

## Big Data In Education

This book constitutes the thoroughly refereed post-workshop proceedings of the 4th International Symposium, SETE 2019, held in conjunction with ICWL 2019, in Magdeburg, Germany, in September 2019. The 10 full and 6 short papers presented together with 24 papers from 5 workshops were carefully reviewed and selected from 34 submissions. The papers cover the latest findings in various areas, such as: virtual reality and game-based learning; learning analytics; K-12 education; language learning; design, model and implementation of e-learning platforms and tools; digitalization and industry 4.0; pedagogical issues, practice and experience sharing.

This book provides a refreshing and user-friendly guide to quantitative data analysis in education for students and researchers. It assumes absolutely no prior knowledge of quantitative methods or statistics. Beginning with the very basics, it provides the reader with the knowledge and skills necessary to be able to undertake routine quantitative data analysis to a level expected of published research. Rather than focusing on teaching statistics through mathematical formulae, the book places an emphasis on using SPSS to gain a real feel for the data and an intuitive grasp of the main concepts and techniques involved. Drawing extensively upon up-to-date and relevant examples, the reader will be encouraged to think critically about quantitative research and its potential as well as its limitations in relation to education. Packed with helpful features, this book: provides illustrated step-by-step guides showing how to use SPSS, with plenty of exercises to encourage the reader to practice and consolidate their new skills makes extensive use of real-life educational datasets derived from national surveys in the US and UK to illustrate key points and to bring the material to life has a companion website that contains all of the educational datasets used in the book to download as well as comprehensive answers to exercises and a range of other useful resources that are regularly updated. The book will therefore appeal not only to undergraduate and postgraduate students but also to more established and seasoned educational researchers and lecturers and professors who have tended to avoid or shy away from quantitative methods.

Making research in all fields of study readily available is imperative in order to circulate new information and upcoming trends. This is possible through the efficient utilization of collections of information. Maximizing Social Science Research Through Publicly Accessible Data Sets is an essential reference source for the latest academic perspectives on a wide range of methodologies and large data sets with the purpose of enhancing research in the areas of human society and social relationships. Featuring coverage on a broad range of topics such as student achievement, teacher efficacy, and instructional leadership, this book is ideally designed for academicians, researchers, and practitioners seeking material on the availability and distribution methods of research content.

This book provides a significant contribution to the increasing conversation concerning the place of big data in education. Offering a multidisciplinary approach with a diversity of perspectives from international scholars and industry experts, chapter authors engage in both research- and industry-informed discussions and analyses on the place of big data in education, particularly as it pertains to large-scale and ongoing assessment practices moving into the digital space. This volume offers an innovative, practical, and international view of the future of current opportunities and challenges in education and the place of assessment in this context.

Digital methodologies, new forms of data visualization and computer-based learning and assessment are creating new challenges as well as opportunities for scholars in educational research. The World Yearbook of Education 2019 explores this highly relevant topic, opening a new discussion about the various conceptual and methodological challenges and opportunities in contemporary educational research. This volume explores contemporary methods of inquiry, with chapters organized around four topics of enduring interest in this field: impacts, patterns, relations and contexts. The World Yearbook of Education 2019 comprises contributions from internationally renowned scholars exploring novel concepts and methodologies in grappling with contemporary empirical phenomena in educational research. Vital questions such as how we understand the technological developments that are creating new possibilities for and demands on education, and how we make sense of complex cases that cut across multiple nations, are discussed. This newest addition to the prestigious World Yearbook of Education series provides a fascinating read for scholars in the fields of education policy and comparative education. It is not only a useful resource for educational researchers and policy makers examining new trends and emerging issues, but would be of interest to graduate students exploring innovative methodologies, particularly in the study of education and education policy.

