



"The contributed chapters in the book written by the faculties of science stream in the light of the recent thinking and developments in the field of science and education. Science & Technology is now dominates almost every field of our activities in summary, The faculties (Science stream) of GEMS Arts & Science college have made an excellent attempt to bring about this book *Homo Scientia* covering almost all the important areas from biological sciences to artificial intelligence. Every article has its own merits in both academic and research fronts. I record my grateful appreciation and thanks to the contributors of this book for their untiring efforts."

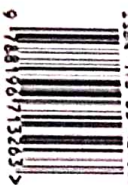
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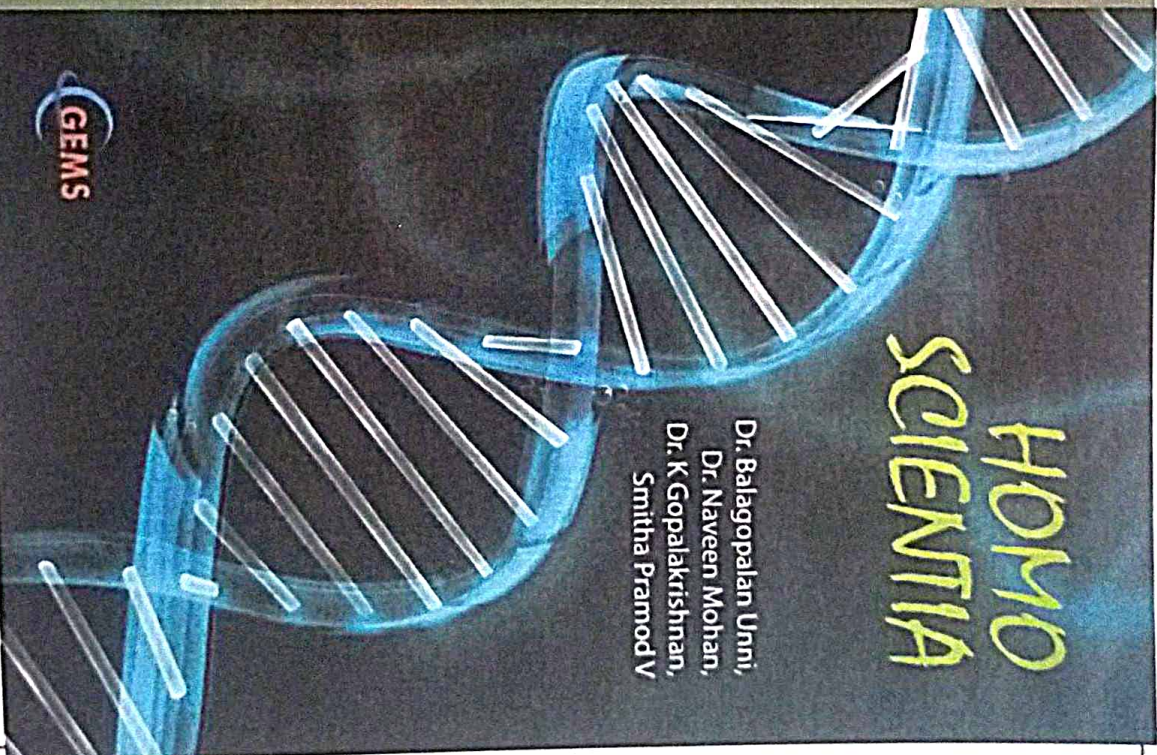
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HOMO SCIENTIA

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Brief Biography

Dr. B.G.Unni, (Balagopalan Unni) Ph.D
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Former Chief Scientist and Area Coordinator (Biotechnology & Biological Sciences) DADD and Fulbright Fellow retired from CSIR service in 2015 after 38 years of research career at CSIR North East Institute of Science & Technology Jorhat Assam. Appointed at Assam down town University as Director-Research in March 2015 and continued up to June 2019 and then re-designated as Adviser Research in August 2019). Back in Kerala, Dr.Unni is appointed as Director Academic & Research at GEMS College of Arts & Science affiliated to University of Calicut from August 2019. Both the positions are on honorary basis to strengthen the institutions in research areas. He did his BSc Biology (1972-74, Ewing Christian College, Alld University), MSc in Biochemistry(1974-76)(Second Rank) and Ph.D in Biochemistry from Allahabad University(1976-80) and PDF in Molecular Biology from Texas A&M University, USA(1988-91). Dr. Unni is specialized in Biochemistry, Molecular Biology, and Biotechnology and well established in his area of research and completed more than 40 years of research in both basic and applied fields of research. Dr.Unni got more than 130 research papers, 190 abstracts, 35 papers in proceedings, 7 patents, 1 technology. 18 chapters in books, edited 3 books and 29 students



