisure, Sport & Tourism Education. 2021 Nov 1;29:100275.
13. Camilleri MA, Camilleri AC. Digital learning resources and ubiquitous technologies in education. Technology, Knowledge and Learning. 2017 Apr;22:65-82.

IMPACT OF SCIENCE AND TECHNOLOGY IN EDUCATION

Bamalakshmi J[1], R. Geetha[2] and Vanitha Innocent Rani[3]

[1]Department of Community Health Nursing,
Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

[2]Department of Child Health Nursing,
Mother Teresa College of Nursing, Pudukkottai - 622102, Tamil Nadu

[3]Department of Mental Health Nursing,
King Khalid University

Corresponding author E-mail: bamalakshmiv@kgnc.ac.in, geethuu2010@gmail.com, vanitha_ramancollege@yahoo.co.in

Abstract:

Science and technology are an integral part of modern life, and as such, it is argued that educational activities and the mass media should contribute to increasing public interest and knowledge about the subjects. Some key issues and recent trends in the development of science and technology are discussed, with particular reference to interdisciplinary education in both primary and secondary schools**.** It has impacted different facets of life and redefined living. Science and technology is the ultimate need of an hour that changes the overall perspective of the human towards life. Right from connecting with people to using digital products, everything involves science and technology. In other words, it has made life easy and simple. With the progress in science and technology, we humans have become lazier. This is affecting the human mind and health. Moreover, several semi-automatic rifles are created using the latest technology, which takes maximum life. There is no doubt that the third world war will be fought with missiles created using technology. Man has misused the tech and used it for destructive purposes. Man uses them to do illegal stuff. Technology such as a smart phone, etc. hurts children. Terrorists use modern technology for damaging work

Introduction:

Traditional education was centred on sources such as schools, colleges, teachers, books and articles. The modern education with the help of technology has become decentralized, now the student's society can access the information anywhere as per their requirement. Introduction of technology has also made learning to be more student centred, it encourages group learning & stimulated interaction. Steve Johnson (2005) in his bestselling book "Everything bad is good for you" has posited that technology is making us more intelligent due to our means of obtaining, interpreting & processing information. Impact of technology in education is a debatable topic with both challenges and opportunities**.**

Technology is changing the way we learn. From zero to hero, technology has gone leaps and bounds. Gone are those days when we used to memorize things and regurgitate them at exam. The education sector has undergone a sea change and completely transformed with the

introduction of new technology and gadgets. There is no longer time for theory and rote learning, as more emphasis is laid on skill development and on problem-solving abilities. Below are the impacts of technology on education sector:

Technology has certainly changed the way we live. It has impacted the different facets of life and redefined living. Undoubtedly, technology plays an important role in every sphere of life. Several mundane manual tasks can be automated, thanks to technology. Also, many of the complex and critical processes can be carried out with ease and efficiency with the help of modern technology. Thanks to the manifold positive effects of technology, the fields of education and industry have undergone a major change and sure, they have changed for the better.

Importance of technology in education

The role of technology in the field of education is four- fold: it is included as a part of the curriculum, as an instructional delivery system, as a means of aiding instructions and also as a tool to enhance the entire learning process. Thanks to technology; education has gone from passive and reactive to interactive and aggressive.

Education is essential in corporate and academic settings. In the former, education or training is used to help workers do things differently than they did before. In the latter; education is geared towards creating curiosity in the minds of students. In either case, the use of technology can help students understand and retain concepts better.

Factors affecting technology in education

I. Jung talks about the enormous challenge teachers are facing in our society due to the rapid expansion of knowledge. The modern technologies are demanding that teachers learn how to use these technologies in their teaching. Hence these new technologies increase the teachers' training needs. Gressard and Loyd (1985) asserted that teacher's attitudes toward computers are a key factor in the successful implementation of ICT in education. They pointed out that teachers do not always have positive attitudes towards computers and their poor attitudes may lead to a failure of the computer- based projects.

Also the most commonly cited barriers are:

- ❖ lack of time
- ❖ lack of access;
- ❖ lack of resources;
- ❖ lack of expertise and
- ❖ lack of support.

Another barrier given by Butler and Sellbom (2002) and Chizmar & Williams (2001) is reliability. Reliability included hardware failures, incompatible software between home and school, poor or slow internet connectivity and out of date software which are available mostly at school while the students/educators are having more up-to-date software at home.

Impact of ICT on education

In educational context, ICT has the potential to increase access to education and improve its relevance and quality. Tinio (2002) asserted that ICT has a tremendous impact on education in terms of acquisition and absorption of knowledge to both teachers and students through the promotion of:

- **Active learning:** ICT tools help for the calculation and analysis of information obtained for examination and also students' performance report are all being computerized and made easily available for inquiry. In contrast to memorization-based or rote learning, ICT promotes learner engagement as learners choose what to learn at their own pace and work on real life situations' problems.
- **Collaborative and Cooperative learning:** ICT encourages interaction and cooperation among students, teachers regardless of distance which is between them. It also provides students the chance to work with people from different cultures and working together in groups, hence help students to enhance their communicative skills as well as their global awareness. Researchers have found that typically the use of ICT leads to more cooperation among learners within and beyond school and there exists a more interactive relationship between students and teachers (Grégoire *et al.,* 1996). "Collaboration is a philosophy of interaction and personal lifestyle where individuals are responsible for their actions, including learning andrespect the abilities and contributions of their peers." (Panitz, 1996).
- **Creative learning:** ICT promotes the manipulation of existing information and to create one's own knowledge to produce a tangible product or a given instructional purpose.
- **Integrative learning:** ICT promotes an integrative approach to teaching and learning, by eliminating the synthetic separation between theory and practice unlike in the traditional classroom where emphasis encloses just a particular aspect.
- **Evaluative learning:** Use of ICT for learning is student-centered and provides useful feedback through various interactive features. ICT allow students to discover and learn through new ways of teaching and learning which are sustained by constructivist theories of learning rather than students do memorization and rote learning.