What if we could unlock the potential in every child? As it turns out, we can. Apple's iconic cofounder Steve Jobs had a powerful vision for education: employing technology to make an enormous impact on the lives of millions of students. To realize this vision, Jobs tapped John D. Couch, a trusted engineer and executive with a passion for education. Couch believed the real purpose of education was to help children discover their unique potential and empower them to reach beyond their perceived limitations. Today, technology is increasingly integrated into every aspect of our lives, rewiring our homes, our jobs, and even our brains. Most important, it presents an opportunity to rewire education to enrich and strengthen our schools, children, and society. In *Rewiring Education*, Couch shares the professional lessons he's learned during his 50-plus years in education and technology. He takes us behind Apple's major research study, *Apple Classrooms of Tomorrow (ACOT)*, and its follow-up (*ACOT 2*), highlighting the powerful effects of the Challenge-Based Learning framework. Going beyond Apple's walls, he also introduces us to some of the most extraordinary parents, educators, and entrepreneurs from around the world who have ignored the failed promises of memorization and, instead, utilize new science-backed methods and technologies that benefit all children, from those who struggle to honor students. *Rewiring Education* presents a bold vision for the future of education, looking at promising emerging technologies and how we—as parents, teachers, and voters—can ensure children are provided with opportunities and access to the relevant, creative, collaborative, and challenging learning environments they need to succeed.

Homework assignments that learn from students. Courses tailored to fit individual pupils. Textbooks that talk back. This is tomorrow's education landscape, thanks to the power of big data. These advances go beyond the much-discussed rise of online courses. As the New York Times bestselling authors of *Big Data* explain, the truly fascinating changes are actually occurring in how we measure students' progress and how we can use that data to improve education for everyone, in real time, both on- and offline. *Learning with Big Data* offers an eye-opening, insight-packed tour through these new trends, for educators, administrators, and readers interested in the latest developments in business and technology.

Addresses the impacts of data mining on education and reviews applications in educational research teaching, and learning This book discusses the insights, challenges, issues, expectations, and practical implementation of data mining (DM) within educational mandates. Initial series of chapters offer a general overview of DM, Learning Analytics (LA), and data collection models in the context of educational research, while also defining and discussing data mining's four guiding principles— prediction, clustering, rule association, and outlier detection. The next series of chapters showcase the pedagogical applications of Educational Data Mining (EDM) and feature case studies drawn from Business, Humanities, Health Sciences, Linguistics, and Physical Sciences education that serve to highlight the successes and some of the limitations of data mining research applications in educational settings. The remaining chapters focus exclusively on EDM's emerging role in helping to advance educational research—from identifying at-risk students and closing socioeconomic gaps in achievement to aiding in teacher evaluation and facilitating peer conferencing. This book features contributions from international experts in a variety of fields. Includes case studies where data mining techniques have been effectively applied to advance teaching and learning Addresses applications of data mining in educational research, including: social networking and education; policy and legislation in the classroom; and identification of at-risk students Explores Massive Open Online Courses (MOOCs) to study the effectiveness of online networks in promoting learning and understanding the communication patterns among users and students Features supplementary resources including a primer on foundational

aspects of educational mining and learning analytics Data Mining and Learning Analytics: Applications in Educational Research is written for both scientists in EDM and educators interested in using and integrating DM and LA to improve education and advance educational research. Knowledge in its pure state is tacit in nature—difficult to formalize and communicate—but can be converted into codified form and shared through both social interactions and the use of IT-based applications and systems. Even though there seems to be considerable synergies between the resulting huge data and the convertible knowledge, there is still a debate on how the increasing amount of data captured by corporations could improve decision making and foster innovation through effective knowledge-sharing practices. Big Data and Knowledge Sharing in Virtual Organizations provides innovative insights into the influence of big data analytics and artificial intelligence and the tools, methods, and techniques for knowledge-sharing processes in virtual organizations. The content within this publication examines cloud computing, machine learning, and knowledge sharing. It is designed for government officials and organizations, policymakers, academicians, researchers, technology developers, and students.