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received PhD degrees under his guidance and supervision. Dr. Unni had completed more than 20 projects sponsored by Commonwealth Science Council, London, Ministry of Non conventional Energy Sources, Department of Non conventional Energy Sources Govt of India, North Eastern Council Govt of India, Department of Science & Technology, Department of Biotechnology, Central Silk Board, GB Pant Institute of Himalayan Environment and Development, CSIR and DRDO, Ministry of Defense, Govt of India during his scientific tenure at CSIR NEIST. Dr Unni received- Fulbright Travel Award/ Fellowship (USA) Dr. B.M. Das Memorial Science award, Hebrew University Award , H.R. Cama Memorial Travel Award, COSTED Travel Award, DAAD- fellowship-Germany, Well Mark International Scholarship (USA) & Technology award in life sciences by CSIR, Govt of India . Best Fulbright Alumni Chapter Leader-South Asia Selected by the United States Education Foundation In India (USIEF), New Delhi .Nominated to represent India at the International Fulbright Scholars meet at Marrakech, Morocco- Nominated by United States Education Foundation In India, New Delhi . Dr. Unni is in the editorial board of more than eight indexed journal in the country .Dr.Unni was nominated to various state and central committees such as High power committee for development of sericulture activities Muga, Eri, Tassar and Mulberry in Assam nominated by Governor of Assam, .Expert in the area of non mulberry sericulture, Ministry of Textiles, Advisory Board, Post graduate Biotechnology programme, Academic Council, Assam Agricultural University, Research Council, Central Silk Board, Ministry of Textiles , DBT's Nominee for Biosafety Committee , Vice President SBC (India) Indian Institute of Science Bangalore, Vice President Indian Academy of Neuro-sciences, Member Fulbright Academy of Science & Technology, USA, Board of studies- Botany Nagaland University and Biotechnology Saugar University Madhya Pradesh., Fellow, Indian Academy of Neurosciences & Indian Society of Agricultural Biochemists, Fellow Royal Entomological Society, London UK and Scientific





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Member Advisory Committee Cancer Research Advisory
Board, North East Cancer Hospital & Research Institute (2017-
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Dr.Unni visited USA, Germany, Israel, Jordan, France,
Morocco ,UK, Thailand ,Jordan, Singapore , China and UAE
under various exchange program.





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Preface

I am very happy to learn that, the GEMS Arts & Science College is bringing out a series of books written by the faculty in this academic year. The college is occupying a very important position among the colleges in Kerala, the same way the college is having unique standing in both academic and research fronts too. This is because of the excellent management, faculties and the best performances of the students.. I have full confident that in the course of time, and with the sincere commitment and dedication of the faculties , students and with management , the college will attain high level perfection and excellence and became a model college in the state of Kerala

This book entitled " Homo Scientia" had comprehensive research topics in various aspects in the topics of cyber security, biotechnology, microbiology and geology. A brief description about the cybersecurity, the protection of computer set up such as hardware, software data from several threats have been described in the chapter The best practices for deploying and managing IPS network security tools have been explored. The integration of intrusion prevention system (IPS) solutions, adherence to security policies, regular updates, monitoring and the implementation of incident response procedures are considered to be the essential components of a comprehensive network security framework. The risk management in cyber security, various cyber-attack kinds, malware, and some strategies to tackle these attacks are also explained by the authors. A comprehensive overview of the evolution of computer graphics, exploring the advancements in hardware, software, algorithms, and techniques that have propelled the field from its early pixel-based beginnings to the current state of realism etc also described. Optical character recognition has been extensively investigated in the past few years, and has been proven that high recognition rates can be achieved in specific