Positive impact

1. Enhanced Teaching and Learning:

- Technological developments like digital cameras, projectors, mind training software, computers, Power point presentations, 3D visualization tools; all these have become great sources for teachers to help studentsgrasp a concept easily.
- It has to be understood that visual explanation of concepts makes learning fun and enjoyable for students. They’re able to participate more in the classroom and even teachers get a chance to make theirclasses more interactive and interesting.

2. Globalization:

- When school in different parts of the state, students can "meet" their counterparts through video conferencing without leaving the classroom.
- Some sites, such as www.glovico.com are used to help students learn foreign languages online by pairing a group of students with a teacher from another country.

3. No Geographical Limitations:

- With the introduction of online degree programs there is hardly any need of being present physically in the classroom. Even several foreign universities have started online degree courses that student can join.
- Distance learning and online education have become very important part of the education system now a day.

Negative impact

1. Declining Writing Skills:

- Due to the excessive usage of online chatting and shortcuts, the writing skills of today's young generation have declined quite tremendously.
- These days, children are relying more and more on digital communication that they have totally forgot about improving their writing skills.
- They don't know the spelling of different words, how to use grammar properly or how to do cursive writing.

2. Increasing Incidents of Cheating:

- Technological developments like graphical calculators, high tech watches, mini cameras and similar equipment have become great sources to cheat in exams.
- It is easier for students to write formulas and notes on graphing calculators, with least chances of being caught.

3. Lack of Focus:

- SMS or text messaging has become a favorite pastime of many students. Students are seen playing with their cell phone, iPhones day and night or driving and very often even between lectures.
- Being ever-connected to the online world has resulted in lack of focus and concentration in academics and to some extent, even in sports and extracurricular activities.

Impact of technology on learning

Technology plays the role of facilitator in educating the students and it has increased the accessibility. Illness, taking a full time job can no longer be a roadblock for education, because technology has extended the way people get educated. Students can pick and choose what medium they prefer to learn content and maximize the study time. Nowadays classrooms look and operate considerably different to the classrooms of a decade ago.

Today classroom houses various technology from IFPDs (Interactive flat panel displays to

laptop & Smartphone's, all connected via Bluetooth and WIFI and also supported by many cloud based applications. Students have become more independent in the classroom because of the technological support. In the current scenario technology is not an added advantage it has become one of the basic requirement.

Technology influence students learning via

- Communication
- Convenience
- Control

Modern technology benefits the education only if they are used properly. Many parents and teachers deny the use of tablets and smart phones by the children's,but they have to accept the fact tablet or smart phone attracts the student's more than ordinary paper books. This extends their time and content in learning. It also encourages collaborative learning where students can share their views and also help their peers to solve subjected related problems using online interface.

Impact of technology on teaching:

Technology has simplified the process of teaching and it has reduced the burden of teachers in imparting knowledge to the students.Technological devices like OHP, animated software's and other audio-visual aids have made presentation more interactive and lively in the class room. Information can be easily accessed via internet, it has become one of the effective tool for teachers to acquire knowledge, there are several websites that provides information on everything in the world.

Advantages

- It makes students more excited to learn.
- Help students with busy schedules, freedom to work at home on their own time.
- Train students to learn new technology skills they can use later in the work place.
- Decrease paper and photocopying costs, promoting concept of "green revolution".

Disadvantages

- Many experts and experienced people say that, due to such technology in education, students imagination is affected, their thinking ability is reduced.
- Sometime it's also time-consuming from teacher's point of view.
- It is costly to install such technology.
- There can be health issues too when used over limit.

Advantages of Technology in Education

There are lots of benefits that comes out of using technology in education sector. Technology has changed the way of learning. It has made our life more colour ful and make studies interesting through the gadgets like smart phones, laptops, tablets etc. The use of technology in education is beneficial in many ways like:

1. Teacher Productivity and Efficiency Have Increased.

Teachers and trainers use technology to boost their productivity, incorporate valuable digital tools to enhance their students' learning options, and boost student support and participation. Technology enables teachers to improve their teaching methods and tailor learning for their students. Schools profit from technology by lowering the cost of physical teaching materials, increasing the efficiency of educational programs, and maximizing teacher time. Access to an infinite amount of current data and information from a number of sources.

2. Automation.

For teachers, automation is a big benefit of educational technology. You can upload lessons to a learning management system (LMS) for students to access at their leisure. Grading is simplified using online tests, and parents can be notified instantly when their children earn a failing mark. Teachers are always seeking for methods to make extra time in their days, and technology may help them tremendously.

3. Reduces the cost of schooling.

Resources have become more available as a result of the introduction of technology in education, resulting in lower tuition costs, a decrease in the demand for books and their price, and a decrease in the need for school supplies. The arrival of e-books has simplified things for low-income families and allowed pupils to approach learning on an equal footing with their peers, without parental pressure for good performance resulting from big investments in their children's education. In addition, employing e-books in education has the positive side effect of indirectly contributing to the reduction of deforestation.

4. It encourages more communication between teachers and parents.

Utilization of education apps also helps in the exchange of information between parents and teachers.

5. Encourages collaboration in classrooms.

Technology in classrooms encourages collaboration by breaking down barriers that are prevalent in the real world. Instead of relying on limited face-to-face social interaction, online spaces allow collaboration to occur more naturally.