The abundance of data and the rise of new quantitative and statistical techniques have created a promising area: data analytics. This combination of a culture of data-driven decision making and techniques to include domain knowledge allows organizations to exploit big data analytics in their evaluation and decision processes. Also, in education and learning, big data analytics is being used to enhance the learning process, to evaluate efficiency, to improve feedback, and to enrich the learning experience. As every step a student takes in the online world can be traced, analyzed, and used, there are plenty of opportunities to improve the learning process of students. First, data analytics techniques can be used to enhance the student's learning process by providing real-time feedback, or by enriching the learning experience. Second, data analytics can be used to support the instructor or teacher. Using data analytics, the instructor can better trace, and take targeted actions to improve, the learning process of the student. Third, there are possibilities in using data analytics to measure the performance of instructors. Finally, for policy makers, it is often unclear how schools use their available resources to "produce" outcomes. By combining structured and unstructured data from various sources, data analytics might provide a solution for governments that aim to monitor the performance of schools more closely. Data analytics in education should not be the domain of a single discipline. Economists should discuss the possibilities, issues, and normative questions with a multidisciplinary team of pedagogists, philosophers, computer scientists, and sociologists. By bringing together various disciplines, a more comprehensive answer can be formulated to the challenges ahead. This book starts this discussion by highlighting some economic perspectives on the use of data analytics in education. The book begins a rich, multidisciplinary discussion that may make data analytics in education seem as natural as a teacher in front of a classroom. Co-published with AIR. Co-published with ACE. In this era of "Big Data," institutions of higher education are challenged to make the most of the information they have to improve student learning outcomes, close equity gaps, keep costs down, and address the economic needs of the communities they serve at the local, regional, and national levels. This book helps readers understand and respond to this "analytics revolution," examining the evolving dynamics of the institutional research (IR) function, and the many audiences that institutional researchers need to serve. Internally, there is a growing need among senior leaders, administrators, faculty, advisors, and staff for decision analytics that help craft better resource strategies and bring greater efficiencies and return-on-investment for students and families. Externally, state legislators, the federal government, and philanthropies demand more forecasting and more evidence than ever before. These demands require new and creative responses, as they are added to previous demands, rather than replacing them, nor do they come with additional resources to produce the analysis to make data into actionable improvements. Thus the IR function must become that of teacher, ensuring that data and analyses are accurate, timely, accessible, and compelling, whether produced by an IR office or some other source. Despite formidable challenges, IR functions have begun to leverage big data and unlock the power of predictive tools and techniques, contributing to improved student outcomes.

Data Science in Education Using R is the go-to reference for learning data science in the education field. The book answers questions like: What does a data scientist in education do? How do I get started learning R, the popular open-source statistical programming language? And what does a data analysis project in education look like? If you're just getting started with R in an education job, this is the book you'll want with you. This book gets you started with R by teaching the building blocks of programming that you'll use many times in your career. The book takes a "learn by doing" approach and offers eight analysis walkthroughs that show you a data analysis from start to finish, complete with code for you to practice with. The book finishes with how to get involved in the data science community and how to integrate data science in your education job. This book will be an essential resource for education professionals and researchers looking to increase their data analysis skills as part of their professional and academic development.

Unequal distribution of wealth, poverty, pollution, and gender inequality are just a few of the problems we face and struggle to eliminate. Sustainable development offers a long-term holistic solution to these problems through meeting the needs of the current generation without endangering the capability of future generations in meeting their own needs. Sustainable education or education for sustainability is a transformative learning paradigm that prepares learners and provides them with knowledge, ethical awareness, skills, values, and attitudes to achieve sustainable goals. Global Approaches to Sustainability Through Learning and Education is a comprehensive academic publication that facilitates a greater understanding of sustainable development and fosters a culture of sustainability through learning and education. Highlighting a range of topics such as ethics, game-based learning, and knowledge management, this book is ideal for teachers, environmentalists, higher education faculty, activists, curriculum developers, academicians, researchers, professionals, administrators, and policymakers.

Data Science and Big Data Analytics is about harnessing the power of data for new insights. The book covers the breadth of activities and methods and tools that Data Scientists use. The content focuses on concepts, principles and practical applications that are applicable to any industry and technology environment, and the learning is supported and explained with examples that you can replicate using open-source software. This book will help you: Become a contributor on a data science team Deploy a structured lifecycle approach to data analytics problems Apply appropriate analytic techniques and tools to analyzing big data Learn how to tell a compelling story with data to drive business action Prepare for EMC Proven Professional Data Science Certification Corresponding data sets are available from the book's page at Wiley which you can find on the Wiley site by searching for the ISBN 9781118876138. Get started discovering, analyzing, visualizing, and presenting data in a meaningful way today!

Learning Analytics become the key for Personalised Learning and Teaching thanks to the storage, categorisation and smart

retrieval of Big Data. Thousands of user data can be tracked online via Learning Management Systems, instant messaging channels, social networks and other ways of communication. Always with the explicit authorisation from the end user, being a student, a teacher, a manager or a persona in a different role, an instructional designer can design a way to produce a practical dashboard that helps him improve that very user's performance, interaction, motivation or just grading. This book provides a thorough approach on how education, as such, from teaching to learning through management, is improved by a smart analysis of available data, making visible and useful behaviours, predictions and patterns that are hinder to the regular eye without the process of massive data.