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application scenarios using some standard and well-studied methods such as neural network, support vector machine (SVM), etc. The possibility of learning an appropriate set of features for designing optical character recognition (OCR) has been investigated

Biotechnology is an interdisciplinary science using modern technologies to construct biological processes in research, agriculture, formulation of pharmaceutical products and other related fields. The better understanding of advances in plant genetic resources, genome modifications, omics technologies to generate new solutions for food security under changing environmental scenarios etc have been discussed in this chapter. The increasing demand for food had a great impact on the agriculture sector to address the various challenges associated with crop productivity. The tremendous advancement in plant research helps in understanding plant biology for sustainable food security, functional ecosystems, crop improvement and human health. One of the sustainable farming techniques is the use of fertilizer at nano level. Nanomaterials that enhance plant nutrition could be considered as an alternative to the conventional chemical fertilizers. one chapter covered the importance of nano fertilizer to enhance metabolic processes in plants and reviewed the concerns in developing nanotechnological methods in the future. Metabolomics has now emerged as a powerful tool for the comprehensive analysis of metabolites within biological systems. One of the chapters provides a review on metabolomics, encompassing its methodologies, applications, potential impact on personalized medicine ,and discusses further the need for advancements in analytical technologies. The antifungal activity of mangroves, particularly Rhizophora species are one of the main sources for fungicidal compounds due to the presence of high concentration of phenols. The antifungal activity of Rhizophora species has been elucidated, and could be further utilized as biocontrol agents for fungal disease in agricultural crops. One of the chapters discussed the species identification and its impact on economical and ecological level in the species like Nutmeg, one of the important medicinal plants that had a greater attention ,however, it was very difficult to differentiate the sexual identity




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in the seedling stages. But the protein content screening among the studied plantlets had differentiated the sexes in the species as explained by the author.

AI (Artificial Intelligence) or machine intelligence enables farmers to enhance the quality and ensure a quick go-to market strategy for crops, and adoption of these algorithms to improve food industries. Artificial intelligence (AI) has also the potential to revolutionize education, from personalized learning to assessment and grading. Additionally, AI-powered tools can provide greater accessibility to students with disabilities, while also enabling more engaging and interactive content. AI continues to develop and become more prevalent in education, towards responsible and equitable implementation. However the negative and positive part of the AI may also be looked into.

The chapters related to microbiological aspects have also been incorporated in this book. Carbapenem-resistant *A. baumannii* (CRAB), bacteria that cause multi-infections in humans and resistant to multiple drugs too. The study attempted to isolate and characterize the bacterial species from the clinical specimens using biochemical techniques. The enzyme, carbapenemase produced by the bacteria was isolated and determined by different assays. Another study identified the antibacterial, antioxidant and anticancer activities of *Ganoderma lucidum* by various chromatographic techniques. Anticancer activity was also assessed on HeLa cell lines using MTT assay and DPPH assay. In one of the chapters, the author discussed L-asparaginase, one of the widely exploited enzymes for the treatment of acute lymphoblastic leukemia (ALL). Also attempted to isolate and characterize the enzyme from soil samples collected from different locations at Kerala. The study indicated that soils can provide a rich source for L-asparaginase which has got ample application in pharmaceutical industries.

The studies on various geological aspects with respect to different geographical areas in Kerala soil has been included in the book. The vertical geochemical variation and elemental mobility of the lateritic terrain in the Makkaraparamba of Malappuram District, Kerala has been very well investigated. Under extremely oxidizing and leaching conditions, laterite




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soil transformed into a variety of rocks and further developed into stable secondary product in the existing humid tropical and subtropical environments. The hydrogeological conditions in Kumbala- Kaliyar river basin, Kasaragod district, Kerala was assessed by means of Vertical Electrical Sounding (VES). The digital spatial data output of the present study would be much helpful for planning and management of surface and sub-surface water resources of Kasaragod River basin in which the Kasaragod township is centrally located

The contributed chapters in the book written by the faculties of science stream in the light of the recent thinking and developments in the field of science and education. Science & Technology is now dominates almost every field of our activities. In summary, The faculties (Science stream) of GEMS Arts & Science college have made a n excellent attempt to bring about this book "Homo Scientia". covering almost all the important areas from biological sciences to artificial intelligence. Every article has its own merits in both academic and research fronts..I record my grateful appreciation and thanks to the contributors of this book for their untiring efforts.