6. Technology aids in the preparation of pupils for their future lives.

It helps children to become more creative, inventive and flexible. It is an effective way to use technology in education because there are many programs that may help you to learn the skills necessary for the future. Technological skills are needed for the future generation. Every program has its benefit, which may be suited to your learning style or personal preferences.

7. Technology has played a significant role in education since the beginning of recorded history.

However, technology has also had an impact on education beyond just facilitating communication and information exchange among learners and instructors.

8. Plays a vital role in teaching and learning process.

Educational apps make it possible for students to access virtual classrooms from home, school or anywhere else they have access to the internet. These can include things like reducing costs, increasing productivity and improving communication.

Disadvantages of Technology In Education

As more and more technology is being introduced into the classroom today, there are still many concerns about the consequences of rapidly integrating new technologies. A lot of these concerns are valid because most teachers are not equipped to integrate technology properly with their teaching methods. Here are some disadvantages of using technology in education sector.

1. Higher Management and Training.

Due to the rise of technology, being effective in the classroom now necessitates teachers' ability to be effective on a screen and on a technology platforms. Research has been done that shows three-quarters of teachers feel the internet and other digital tools have increased their workload and drastically increased the range of topics and abilities about which they must be educated. This is whereby IT specialists are needed to help set up, manage, and support teachers and students using new technology in the classroom.

2. Expensive.

Technology required in the education includes internet services, computer hardware, printers, Internet browsers etc. Acquiring all of these needs a lot of money to invest in technology at your school.

3. Distraction.

With social media sites like Facebook, Twitter, and YouTube are becoming very popular among the youth. They are spending most of their time on these sites, which is having bad effect on their studies. Cell phones have become a great source of distraction in the classroom. Students use cell phones in their free time in school too, especially in breaks.

4. Makes students to cheat.

When phones couldn't be used to access the internet during tests, cheating was far more difficult. To outsmart the system, students have taken use of new technology to cheat in their exams and Continuous Assessment Tests (CATs). As a result, a significant proportion of students get away with it and earn their degrees. They go on to become true professionals in their fields while not being academically qualified for them.

5. Students acquiring wrong information.

Many websites and other online platforms are providing wrong information that users require. Many websites post deceptive material online in order to increase traffic, even if the information is inaccurate. As a student, you are sure to come across some of these sites that contain inaccurate information or incorrect details. Other websites replicate stuff from other

websites without verifying its authenticity. Readers are misled in any case, which is bad for learners.

Conclusion:

Technology has impacted different facets of life and redefined living. When technology is combined with appropriate teaching methods, it will increase the academic achievement. Many complex and critical process can be carried out with ease and greater efficiency with the help of modern technology. It is completely up to the people using technology whether they use it to their benefits or let it distract them from their purpose. The importance of science and technology in education cannot be stressed enough. The introduction of technology in the education field has made the process of learning and knowledge sharing, an interactive and fun-filled activity. Technology is indeed one of God's greatest gifts to mankind.

References:

1. Apple (2002), Apple Computer, Inc. The Impact of Technology on Student Achievement: A Summary of Research Findings on Technology's Impact in the Classroom. Retrieved on 12th February, 2010
2. Adams, S. C. (2016). Improving teacher comfort levels and self-efficacy with technology integration and application of technology into the elementary education curriculum through the tech buddy program (Order No. 10120866).
3. Anderson, T. (2004). Theory and practice of online learning. In T. Anderson & F. Elloumi (Eds.), Retrieved from http://cde. Athabascau.ca/online_book/ch2.html.
4. Aristovnik, A., (2012) The impact of ICT on educational performance and its efficiency in selected EU and OECD countries: a non-parametric analysis, The Turkish Online Journal of Educational Technology, Vol. 11, No. 3, pp. 144- 152.
5. Ahme Nagasubramani, (2021).. Impact of modern technology in Education, Journal of Applied and Abu Talib, M., Bettayeb, A.M. & Omer, R.I. Analytical study on the impact of technology in higher education during the age of COVID-19: Systematic literature review. Educ Inf Technol 26, 6719–6746
6. Eyyam, R., & Yaratan, H. S. (2014). Impact of use of technology in mathematics lessons on student achievement and attitudes. Social Behavior & Personality: An International Journal, 4231-42
7. Raja, R & Nagasubramani, P.C. (2018). Impact of modern technology in education. Journal of Applied and Advanced Research, 3 (1), 33 – 35.
8. Pritam Singh Negi et al., (2011). Impact of Information Technology on Learning, Teaching and Human Resource Management in Educational Sector. International Journal of Computer Science and Telecommunications,2(4), 2047-3338.
9. Stegmaier, B.S.J. (2007) Impact of technology in education - A study of the past, present and future, GRIN. Available at: https://www.grin.com/document/111058

SCIENCE AND TECHNOLOGY IN INDIA

R. Geetha[1] and Bamalakshmi J[2]

[1]Mother Teresa College of Nursing,

Pudukkottai - 622102, Tamil Nadu,

[2]Department of Community Health Nursing,

Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry

Corresponding author E-mail: geethuu2010@gmail.com, bamalakshmiv@kgnc.ac.in

Abstract:

Modern India has had a strong focus on science and technology, realising that it is a key element for economic growth. India ranks third among the most attractive investment destinations for technology transactions in the world. India is among the top countries globally in the field of scientific research, positioned as one of the top five nations in the field for space exploration. The country has regularly undertaken space missions, including missions to the moon and the famed Polar Satellite Launch Vehicle (PSLV). India is likely to take a leading role in launching satellites for the SAARC nations, generating revenue by offering its space facilities for use to other countries. Science and Technology has added greatly to our material comforts. It has also quickened the tempo of life. It has given man an altogether new social and political outlook. The child is always interested in trees, in flowers, in birds, in insects, in all the things that he sees around him. His curiosity in this regard should be fostered and developed. This can be done easily and naturally if teaching be related to those material objects that he is always seeing.