Big Data for Qualitative Research covers everything small data researchers need to know about big data, from the potentials of big data analytics to its methodological and ethical challenges. The data that we generate in everyday life is now digitally mediated, stored, and analyzed by web sites, companies, institutions, and governments. Big data is large volume, rapidly generated, digitally encoded information that is often related to other networked data, and can provide valuable evidence for study of phenomena. This book explores the potentials of qualitative methods and analysis for big data, including text mining, sentiment analysis, information and data visualization, netnography, follow-the-thing methods, mobile research methods, multimodal analysis, and rhythm analysis. It debates new concerns about ethics, privacy, and dataveillance for big data qualitative researchers. This book is essential reading for those who do qualitative and mixed methods research, and are curious, excited, or even skeptical about big data and what it means for future research. Now is the time for researchers to understand, debate, and envisage the new possibilities and challenges of the rapidly developing and dynamic field of big data from the vantage point of the qualitative researcher.

The term learning analytics is used in the context of the use of analytics in e-learning environments. Learning analytics is used to improve quality. It uses data about students and their activities to provide better understanding and to improve student learning. The use of learning management systems, where the activity of the students can be easily accessed, potentiated the use of learning analytics to understand their route during the learning process, help students be aware of their progress, and detect situations where students can give up the course before its completion, which is a growing problem in e-learning environments. Advancing the Power of Learning Analytics and Big Data in Education provides insights concerning the use of learning analytics, the role and impact of analytics on education, and how learning analytics are designed, employed, and assessed. The chapters will discuss factors affecting learning analytics such as human factors, geographical factors, technological factors, and ethical and legal factors. This book is ideal for teachers, administrators, teacher educators, practitioners, stakeholders, researchers, academicians, and students interested in the use of big data and learning analytics for improved student success and educational environments.

?This book focuses on the uses of big data in the context of higher education. The book describes a wide range of administrative and operational data gathering processes aimed at assessing institutional performance and progress in order to predict future performance, and identifies potential issues related to academic programming, research, teaching and learning?. Big data refers to data which is fundamentally too big and complex and moves too fast for the processing capacity of conventional database systems. The value of big data is the ability to identify useful data and turn it into useable information by identifying patterns and deviations from patterns?.

Big Data in Education The Digital Future of Learning, Policy and Practice SAGE

The primary challenge of online education is bridging the distance, both geographical and psychological, between student-and-teacher and student-and-student dynamics. In today's increasingly digitalized world, it is important to enhance the quality of learning and the nature of interactions in distance education formats. The Community of Inquiry Framework in Contemporary Education: Emerging Research and Opportunities is a critical scholarly resource that examines the benefits, challenges, and intricacies of online learning with attention to key concepts, literature, resources, tools, and scenarios. Featuring coverage on a broad range of topics, such as big data research, network communication theory, educational data mining, and digital learning, this book is geared towards researchers, instructors, and higher education administrators seeking current research on the integration of new distance learning technologies.

This is a critical time to understand the benefits and risks of educational research using large data sets. Massive quantities of educational data can now be stored, analyzed, and shared. State longitudinal data systems can track individual students from pre-K through college and work. Districts and schools keep detailed data on individual academic performance, behavior, and educational needs. Schools provide portals for parents to check student assignments and grades. Software developers and researchers collect data from applications used for instruction that include keystroke-level information about student decision making. The benefits of big data for educational research often arise when data sets are combined and merged. This summary report addresses a fundamental tension of how to reap the educational benefits that access to comprehensive "big" data provides while ensuring student privacy. In order to understand and improve teaching and learning, education data must be available to researchers, and the privacy of children and families must be protected. This report, based upon a workshop, reviewed the benefits of educational research using modern data systems, the risks to the privacy of families and children, and technical and political solutions for maximizing benefits and minimizing risks. In particular, the report recommends that the research community (1) adopt common terminology, (2) communicate the importance of educational research more effectively, (3) build strong partnerships and models to ensure the sharing of data, and (4) better educate researchers and universities on privacy issues. [The National Academy of Education (NAEd) held a two-day workshop on August 9-10, 2016, to address a fundamental tension faced by the education research community: how to balance the benefits of access to comprehensive ("big") data with the potential risks to privacy. The NAEd website contains a commissioned background paper, summaries of each workshop panel, handouts and presentations, and video recordings. <https://naeducation.org/workshop-on-big-data-in-education-balancing-research-needs-and-student-privacy/>.]