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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EDUCATION: EXPLORING THE PROS AND CONS

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ABSTRACT


Artificial intelligence has the potential to revolutionize education, from personalized learning to assessment and grading. With AI, educational materials and assessments can be tailored to individual students' needs, preferences, and learning styles, leading to more efficient and effective learning. Additionally, AI-powered tools can provide greater accessibility to students with disabilities, while also enabling more engaging and interactive content. However, the use of AI in education also raises ethical concerns related to data privacy, bias, and accountability. As AI continues to develop and become more prevalent in education, it is crucial for educators to consider these issues and work towards responsible and equitable implementation.

INTRODUCTION

AI has the potential to transform education by providing personalized learning experiences for students, increasing accessibility to educational materials, and improving efficiency in grading and assessment. AI-powered tools can adapt to individual students' learning styles, identify knowledge gaps, and provide targeted support, leading to more effective learning outcomes. Additionally, AI can make education more accessible for students with disabilities and provide more engaging and

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interactive content. However, ethical concerns such as data privacy, bias, and accountability must also be considered in the implementation of AI in education. As AI continues to develop and become more prevalent in education, it is important for educators to explore its potential benefits and challenges to ensure responsible and equitable use.

The use of AI in education has both pros and cons. On the positive side, AI has the potential to provide personalized learning experiences that are tailored to individual students' needs, preferences, and learning styles, leading to more effective learning outcomes. AI can also make education more accessible for students with disabilities and provide more engaging and interactive content.

However, there are also some potential drawbacks to the use of AI in education. Ethical concerns such as data privacy, bias, and accountability must be considered to ensure responsible and equitable implementation of AI. There is also a risk that AI-powered tools may replace human educators, leading to a loss of human interaction and empathy in the learning process.

Artificial Intelligence on Education

- **Primary education:** AI can provide personalized learning experiences, adapt to individual students' needs, and provide immediate feedback to students and educators. AI can also help identify students who may be struggling and provide targeted interventions to help them succeed.

- **Higher education:** In higher education, AI can provide personalized learning experiences, adapt to individual students' needs, and provide immediate feedback to students and educators. AI can also help automate administrative tasks such as course registration and grading, freeing up time for faculty to focus on teaching and research.

- **Career and technical education:** In career and technical education, AI can help students develop important skills such as critical thinking, problem-solving, and creativity, which are increasingly in demand in the workforce. AI can also help identify skills gaps and provide targeted interventions to help students develop the skills they need for their chosen careers.



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- Continuing education: In continuing education, AI can provide personalized learning experiences, adapt to individual learners' needs, and provide immediate feedback to learners and educators. AI can also help identify areas where learners need additional support and provide targeted interventions to help them succeed.

- Online learning: In online learning, AI can provide personalized learning experiences, adapt to individual learners' needs, and provide immediate feedback to learners and educators. AI can also help identify areas where learners need additional support and provide targeted interventions to help them succeed.

- Overall, AI has the potential to impact education in a variety of fields in different ways. However, it is important for educators and policymakers to consider the potential benefits and challenges associated with AI in each field to ensure responsible and equitable implementation.

Advantages

- Personalized learning: AI can adapt to individual students' learning styles and provide personalized content and feedback, leading to more effective learning outcomes.

- Accessibility: AI-powered tools can make education more accessible for students with disabilities by providing assistive technologies such as text-to-speech or speech-to-text tools.

- Efficiency: AI can increase efficiency in grading and assessment, saving time for educators and providing immediate feedback to students.

- Engaging and interactive content: AI can create more engaging and interactive educational content, such as virtual or augmented reality simulations, that can enhance the learning experience.

- Skill development: AI can help students develop important skills such as critical thinking, problem-solving, and creativity, which are increasingly in demand in the workforce.

- Cost savings: AI-powered tools can reduce labor costs

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and other expenses associated with human workers.