Introduction:

Education is a very important and integral part of society that governs the social functioning. It deeply connects with the wants and ambitions of every society. This is the reason that education cannot remain unaffected by any social change that takes place around us. Hence, any advancement in technology has a direct or indirect impact on the methodology of education in the current scenario.

Educational Technology (ET) is the efficient organization of any learning system adopting or adapting itself to methods, processes, and products to serve identified educational goals. This involves systematic identification of the goals of education, recognition of the diversity of learners' needs, the contexts in which learning will take place, and the range of provisions needed for each of these. The key to meeting this challenge is an appreciation of the role of educational technology as an agent of change in the classroom, which includes not only the teacher and the teaching- learning process but also systemic issues like reach, equity, and quality

The 21st century has been named as the 'age of knowledge' and there is no way in which one can deny the role of technology in different aspects of our lives. Like other fields, education too has been deeply impacted by technological revolution. This interface of education and

technology is popularly known as educational technology. Some associate the term 'educational technology' solely with technical equipment and media of education, such as overhead projectors, television, and computers. There are others who believe that educational technology involves a scientific and systematic analysis of the teaching-learning process with an objective to maximize its effectiveness.

Objectives of Educational Technology

Educational technology has the following prime objectives:

- To modernize learning methods and techniques according to the changing world
- To bring desirable changes in the behaviour of teachers and pupils by improving teaching, learning and evaluation conditions
- To make classroom teaching clear, effective, objective and scientific

Hilliard Jason has given the following points on the objectives of educational technology:

- It transmits information.
- It serves as a role model.
- It contributes to the provision of feedback.
- It assists in the practice of specific skills.

Alvin Toffler talks of 'responsible technology', so the objectives of educational technology can be as follows:

- To establish objectives and put together goals, in terms of behaviour
- To examine the learners' personality
- To structure the information in an order that is psychologically inclined
- To arbitrate between content and resources of presentation
- To assess the accomplishment of learners, in terms of the objectives of education
- To supply feedback, among other components, for modifying the learner

The general objectives of educational technology are:

- To identify educational needs of the community
- To determine the aims and objectives of education
- To prepare an appropriate curriculum
- To determine suitable strategies
- To identify human and non-human resources
- To identify problems which stand in the way of development of the learner's personality
- To suggest remedies to solve problems that emerge
- To manage the entire educational system
- To improve the process and product of education

Specific objectives of educational technology

- To identify the educational needs of the students
- To determine the classroom objectives in behavioural terms
- To evaluate and sort the content of instructions in logical or psychological succession

- ❖ To plan teaching methods and strategies of the presentation of content
- ❖ To make use of aid material, software and hardware, mass media and communication Techniques
- ❖ To identify human and non-human resources
- ❖ To evaluate classroom teaching, in terms of performance of students
- ❖ To provide continuous feedback to students and the teacher for improving the teaching - learning process.

Components of Educational Technology

S. P. Ruhela (2002) in his book, Educational Technology, has listed three main components of educational technology

i. **Methods:** Making use of a few devices like programmed learning, team teaching, micro-teaching and personalized system of instruction as methods in teaching– learning situations.

ii. **Materials:** Comprises instructional materials like programmed textbooks, manuals, guides, texts and other written/print materials.

iii. **Media:** Implies employing audio or visual or both audio-visual media, such as radio, tape recorders, charts, maps, posters, films and educational television as teaching aids to supplement effective teaching and promote better learning.

Types of educational technology

Technology, media and materials that are useful in the instructional process, comprise simple varieties that help teachers to develop and present their lessons more effectively in traditional classrooms. A number of technological media and materials can be useful in both teaching and in the management of administrative data that is necessary in modern mass education. Educational technology can thus assume many forms. Often, its only aim is to make the current practices more efficient and effective. The three commonly accepted types of educational technologies are: ***(i) teaching technology, (ii) behavioural technology and (iii) instructional technology***. These are discussed below.

(i) Teaching Technology

Teaching is a skill. The use of technology in teaching makes this skill simpler, specific, functional and unprejudiced. This form of educational technology rests itself on the knowledge of philosophy, psychologyand science, so as to achieve the desired learning objectives. There are two important features of teaching: (i) content and (ii) classroom communication. Substance and interaction are the two factors that form teaching technology. In addition, contemporary teaching focuses on the student and not on the teacher. Thus, it needs a psychological analysis of the learner. Hence, teaching is both scientific and psychological. The system of learning assists the teacher in making right decisions. In addition, it also builds up a sense of professionalism that makes one accountable. It incorporates essential alterations in the idea of teaching; teacher's training, formulating the policies of teaching, and management objectives of a teacher. Teaching

technology is that form of educational technology, which is concerned with making the process of teaching more systematic.

Assumptions of teaching technology

- Nature of teaching process is scientific
- Teaching activities can modified as required
- Pre-determined learning objectives can be achieved through teaching activities.
- A mutual relationship between teaching and learning can be established.
- Proper conditions can be created for effective learning.

Characteristics of teaching technology

- Teaching is a scientific process and its major components are content, communication and feedback.
- There is a close relationship between teaching and learning.
- It is possible to modify, improve and develop teaching–learning activities.
- The terminal behaviour of the learner, in terms of learning structures, can be established by appropriate teaching environment.
- Teaching skills can be developed and strengthened by means of feedback devices, with or without sophisticated techniques.
- Pre-determined learning objectives can be achieved by designing suitable teaching activities.
- The use of achievement motivation technique enhances the output of a teacher and a learner.