The idea behind this book is to simplify the journey of aspiring readers and researchers to understand Big Data, IoT and Machine Learning. It also includes various real-time/offline applications and case studies in the fields of engineering, computer science, information security and cloud computing using modern tools. This book consists of two sections: Section I contains the topics related to Applications of Machine Learning, and Section II addresses issues about Big Data, the Cloud and the Internet of Things. This brings all the related technologies into a single source so that undergraduate and postgraduate students, researchers, academicians and people in industry can easily understand them. Features Addresses the complete data science technologies

workflow Explores basic and high-level concepts and services as a manual for those in the industry and at the same time can help beginners to understand both basic and advanced aspects of machine learning Covers data processing and security solutions in IoT and Big Data applications Offers adaptive, robust, scalable and reliable applications to develop solutions for day-to-day problems Presents security issues and data migration techniques of NoSQL databases

Radically reimagine our ways of being, learning, and doing Education can be transformed if we eradicate our fixation on big data like standardized test scores as the supreme measure of equity and learning. Instead of the focus being on "fixing" and "filling" academic gaps, we must envision and rebuild the system from the student up—with classrooms, schools and systems built around students' brilliance, cultural wealth, and intellectual potential. Street data reminds us that what is measurable is not the same as what is valuable and that data can be humanizing, liberatory and healing. By breaking down street data fundamentals: what it is, how to gather it, and how it can complement other forms of data to guide a school or district's equity journey, Safir and Dugan offer an actionable framework for school transformation. Written for educators and policymakers, this book · Offers fresh ideas and innovative tools to apply immediately · Provides an asset-based model to help educators look for what's right in our students and communities instead of seeking what's wrong · Explores a different application of data, from its capacity to help us diagnose root causes of inequity, to its potential to transform learning, and its power to reshape adult culture Now is the time to take an antiracist stance, interrogate our assumptions about knowledge, measurement, and what really matters when it comes to educating young people.

This book focuses on big data in business intelligence, data management, machine learning, cloud computing, and smart cities. It also provides an interdisciplinary platform to present and discuss recent innovations, trends, and concerns in the fields of big data and analytics. Big Data Analysis for Green Computing: Concepts and Applications presents the latest technologies and covers the major challenges, issues, and advances of big data and data analytics in green computing. It explores basic as well as high-level concepts. It also includes the use of machine learning using big data and discusses advanced system implementation for smart cities. The book is intended for business and management educators, management researchers, doctoral scholars, university professors, policymakers, and higher academic research organizations.

This book presents the current trends, technologies, and challenges in Big Data in the diversified field of engineering and sciences. It covers the applications of Big Data ranging from conventional fields of mechanical engineering, civil engineering to electronics, electrical, and computer science to areas in pharmaceutical and biological sciences. This book consists of contributions from various authors from all sectors of academia and industries, demonstrating the imperative application of Big Data for the decision-making process in sectors where the volume, variety, and velocity of information keep increasing. The book is a useful reference for graduate students, researchers and scientists interested in exploring the potential of Big Data in the application of engineering areas.

As digital technologies occupy a more central role in working and everyday human life, individual and social realities are increasingly constructed and communicated through digital objects, which are progressively replacing and representing physical objects. They are even shaping new forms of virtual reality. This growing digital transformation coupled with technological evolution and the development of computer computation is shaping a cyber society whose working mechanisms are grounded upon the production, deployment, and exploitation of big data. In the arts and humanities, however, the notion of big data is still in its embryonic stage, and only in the last few years, have arts and cultural organizations and institutions, artists, and humanists started to investigate, explore, and experiment with the deployment and exploitation of big data as well as understand the possible forms of collaborations based on it. Big Data in the Arts and Humanities: Theory and Practice explores the meaning, properties, and applications of big data. This book examines the relevance of big data to the arts and humanities, digital humanities, and management of big data with and for the arts and humanities. It explores the reasons and opportunities for the arts and humanities to embrace the big data revolution. The book also delineates managerial implications to successfully shape a mutually beneficial partnership between the arts and humanities and the big data- and computational digital-based sciences. Big data and arts and humanities can be likened to the rational and emotional aspects of the human mind. This book attempts to integrate these two aspects of human thought to advance decision-making and to enhance the expression of the best of human life.