Disadvantages

While AI has the potential to revolutionize education, there are also potential drawbacks associated with its use, including:

- **Data privacy:** The use of AI in education raises concerns about data privacy, as large amounts of sensitive student data are collected and analyzed. There is a risk that this data could be used for unauthorized purposes or accessed by unauthorized parties.
- **Bias:** AI algorithms can be biased, perpetuating existing social, cultural, and economic inequalities in education. This can lead to unfair outcomes, such as inaccurate assessments or unequal access to educational opportunities.
- **Accountability:** As AI algorithms become more complex, it can be difficult to determine how decisions are being made and who is responsible for them. This lack of accountability can be problematic if AI-powered systems make incorrect or unfair decisions.
- **Cost:** Implementing AI in education can be expensive, requiring significant investments in technology and personnel. This can create financial barriers that prevent some schools and students from benefiting from AI.
- **Lack of human interaction:** There is a risk that AI-powered tools may replace human educators, leading to a loss of human interaction and empathy in the learning process. This can be especially problematic for students who need more personalized attention or support.

Impacts of AI on reading habits

AI can have both positive and negative impacts on the reading habits of students. On one hand, AI can provide access to vast amounts of digital reading material, including eBooks, online articles, and other digital resources. This can make it easier for students to find reading materials that interest them and can support personalized learning experiences. Additionally, AI-powered tools such as reading comprehension software and

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adaptive reading platforms can help students improve their reading skills and better understand the material.

However, there are also potential negative impacts associated with the use of AI in reading. For example, some researchers have expressed concern that the over-reliance on digital reading materials and screen-based learning could lead to a decline in reading comprehension and critical thinking skills. Additionally, the use of AI-powered tools to guide reading habits may limit students' exposure to diverse perspectives and ideas, leading to a narrowing of their intellectual horizons.

Furthermore, the use of AI in reading may also raise concerns about data privacy and student tracking, as AI-powered reading tools can collect data on students' reading habits and learning behaviors. This data can potentially be used to make decisions about students' academic progress, but it can also raise concerns about the use of data for purposes beyond the scope of education.

Overall, the impact of AI on the reading habits of students is complex and multifaceted. While AI has the potential to support personalized learning experiences and improve reading skills, it is important for educators and policymakers to carefully consider the potential positive and negative impacts and work towards responsible and equitable implementation.

CONCLUSION

The future of AI in education is likely to be transformative, as AI technology continues to develop and become more sophisticated. Here are a few potential developments that may shape the future of AI in education:

- Personalized learning: AI technology can help create personalized learning experiences for each student by adapting to individual learning styles and providing customized feedback and support.
- Intelligent tutoring: AI-powered intelligent tutoring systems can provide targeted feedback and support to students based on their individual learning needs.
- Augmented reality and virtual reality: AI technology can be combined with augmented reality and virtual reality to



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create immersive learning experiences that enhance student engagement and understanding.

- Data-driven decision-making: AI technology can analyse large amounts of data on student performance and behaviour to provide insights that can inform decision-making and improve student outcomes.
- Adaptive testing: AI-powered adaptive testing systems can provide a more accurate and efficient way to assess student learning, adjusting the difficulty of questions in real-time based on student performance.
- Collaboration and communication: AI technology can facilitate collaboration and communication between students and educators by providing real-time feedback and support.

Overall, the future of AI in education is likely to be characterized by increasingly personalized, adaptive, and data-driven learning experiences that enhance student engagement and improve academic outcomes. However, it is important for educators and policymakers to carefully consider the ethical and practical implications of AI technology in education and work towards responsible and equitable implementation.

AI technology has the potential to revolutionize education by providing personalized learning experiences, improving efficiency, and increasing access to educational resources. However, there are also potential drawbacks, including concerns about data privacy, bias, and the potential loss of human interaction and empathy in the learning process. As the development and implementation of AI technology in education continues, it is important for educators and policymakers to carefully consider the potential advantages and disadvantages and work towards responsible and equitable implementation. This includes prioritizing student privacy and data protection, addressing issues of bias and equity, and ensuring that AI-powered tools support, rather than replace, human educators and their expertise. AI technology can be a powerful tool for enhancing the quality and accessibility of education, but it is important to approach its implementation with caution and thoughtfulness in order to maximize its potential benefits and minimize its potential risks.




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