(ii) Behavioural Technology

Behavioural technology is a vital constituent of educational technology. It emphasizes that psychosomatic values be used in learning and teaching. The motive is to change the behaviour of the teachers and pupils to match with the objectives of teaching. This form of educational technology is dependent on psychology. Behavioural technology is aimed at boosting the growth and development of behaviour and learning. It employs the following to transform the behaviour of a teacher:

- Definition of teacher-behaviour
- Doctrines of teacher-behaviour
- Observation technique of teacher-behaviour
- Study and nature of teacher-behaviour
- Assessment and standards of teacher-behaviour
- Prototypes of teacher-behaviour
- Different tools to develop teacher-behaviour such as: programmed instructions, T-group training, interaction analysis techniques and simulated training of social skills.

Behavioural technology is based on the following suppositions:

- A teacher’s behaviour socially and psychologically.

- A teacher's behaviour can be observed.
- A teacher's behaviour can be measured.
- A teacher's behaviour can be modified.
- Everyone is not a born teacher.
- Teachers can also be made.

Salient features of behavioural technology

Some of the important characteristics of behavioural technology are:

- The basic function of behavioural technology is psychology.
- Strength and responses are strongly focused upon in behavioural technology.
- The teaching acts are appraised from a purposeful viewpoint in behavioural technology.
- Behavioural technology emphasizes psychomotor goals.
- Behavioural technology is in terms of the software approach.
- Behavioural technology is widely practised in training institutes of teachers.
- The attention of behavioural technology can be based on individual differences between students and teachers.
- Behavioural technology is focused on the elements and direction of behaviour in a classroom.

(iii) Instructional Technology

'Instructional technology is a systematic way of designing, carrying out and evaluating the total process of learning and teaching, in terms of specific objectives based on research, human learning and communication. It employs a combination of human and non-human resources to bring about the more effective instruction'.

Assumptions of instructional technology

The fundamental assumptions of instructional technology are as follows:

A student is able to learn in accordance with his requirement and capability.

- A student can learn even if the teacher is not present.
- One can augment a particular instruction by its continuous use.
- Instructional objectives can be achieved with the help of learning objectives.
- The area of discussion can be segregated into different sectors or parts, and every part can be taught in an independent way by use of this technology.

Unique features of instructional technology

Following are the characteristics of instructional technology:

- Instructional technology helps a lot in the achievement of reasonable goals.
- Instructional technology can make teachers more efficient.
- When supported by instructional technology, the students can learn in accordance with their requirement and speed of grasping.
- Instructional technology has control over individual disparities.
- Instructional technology also uses the theory of conditioned response.

- A more detailed examination of subject matter is carried out with the help of instructional technology, which motivates optimism, pertaining to the remarkable manner in which the contents are presented.

Instructional technology suggests many tools, techniques and knowledge which are used in designing and delivering results. Together they provide useful means towards accomplishing educational objectives. It is important to know and be responsive to:

- The destination of delivery of instructions
- The tools and techniques available to deliver instruction
- The right time to use these tools
- Design and delivery of successful learning experiences
- Proper distribution of content and methods
- The best place to deliver instruction
- Ensured meeting of expectations
- Revision techniques, in case instructions are not met

Components of educational technology: hardware and software

Professor Henry Ellington (1993) opined that the key function of educational technology is to bring about improvements in the general competence and efficacy of the teaching–learning process. He further said that these improvements can be introduced in the following ways:

- By enhancing the quality and capacity of learning
- By reduction of the turnaround time for learners to achieve the assigned objectives
- By making teachers more efficient
- By cost-cutting without compromising on quality
- By making learners capable of taking their own decisions
- By providing education in more flexible ways

Considering educational technology as multifaceted in nature, Lumsdaine (1964) has listed its three distinct approaches:

(i) Educational technology I (ET1) or the hardware approach
(ii) Educational technology II (ET2) or the software approach
(iii) Educational technology III (ET3) or the systems approach

Hardware Approach

The hardware approach implies the use of mechanical materials and equipment in the domain of education. Audio-visual aids like charts, models, filmstrips, slides, audio cassettes and sophisticated equipment and gadgets like films, projectors, radio, tape recorder, record player, television, video, teaching machines, computers, etc., fall in the category of hardware. The hardware approach is based on the application of principles of physical sciences and engineering to education and training. In this system, the teaching process is being mechanized gradually so that maximum pupils may be educated in minimum time and at low costs. This approach is a by-product of the scientific and technological developments of the 20th century.

It is to be noted that teaching machines are the only mechanical aids deliberately designed and invented to fulfil instructional requirements. All other audio-visual aids were designed and manufactured for improving the communication system, but now they are being used for instructional purposes. This comprises borrowing and applying technology, machines and devices in the process of teaching and learning. In this context, educational technology serves a simple 'service' function in education.

Characteristics of hardware are as follows:

- Hardware components are generally electronic and mostly depend on mechanical
- systems.
- New techniques and researches are being conducted to evaluate the effect of
- hardware.
- The outcome of hardware is direct and immediate because of its concrete form.
- Hardware components are the media of communication.

