Role of AI
in Teaching, Learning & Research in Higher Education

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Foreword

I take the opportunity with immense zeal and eagerness to introduce the book "*Role of Artificial Intelligence in Teaching, Learning and Research in Higher Education*" authored by various talented authors. This book explains the use of artificial intelligence in higher education especially for teachers, learners and researchers. The book focuses on introduction of AI, application of AI in higher education, emotional AI, automated grading and feedback, AI in higher education research, the authors very thoughtfully elaborated different AI tools and how to use them in the chapter "AI and AI Tools for Teaching", ethics of use of artificial intelligence, impact of AI on higher education and application of AI in assignment preparation by learners and assessment by teachers.

The use of chatboats such as ChatGPT has been described in detail by the authors it was further concluded that if used with ethics intelligently the ChatGPT is a boon not only for learners but it is much useful for teachers and researchers also. The application of AI in day-to-day academic tasks such as admission, enrollment and examination has also

been highlighted by the authors. The utility of AI in pedagogy and lesson preparation by the teachers, application of AI in library, digital resources of the different ai tools have been explained in this book. The application of AI in higher education administration has been explained effectively by the author in the chapter “AI in Educational Administration and Management”. Not only this the holistic influence of artificial intelligence on higher education has also been explored by the authors

I am sure that this valuable book will serve it’s very purpose to let the readers know how to use AI in higher education ?, about the current scenario of AI application in teaching, learning, research and importance of ethics in using AI along-with other areas of higher education and higher education research. I congratulate all the authors for their contribution in the book which is a valuable source for different stakeholders of higher education.

Dr. S.L. Sihag
Chairperson
Nirwan University Jaipur

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Rahul Kumar

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Acknowledgement

First and foremost I avail this opportunity to thank Nirwan University Jaipur for providing all the courage, motivation and resources to accomplish the challenging task of producing the book "*Role of AI in Teaching Learning & Research in Higher Education".* The constant encouragement, moral support and guidance of Hon'ble Chairperson made it possible to complete this book timely with good quality content.

I cannot express how grateful I am to the Hon'ble Vice Chancellor and Hon'ble Vice Chairperson for their advice and persistent support that have been invaluable during the completion of this volume.

I would like to express my heartfelt gratitude to the Office of the Hon'ble Chairperson, and to the distinguished OSD in particular, for their timely help during this endeavour. A particular thanks goes out to the esteemed COE, and Joint Registrar, whose commitment and skill have added significant depth and clarity of content to the chapters. Their suggestions have made a substantial contribution to the overall quality of this book.

I would also like to thank the Deans, Directors and Faculty Members, whose encouragement and support have been crucial in forming the contents of this book really meaningful and impressive. Finally, I want to express my

gratitude to the social media Team for spreading the word about the book and expanding its reach. Their efforts helped to increase participation and interest in the different AI topics covered.

The Nirwan University Jaipur community's combined efforts have made "*Role of AI in Teaching Learning & Research in Higher Education*" a relevant and collaborative endeavor. It demonstrates the University's commitment to creating a culture of excellence in academics. Thank you again for your constant support and encouragement during this journey. I am deeply appreciative for the collaborative attitude that characterizes Nirwan University Jaipur.

I would be negligent if I did not thank Prof. (Dr.) Ravi Kant Modi, Member Secretary, Publication Board, Nirwan University Jaipur, for his prompt and efficient assistance.

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Sincerely,

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Nakuleshwar Dut Jasuja, currently holding the position of Dean & Joint Registrar at Nirwan University Jaipur, boasts an illustrious academic career coupled with over 13 years of extensive experience in teaching, research, academic administration, and industry. His multifaceted professional journey has encompassed affiliations with renowned institutions such as the Indian Institute of Integrative Medicine (IIIM) and the University of Rajasthan. Prof. Jasuja has assumed diverse roles, exemplifying his commitment to academic excellence and institutional development. At Nirwan University, he has served as the NAAC Coordinator, Convenor of the NEP Committee, and a distinguished member of the Institutional Development Committee. His versatile contributions have played a crucial role in shaping the academic landscape of the institutions he has been associated with. Beyond his administrative roles, Prof. Jasuja has demonstrated his prowess in research and innovation. His prolific research output includes the publication of 85 articles in international journals of high repute, and he has been granted several patents, underscoring his significant contributions to the field. In recognition of his outstanding research work on environmental issues,

toxicology, and exposure science, Prof. Jasuja was honored with the prestigious Young Scientist Award in 2013. His dedication to advancing knowledge in the realm of Animal Science and Microbiology has not gone unnoticed. Prof. Jasuja received a Gold Medal from the Hon'ble Chief Minister of U.P. during the All India Congress of Zoology at B.B.A. Central University, Lucknow. His commitment to excellence, coupled with his extensive contributions, marks him as a distinguished professional whose impact extends across academia, research, and industry. This accolade stands as a testament to his immense contributions to these fields.