As technology advances, high volumes of valuable data are generated day by day in modern organizations. The management of such huge volumes of data has become a priority in these organizations, requiring new techniques for data management and data analysis in Big Data environments. These environments encompass many different fields including medicine, education data, and recommender systems. The aim of this book is to provide the reader with a variety of fields and systems where the analysis and management of Big Data are essential. This book describes the importance of the Big Data era and how existing information systems are required to be adapted to face up the problems derived from the management of massive datasets.

Big data is a term that is used to refer to the massive amount of data that is being generated today. With more and more people getting connected through the internet, the rate of generation of data has increased rapidly. Different types of industries are continuously shifting towards the analysis of big data to generate insights that can help them make better decisions. Nowadays, big data technology is seen as an important tool in the field of education. There has been a considerable shift from the traditional teaching programs to the use of efficient online educational tools to expand the reach of education. Big data technology can be used to assess the data generated through the use of these educational tools to make better policies. Education has always been a top-rated agenda in any policy making and data has become a key asset for many economies today. Big Data (BD) has been considered as a matter of a priority in scientific research, industrial implications, and public sectors than the education sector. Big data helps us take a step forward in the field of education to reach out to all the impossibilities that lies within it. By using big data analytics wisely, we can provide a more personalized learning experience to the young generation. Though the internet already had a major impact on the way students collect information and the way they carry out research, recently, attention is now turning to the potential of big data through which it can help to radically transform the structure of the educational landscape. It could, for an instance, provide educators with the paramount information about the customized needs of individual students and how to customize learning by enabling educators to keep a track on students' progress more accurately so that courses can be designed to meet the specific needs of the learners. This book is proposed to be a reference material, which will throw light on the vast field of big data and its application in the field of education. The first chapter gives an overview about the tools and techniques related to big data and its application in the field of education. The next chapter talks about the various data mining methods that can be used in the field of education. The fourth chapter discusses the evolution of big data technology over the years. Chapter 5

highlights the various applications of big data in the field of education. Subsequently, we discuss the challenges and applications of big data in education. Chapter 8 discusses the future prospects of big data technology in the education sector. It also focusses on the digital education sector. The last chapter of the book discusses several case studies related to the implementation of big data and the associated challenges. This book addresses the issues which are faced by the researchers in the field of big data in education such as increasing the effectiveness of educators, wisely harnessing the fruitful insights from the learning experiences, making sure to deliver the quality education to all which is tailor made according to the needs of an individual learner and making students well equipped with the relevant skills as required for their future careers needs. Overall, this book will help to provide guidance on the complete structure of the big data problems and its solution in the education sector.

Historically, nursing, in all of its missions of research/scholarship, education and practice, has not had access to large patient databases. Nursing consequently adopted qualitative methodologies with small sample sizes, clinical trials and lab research. Historically, large data methods were limited to traditional biostatistical analyses. In the United States, large payer data has been amassed and structures/organizations have been created to welcome scientists to explore these large data to advance knowledge discovery. Health systems electronic health records (EHRs) have now matured to generate massive databases with longitudinal trending. This text reflects how the learning health system infrastructure is maturing, and being advanced by health information exchanges (HIEs) with multiple organizations blending their data, or enabling distributed computing. It educates the readers on the evolution of knowledge discovery methods that span qualitative as well as quantitative data mining, including the expanse of data visualization capacities, are enabling sophisticated discovery. New opportunities for nursing and call for new skills in research methodologies are being further enabled by new partnerships spanning all sectors.

Demonstrates how universities can use Big Data to enhance operations and management, improve the education pipeline, and educate the next generation of data scientists. The Big Data movement and the renewed focus on data analytics are transforming everything from healthcare delivery systems to the way cities deliver services to residents. Now is the time to examine how this Big Data could help build smarter universities. While much of the cutting-edge research that is being done with Big Data is happening at colleges and universities, higher education has yet to turn the digital mirror on itself to advance the academic enterprise.

Institutions can use the huge amounts of data being generated to improve the student learning experience, enhance research initiatives, support effective community outreach, and develop campus infrastructure. This volume focuses on three primary themes related to creating a smarter university: refining the operations and management of higher education institutions, cultivating the education pipeline, and educating the next generation of data scientists. Through an analysis of these issues, the contributors address how universities can foster innovation and ingenuity in the academy. They also provide scholarly and practical insights in order to frame these topics for an international discussion.