Software Approach

The software approach or software technology of education owes its origin to behavioural sciences and their applied aspects concerned with the psychology of learning. It originated from the engineering efforts of Skinner and other behaviourists. This view of educational technology is associated with modern principles and theory of teaching, models of teaching, theory of instruction, and theory of teacher–behaviour and principles of programmed learning. The components of software technology are closely associated with the modern principles of programmed learning, such as:

- Task analysis
- Writing objectives in behavioural terms
- Selection of appropriate instructional strategies
- Reinforcement of correct responses
- Constant evaluation

In the beginning, this approach found its application in the design of materials having sequential content. Soon after, it was widely used as part of curriculum and for developing courses. Based on the engineering approach, it takes the form of a series of steps to be followed. These steps comprise a statement of inputs and definition of objectives, intermediate steps which examine and select instructional strategies and resources and a terminal step of evaluation and output. This process always includes feedback. Though conventionally, ET1 went aboard after ET2, it is not to be regarded as a successful version of ET1. The development of both versions was independent and they still exist.

Systems approach in educational technology

Systems analysis or approach is a term used to describe the systematic application of educational technology to an educational or training problem starting with the input (entry behaviour) and output (terminal behaviour) and determining how best to progress from the

former to the latter. Systems approach is an educational tool developed to make the educational adventure more flexible, holistic, logical, orderly, responsible and self-correcting rather than intuitive, undefinable and unordered.

Steps in systems approach

I. Identifying objectives: This step includes:

- Determining the broad aims of the course
- Deciding as to what kind of people you are helping your students to become
- Finding out the range of backgrounds, interests, attitudes, aptitudes, skills and understandings of the students
- Deciding learning experiences that the learners should process
- Deciding about the test you will use as a criterion for evaluation when checking the extent to which objectives have been achieved
- Deciding about the various techniques you would use, i.e., paper-pencil test, interviews, observation, and questionnaire

II. Designing learning experiences: This includes:

- Visualising conditions necessary to achieve these objectives
- Identifying learning sequences
- Deciding teaching strategy for reaching the goal
- Selection media of teaching-learning, i.e., lecturing, discussion, field trips, role playing, textbook, models, programmed learning, and multimedia
- Documenting experiences which include film also

III. Evaluating effectiveness in achieving the objectives: This implies:

- Engaging students in the learning experiences you have designed
- Applying criterion tests to determine how students have changed as a result
- Determining which objectives have been most widely attained, which remain unattained and by which set of students
- Determining whether any unplanned objectives have been attained

IV. Improving learning experiences: This means:

- Determining the strengths and weaknesses of the course
- Identifying remedial weaknesses
- Try out the revised ling earning experiences and evaluating again
- Updating the course
- Restarting the course.

The advantage of systems approach are:

- Systems approach provides a framework on which the plans for implementing changes in education can be built.
- It assists in identifying the suitability or otherwise of the source material to achieve the specific goal.

Role of the Teacher in Systems Approach

As a matter of fact, best teachers have always done something of the sort of systems approach. It has, therefore, been stated by Michael Eraut and Geoffrey Squires that systems approach is a 'response different in degree rather than kind from the other good method'.

A system-oriented teacher does the following:

- Thoroughly assesses the inputs of his system
- Gathers as much data as possible about his subject-matter
- Thinks of alternative processes for achieving his objectives
- Analyses his objectives into well-defined learning tasks
- Conducts discussions regarding processes and components based on the best means of furthering the purposes
- Activates the system by putting the plan into action
- Gathers feedback data accordingly and systematically
- Modifies the system's components and processes based on the feedback
- Assesses the effectiveness of the system by comparing the outputs with the inputs
- Modifies the system based on all resources of feedback

Role of Technology in Present Education

- The presence of technology enhances the level of education and makes it easier. Today the easy access to the internet has made education easy. It has increased the level, nowadays students don't have to wait for the teacher to complete a topic, and they can easily read whatever they need online or with the help of different educational apps and platforms.
- Nowadays computers and laptops or mobile phones are easily available to educate yourself.
- The use of technology in education is a boon for those who don't have much time, especially those who work. Suppose you work and want to learn a new skill to improve or upgrade your work, so you can easily prefer an online course.
- In the COVID-19 epidemic, the schools were closed for more than 6 months and education was only possible online. Technology saved students from being uneducated for a year, really thanks to the technology that education during COVID got possible.
- There are smart classes available everywhere which increases the interest of students and encourages them to read.

Role of Technology in Future Education

- Soon, books will be available online and this will reduce the burden of a bag of school-going children.
- Digital education will be promoted, this will save the environment, as well as will also decrease pollution caused by the burning of paper.
- Education will become easy and each and every student will get the same education.

- It will help students to read, think, analyze, and then perform and this will definitely increase the standards of education.
- Distance will never be an obstacle to gaining knowledge with the help of technology.
- Helps us to perform advanced research programs and learn new things.

Different Technologies for Education

Any device which is helpful in educating self is a student-friendly technology. It can also be a mobile phone or a laptop. Nowadays there are many devices made especially for students for their studies. I have listed them below:

- **Laptops:** One of the best mediums of gaining knowledge. The Internet is something where you can get information either in a written way or in an audio form. You can get a detailed explanation from different tutors on various platforms. It helps students to get detailed information and also helps to clear their doubts. A laptop is a device where you can easily access different educational portals.
- **Smart Phone:** They are the smaller version of laptops; you can carry your smartphones anywhere and it is a bit convenient to use as compared to a laptop. The easy internet connection and small size make it user friendly. Many students have mobile phones and they use them for educational purposes. There are many educational apps available in Play Store which can be easily used in these phones.
- **Electronic Pen Reader:** It is a thermometer device which helps to record the words written in a book. Actually, it is not always we want to read sometime we prefer listening and it has been proved that we acquire more knowledge by listening. So, this device is specially designed for those who prefer listening. This pen collects whatever written in a book and plays audio when needed.
- **Kindle for Textbooks:** These books are available online and they are available in half rates. This helps to reduce the production of paper and online books can be easily stored. They are popular these days.
- **Noise Cancelling Headphones:** They are super isolated headphone which helps to maintain pin-drop silence. Some time due to marriage seasons and some other reasons it becomes difficult to study. These headphones are specially designed which removes any kind of noise and helps you to focus.