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In addition to her academic roles Dr. Anju Gautam is actively involved in the academic community as a member of the organizing committee in a renowned computer science research journal. She had awarded with Star Excellence Award in July 2017. Dr. Anju Gautam has contributed significantly to the body of knowledge in her field through the publication of various papers in national and international journals. Her research interests lie in the area of data Science, Artificial Intelligence, Machine Learning and software Engineering. She has published in various reputed UGC Care journals. She has published 7 Books and one Indian patent.

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Preface

The growth of artificial intelligence has created a fog of tales, misunderstanding, and fear among educators. This book, *Role of AI in Teaching Learning & Research in Higher Education* provides the precious information about the usefulness of AI in higher education in different fields. It has been very well explained by the various authors that AI is an instrument to be used purposefully inspite of a thinking that it is a threat to education. It's a fact that artificial intelligence (AI) offers the field of education both great prospects and problems but if used judiciously it provides tremendous opportunities to learners, teachers and researches in higher education. The chapters have been written keeping in mind the current scenario of application of AI in higher education. The authors have provided valuable insights based on their experience and exposure in easy-to-understand terminology and examples.

This book basically is focused on the detailed aspects and various methods, tools through which the AI can be efficiently used in teaching, learning and research in higher education. The various authors have very well written about the Artificial Intelligence, pros and cons of it’s use in education, it’s application in research, ethics of using AI, the use of popular tools like ChatGPT in learning and teaching. Not only this the AI application in pedagogy, assignments preparation by learners, lessons preparation by teachers, assessment, analysis, and educational

administration along-with the description of most popular AI tools specifically for teachers as well as learners have been explained very well by the authors. The multi-application of AI in education in prominent sectors such as examination, learning management systems, enrolment and retention, plagiarism detection, teachers lecture transcription and academic research are also covered by the authors in different chapters. Impact of application of AI in higher education, the use of AI in library, in science and technology research have also been highlighted.

I am hopeful that readers will be highly benefitted from this book and its contents in terms of acquiring knowledge about the role of AI in higher education. I am sure that this book will be very useful for students, teachers, researchers, officials, academic administrators and policy makers associated with higher education.

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Role of AI in Teaching, Learning & Research in Higher Education

I am feeling immense pleasure and gratitude to present this book "*Role of Artificial Intelligence in Teaching, Learning and Research in Higher Education*" to all esteemed readers, the entire book has eleven Chapters explaining the multifaceted role of artificial intelligence in current scenario in the higher education. The chapter "Application of Artificial Intelligence in Higher Education" explains the use of artificial intelligence in the current system of higher education in different areas from perspective students to completion of their academic journey and for teachers and researchers it's a boon to sharpen their skills.

The chapter "AI and Higher Education Research" explains the application of AI in higher education research from problem formulation up to conclusion of research on different steps further the use of most popular Chatboat ChatGPT has been explained in the chapter "ChatGPT as a Learning Tool". Further authors analyzed the impact of artificial intelligence on higher education in different sectors in the chapter "AI's Impact on Higher Education

Teaching & Learning" The authors provided the detailed information of utility of AI in the chapter "AI in Teaching & Pedagogy".

The artificial intelligence importance in day-to-day educational administration has been explained effectively and impressively in the chapter "Educational Administration & Management". Further the valuable information and application of different popular AI tools along with the sources has been incorporated in this book in the chapter "AI & AI Tools for Teaching". The AI actually effects the higher education holistically the helictical influence of AI has been explored by the author in the chapter "Exploring the Holistic Influence of Artificial Intelligence on Higher Education: An Investigation into Teaching, Learning, and Research". There are opportunities as well as challenges in artificial intelligence for example ethics, accuracy, adaptability, customization, knowledge sharing and institutional culture are few of them, this aspect has been elaborated in detail in the chapter "The AI Education Revolution: Opportunities and Challenges". AI can be integrated with various research processes an effort has been made to elaborate it in the chapter "Integration of Artificial Intelligence in the Study and Optimization of Composite Materials and Sintering Processes: A Comprehensive Review"

The utilization of Artificial Intelligence (AI) in libraries has emerged as a transformative paradigm, reshaping traditional library services and augmenting user experiences, the chapter "Use of Artificial Intelligence in Modern Libraries" explains in detail how AI is making the

libraries more user friendly with ease of access to books and better library management. The impact of AI on the higher education has been described in the perspective of existing setting in the chapter "AI's Impact on Higher Education Teaching & Learning".

The AI is impacting the higher education in bigger way and it is evident that the use of AI in higher education is revolutionizing teaching and learning and is more than simply a fad. AI is revolutionizing every facet of the educational process, from intelligent student support systems and tailored learning pathways to data-driven insights for educators and expedited administrative procedures.

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