Recent technological advancements and other related factors and trends are contributing to the production of an astoundingly large and rapidly accelerating collection of data, or 'Big Data'. This data now allows us to examine urban and regional phenomena in ways that were previously not possible. Despite the tremendous potential of big data for regional science, its use and application in this context is fraught with issues and challenges. This book brings together leading contributors to present an interdisciplinary, agenda-setting and action-oriented platform for research and practice in the urban and regional community. This book provides a comprehensive, multidisciplinary and cutting-edge perspective on big data for regional science. Chapters contain a collection of research notes contributed by experts from all over the world with a wide array of disciplinary backgrounds. The content is organized along four themes: sources of big data; integration, processing and management of big data; analytics for big data; and, higher level policy and programmatic considerations. As well as concisely and comprehensively synthesising work done to date, the book also considers future challenges and prospects for the use of big data in regional science. Big Data for Regional Science provides a seminal contribution to the field of regional science and will appeal to a broad audience, including those at all levels of academia, industry, and government.

Data science is emerging as a field that is revolutionizing science and industries alike. Work across nearly all domains is becoming more data driven, affecting both the jobs that are available and the skills that are required. As more data and ways of analyzing them become available, more aspects of the economy, society, and daily life will become dependent on data. It is imperative that educators, administrators, and students begin today to consider how to best prepare for and keep pace with this data-driven era of tomorrow. Undergraduate teaching, in particular, offers a critical link in offering more data science exposure to students and expanding the supply of data science talent. Data Science for Undergraduates: Opportunities and Options offers a vision for the emerging discipline of data science at the undergraduate level. This report outlines some considerations and approaches for academic institutions and others in the broader data science communities to help guide the ongoing transformation of this field.

Learning analytics is one of the most important research issues in the field of educational technology. By analyzing logs and records in educational databases and systems, it can provide useful information to teachers, learners, and decision makers – information which they can use to improve teaching strategies, learning performances, and educational policies. However, it is a great challenge for most researchers to efficiently analyze educational data in a meaningful way. This book presents various learning analytics approaches and applications, including the process of determining the coding scheme, analyzing the collected data, and interpreting the findings. This book was originally published as a special issue of Interactive Learning Environments.

This book documents recent attempts to conduct systematic, prodigious and multidisciplinary research in learning analytics and present their findings and identify areas for further research and development. The book also unveils the distinguished and exemplary works by educators and researchers in the field highlighting the current trends, privacy and ethical issues, creative and unique approaches, innovative methods, frameworks, and theoretical and practical aspects of learning analytics.

Webber, Henry Y. Zheng, Ying Zhou

Big Data is now highly regarded and accepted as a useful tool to help organizations manage their data and information effectively and efficiently. This new volume, *The Emerging Technology of Big Data: Its Impact as a Tool for ICT Development*, looks at the new technology that has emerged to meet the growing need and demand and studies the impact of Big Data in several areas of today's society, including social media, business process re-engineering, science, e-learning, higher education, business intelligence, and green computing. In today's modern society, information system (IS) through Big Data contributes to the success of organizations because it provides a solid foundation for increasing both efficiency and productivity. Many business organizations and educational institutions realize that compliance with Big Data will affect their prospects for success. Everyday, the amount of data collected from digital tools grows tremendously. As the amount of data increases, the use of IS becomes more and more essential. The book looks at how large datasets and analytics have slowly crept into the world of education and discusses methods of teaching and learning and the collection of student-learning data. The final chapter of the book

considers the environmental impacts of ICT and emphasizes green ICT awareness as a corporate strategy through information systems. The global ICT industry accounts for approximately 2 percent of global carbon dioxide (CO<sub>2</sub>) emissions, and the manufacture, shipping, and disposal of ICT equipment also contributes environmentally. This chapter addresses these issues. The information provided here will be valuable information for education professionals, businesses, faculty, scientists and researchers, and others.

This cutting-edge overview explores big data and the related topic of computer code, examining the implications for education and schooling for today and the near future.

The proposed book talks about the participation of human in Big Data. How human as a component of system can help in making the decision process easier and vibrant. It studies the basic build structure for big data and also includes advanced research topics. In the field of Biological sciences, it comprises genomic and proteomic data also. The book swaps traditional data management techniques with more robust and vibrant methodologies that focus on current requirement and demand through human computer interfacing in order to cope up with present business demand. Overall, the book is divided in to five parts where each part contains 4-5 chapters on versatile domain with human side of Big Data.

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