Growth of Science and Technical Education in India:

- The role of science and technical education in the life of a nation is im-mense. We live in the age of science and technology. Science to-day is the concern of everybody. Even is ancient India the art of warfare was scientific and technically biased.
- First, it was hereditary in nature. Our conser-vative character and outlook also gave a death blow to scientific and tech-nical education. We attached importance to bookish, narrow, theoretical and impractical knowledge. Education of the brain was considered vital, and

education of the hand was neglected. Scientific and technical education was originally neglected.

- It recommended bifurcation of the curriculum into general or academic and technical or practical courses. The former was the 'A' course leading to high-er education and the latter was the 'B' course leading to useful vocation in life. But these recommendations only remained in paper. These were not im-plemented in right earnest. If this was done the character of Indian educa-tion might have been different.
- Lord Curzon sincerely felt the need of introduction and improvement of technical, vocational and agricultural education in India for the economic advancement of the Indian society which was traditionally agricultural and backward. In 1904 -n organization known as the "Association for the Ad-vancement of Scientific and Industrial Education" was established.
- The Indian National Congress stressed the need for the pro-motion of technical education in India. The National Education Movement under the banner of the National Congress greatly emphasized the need of the promotion of science and technical education for material progress of the Indian people.
- The second world war produced also a number of salutary ef-fects on the promotion of scientific and technical education. The Sargent Committee in 1944 strongly advocated for the expansion of technical and vo-cational education in India. In 1947 when India became free, there were in the country 38 institutions with a total admission capacity of 2,940 students per year for the degree course.
- There were also 53 polytechnics with a total admission capacity of 3,670 students per year for the diploma courses. The University Education Commission of 1948-49 also laid great em-phasis on the promotion of scientific and technological education.
- Though education is a state subject the Central Govt. has a role to play in the organization and promotion of science and technical education in the country.

Trends in Science and Technology Education in India:

- In recent years science and technology has gained remarkable populari-ty because of their multi channel avenues of employment. They have also opened new horizon for social and economic status and security. These branches of knowledge also have added a new dimension to education and to its role in the life of a nation. But to crown all this is the quality of educa-tion in science and technology.
- If science is taught poorly and badly learnt, it will bring no good either to the individual or to the nation. It will only burden the mind with dead information. Education in science and technology should be up-to-date as well as up to the mark. The most urgent need is the improvement in the standard and quality of science and technology educa-tion at all levels in the country.

- At the present level of our national economy the education of a vast ma-jority of scientists and engineers cannot be at the level reached by the high-ly industrialized countries. But the standard of attainment of future leaders in these fields must bear international comparisons. At least we must aim to provide the best education according to international standard. To achieve this aim we must select the most able students for such courses and build a small number of centres of excellence or advanced study and research.
- To raise the standard in science and technology education and to in-crease efficiency in these fields effective co-operation between the institution of higher education, the universities and national laboratories scien-tific Govt. departments, and industry should be vigorously promoted and strengthened (Joint research project, training of post-graduate and research students and exchange of staff etc.).
- Another important trend in recent years is the expansion of enrolments in the fields of science and technology education. Since independence the number of young people graduating in science and technology in India has been increasing rapidly. It represents a growing awareness and desire for ed-ucation in science and science based courses. This is a welcome trend.
- Another important development in respect of science and technology ed-ucation is that more emphasis is given on theoretical aspects rather than practical aspects. This is an undesirable trend. A proper balance between ex-perimental (practical) and theoretical aspects should be maintained. Sub-jects like experimental physics and chemistry should be developed.
- National Education Policy, 1986, attaches highest priority to teaching of modern and latest science and sophisticated technology at all levels of education to pilot the nation into 21st century. Science and technology should be utilized in the welfare of humanity at large and not for its destruction.

Conclusion:

The study of science and technology acts as a perpetual urge to acquire knowledge. It deepens our sense of the mystery of creation. The more we know of the secrets of nature, the more we realized how much remains unknown. India is aggressively working towards establishing itself as a leader in industrialisation and technological development. Significant developments in the nuclear energy sector are likely as India looks to expand its nuclear capacity. Moreover, nanotechnology is expected to transform India's pharmaceutical industry. The agriculture sector is also likely to undergo a major revamp with the government investing heavily for a technology-driven green revolution. The Government of India, through the Science, Technology and Innovation (STI) Policy-2013, among other things, aspires to position India among the world's top five scientific powers.

Today scientists speak of the wonder of nature with a thrill of emotion. We are learning as much of the secrets of the atoms in space as of the molecular cells in living organism. So a

modern curriculum of studies must include the study of science and technology, because the modern man needs a scientific mind in approaching the problems of life. The use of technology in education will bring a drastic change in our education system. One side will encourage students to study, whereas on the other side will also help them in their studies in many ways. Technology teaches us new things and also encourages us to develop new ideas and promote our creativity. We can easily connect with people and solve our problems.

References:

1. Taber, K. (2017). Reflecting the nature of science in Science Education. In K. S. Taber & B. Akpan (Eds.), Science Education- an international Course Companion, Sense Publishers pp. 23-39.
2. Aydeniz, M., & Cakmakci, G. (2017). Intergrating Engineering Concepts and Practices into Science Education: challenges and opportunities. In K. S. Taber and Akpan. B (Eds.), Science Education- an International Course Companion Sense Publishers (pp. 221-235).
3. Clough, M. P. (2017). History and Nature of Science in Science Education. In K. S. Taber and Akpan. B (Eds.), Science Education- an International Course Companion Sense Publishers (pp. 39-53).
4. Karagöz, E, Cavas, B., & Oral, O. (2019). A view of the impact of technology on science Education in 2070. In B. Akpan (Ed.), Science Education: Visions of the future,Ajuba: Next Generation Nigeria (pp. 261-289).
5. Abd-El-Khalick, F., Bell, R.L. & Lederman, N.G. (1998). The nature of science and instructional practice: Making the unnatural natural. Science Education, 82(4), 417-436
6. Linn, M. C., Davis, E. A., & Bell, P. (2004). Inquiry and technology. In M. C. Linn, E. A. Davis & P. Bell (Eds.). Internet enviroments for science education (pp. 3-27). Mahwah, New Jersey: Lawrence Erlbaum Associates
7. Svendsen, B., Burner, T., & Røkenes, F. M. (2019). Intrinsically Motivating Instruction, In B. Akpan & T. Kennedy (Eds.), Science Education in Theory and Practice- An Introductory Guide to Learning Theory, Springer (pp. 45-55).
8. Influence of Science and Technology on Education, B. L. Dodds and R. W. Lefler, Review of Educational Research,Vol. 16, No. 1, Social Foundations of Education (Feb., 1946), American Educational Research Association,pp. 30-38
9. Biancarosa, G., & Griffiths, G. C. (2012). Technology tools to support reading in the digital age. The Future of Children, 22(2), 139-160.
10. Delgado, A.J., Wardlow, L., McKnight, K., & O'Malley, K. (2015). Educational technology: A review of the integration resources, and effectiveness of technology in K-12 classrooms. Journal of Information Technology Education: Research, 14, 397-416.

Advances in Science and Technology Volume V (ISBN: 978-93-88901-54-3)

About Editors

Dr. Bamalakshmi J, (M.Sc, PhD in Nursing, working as Professor cum Head, Department of Community Health Nursing at, Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, Puducherry. 2 years experience in Clinical practice and 18 years in teaching and research experience for UG, PGs & NPCC programme. Completed American Heart Association (AHA) certified BLS (Basic Life Support) Course, Completed Training of Trainers Programme on Transgender Nursing and BMJ Modules and Course completion. Completed 8 Intramural Research Projects and one Extra mural Research Projects which affiliated by The Tuberculosis Association of India on Identification and exploration of the needs for health care among initial defaulters of Tuberculosis Treatment in selected Areas, Puducherry. Published chapters wit ISBN - 16 and Research original articles published in Internal journals around 4 and National journal around 15. Organized National and Internal conference 2, Participated in National and International Conference and Workshop-85. Had taken special role and responsibility in my job are Design and Development of Technological Advancement in Community level, Validation for the Health Care Product Developmen, Guidance in Patent and Copyright proposal Writing, Expert in Two Dimensional Drawings needed for PrototypeDevelopment, Handling Non – Mobilize Clients Care, Conducting and Organizing various health awareness, camp and campaigns, Conducting Occupational and School Health Assessment and Services, Design Alternative and Complementary Therapy on Maternal Health, Organizing and Conducting Special Training Programme for Peripheral Health Workers, Design and Development of Manual on RCH among Anganwadi workers and Actively involved in Prevention and Control of Pandemic disease.

Mrs. Aruna Devi M (M.Sc) is working as a Professor of Community Health Nursing at Puducherry, Kasturba Gandhi Nursing College. She has 12 years of teaching and research experience. She is recognized PG Teacher and Research Supervisor in Community Health Nursing of Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth University since 2011. She completed 4 certificate courses and received 5 awards. She has attended 65 conferences, workshops, symposium, CNE, webinar and seminars of state, national levels and presented her research work therein and as a resource person. She has published many research papers in various reputed journals as well as she has organized conferences and many community programmes. She is Editorial member for Pondicherry Journal of Nursing.

Mrs.Ranjitha G (M.Sc Nursing) is working as an Nursing Tutor in Department of Community Health Nursing at Kasturba Gandhi Nursing College, Sri Balaji Vidhyapeeth, Pondicherry. She has around 5 years of teaching experience. She has attended 13 conferences of state, national and international standard and presented her research work therin.She has published around 15 various chapters and journals has a author and co-author

Dr. Mrs. R.Geetha (M. Sc., Ph. D.) is working as a Vice principal at Mother Terasa College of Nursing at Tamilnadu. She has 18 years of teaching and research experience. She is Recognized PG Teacher and Research Supervisor in Child Health Nursing of Mother Terasa College of Nursing under The Tamilnadu Dr.M.G.R Medical university, since 2018. She has attended 28 conferences, workshops and seminars of state, national and international standard and presented her research work therein. She has organized conferences and workshop. She has published 10 research papers in various reputed journals as well as there are 5 articles to her account.

Mrs. Manimekalai.S (M.Sc) is working as an Associate professor of Community Health Nursing at Puducherry, Sri Manakula Vinayagar Nursing College. She has 18 years of teaching and research experience. She is Recognized PG Teacher and Research Supervisor in Community Health Nursing of Sri Manakula Vinayagar Nursing College, Pondicherry University since 2017. She has attended 28 conferences, workshops and seminars of state, national and international standard and presented her research work therein and as a resource person. She has published many research papers in various reputed journals as well as she has organized conferences and many community programmes.

Bhumi Publishing

ISBN 978-93-88901-54-3
9 789388 901543