Peer Instruction Users Manual

This book chronicles the revolution in STEM teaching and learning that has arisen from a convergence of educational research, emerging technologies, and innovative ways of structuring both the physical space and classroom activities in STEM higher education. Beginning with a historical overview of US higher education and an overview of diversity in STEM in the US, the book sets a context in which our present-day innovation in science and technology urgently needs to provide more diversity and inclusion within STEM fields. Research-validated pedagogies using active learning and new types of research-based curriculum is transforming how physics, biology and other fields are taught in leading universities, and the book gives profiles of leading innovators in science education and examples of exciting new research-based courses taking root in US institutions. The book includes interviews with leading scientists and educators, case studies of new courses and new institutions, and descriptions of site visits where new trends in 21st STEM education are being developed. The book also takes the reader into innovative learning environments in engineering where students are empowered by emerging technologies to develop new creative capacity in their STEM education, through new centers for design thinking and liberal arts-based engineering. Equally innovative are new conceptual frameworks for course design and learning, and the book explores the concepts of Scientific Teaching, Backward Course

Design, Threshold Concepts and Learning Taxonomies in a systematic way with examples from diverse scientific fields. Finally, the book takes the reader inside the leading centers for online education, including Udacity, Coursera and EdX, interviews the leaders and founders of MOOC technology, and gives a sense of how online education is evolving and what this means for STEM education. This book provides a broad and deep exploration into the historical context of science education and into some of the cutting-edge innovations that are reshaping how leading universities teach science and engineering. The emergence of exponentially advancing technologies such as synthetic biology, artificial intelligence and materials sciences has been described as the Fourth Industrial Revolution, and the book explores how these technologies will shape our future will bring a transformation of STEM curriculum that can help students solve many the most urgent problems facing our world and society.

For Introductory Calculus-based Physics Courses. Putting physics first Based on his storied research and teaching, Eric Mazur's Principles & Practice of Physics builds an understanding of physics that is both thorough and accessible. Unique organization and pedagogy allow students to develop a true conceptual understanding of physics alongside the quantitative skills needed in the course. * New learning architecture: The book is structured to help students learn physics in an organized way that encourages comprehension and reduces distraction. * Physics on a contemporary foundation: Traditional texts delay the introduction of ideas that we now see as unifying and

foundational. This text builds physics on those unifying foundations, helping students to develop an understanding that is stronger, deeper, and fundamentally simpler. * Research-based instruction: This text uses a range of research-based instructional techniques to teach physics in the most effective manner possible. The result is a groundbreaking book that puts physics first, thereby making it more accessible to students and easier for instructors to teach.MasteringPhysics(R) works with the text to create a learning program that enables students to learn both in and out of the classroom. This program provides a better teaching and learning experience for you and your students. Here's how: * Build an integrated, conceptual understanding of physics: Help students gain a deeper understanding of the unified laws that govern our physical world through the innovative chapter structure and pioneering table of contents. * Encourage informed problem solving: The separate Practice Volume empowers students to reason more effectively and better solve problems. * Personalize learning with MasteringPhysics: MasteringPhysics provides students with engaging experiences that coach them through physics with specific wrong-answer feedback, hints, and a wide variety of educationally effective content. MasteringPhysics is not included. Students, if MasteringPhysics is a recommended/mandatory component of the course, please ask your instructor for the correct ISBN and course ID. MasteringPhysics is not a self-paced technology and should only be purchased when required by an instructor.Instructors, contact your Pearson representative for more

information. MasteringPhysics is an online homework, tutorial, and assessment product designed to personalize learning and improve results. With a wide range of interactive, engaging, and assignable activities, students are encouraged to actively learn and retain tough course concepts.

The Handbook offers models of teaching and learning that go beyond the typical lecture-laboratory format and provides rationales for new practices in the college classroom. It is ideal for graduate teaching assistants, senior faculty and graduate coordinators, and mid-career professors in search of reinvigoration.

The flipped classroom methodology is one of the latest innovations in the field of education, challenging traditional notions of the classroom experience. Applying this methodology to language learning has the potential to further engage students and drive their understanding of key concepts. Flipped Instruction Methods and Digital Technologies in the Language Learning Classroom explores the latest educational technologies and web-based learning solutions for effective language learning curricula. Featuring emergent research on critical topics and innovations in the field of education, this publication is an essential resource for educators, administrators, instructional designers, pre-service teachers, and researchers in the field of education.

This book represents the emerging efforts of a growing international network of researchers and practitioners to promote the development and uptake of evidence-based pedagogies in higher education, at something a level approaching large-scale

impact. By offering a communication venue that attracts and enhances much needed partnerships among practitioners and researchers in pedagogical innovation, we aim to change the conversation and focus on how we work and learn together – i.e. extending the implementation and knowledge of co–design methods. In this first edition of our Research Topic on Active Learning, we highlight two (of the three) types of publications we wish to promote. First are studies aimed at understanding the pedagogical designs developed by practitioners in their own practices by bringing to bear the theoretical lenses developed and tested in the education research community. These types of studies constitute the "practice pull" that we see as a necessary counterbalance to "knowledge push" in a more productive pedagogical innovation ecosystem based on research-practitioner partnerships. Second are studies empirically examining the implementations of evidence-based designs in naturalistic settings and under naturalistic conditions. Interestingly, the teams conducting these studies are already exemplars of partnerships between researchers and practitioners who are uniquely positioned as "in-betweens" straddling the two worlds. As a result, these publications represent both the rigours of research and the pragmatism of reflective practice. In forthcoming editions, we will add to this collection a third type of publication -- design profiles. These will present practitioner-developed pedagogical designs at varying levels of abstraction to be held to scrutiny amongst practitioners, instructional designers and researchers alike. We hope by bringing these types of studies together in an open

access format that we may contribute to the development of new forms of practitioner-researcher interactions that promote co-design in pedagogical innovation.

Peer Instruction: A User's Manual is a step-by-step guide for instructors on how to plan and implement Peer Instruction lectures. The teaching methodology is applicable to a variety of introductory science courses (including biology and chemistry). However, the additional material–class-tested, ready-to-use resources, in print and on CD-ROM (so professors can reproduce them as handouts or transparencies)–is intended for calculus-based physics courses.

Learn how to harness students' natural curiosity to develop self-directed learners. Discover how technology allows students to take ownership of their learning, create and share learning tools, and participate in work that is meaningful to them and others. Real-life examples illustrate how every student can become a teacher and a global publisher. The embedded QR codes link to supporting websites.

Peer Instruction: A User's Manual is a step-by-step guide for instructors on how to plan and implement Peer Instruction lectures. The teaching methodology is applicable to a variety of introductory science courses (including biology and chemistry). However, the additional material--class-tested, ready-to-use resources, in print and on CD-ROM (so professors can reproduce them as handouts or transparencies)--is intended for calculus-based physics courses.

Describes how students learn and the ways instruction can promote learning.

This book shows teachers and other human service professionals working in school settings how to employ non-aversive, behavior analysis principles in classrooms and other school settings. Marked by its clear writing and multitude of real-classroom examples, this book is appropriate for undergraduate and graduate courses in teacher education, special education, school psychology, and school counseling. Behavior Analysis for Effective Teaching makes a perfect text for one of the five required courses for the Credentialing Exam of the Behavior Analysis Certification Board (BACB). Outstanding features include: • A classroom focus that seamlessly integrates behavior management with effective classroom instruction. • Up-to-date research covering topics such as tag teaching, precision teaching, verbal behavior, autism, and computer-aided instruction. • Pedagogical strategies including in-chapter quizzes and problem-solving exercises. • A companion website featuring instructor test banks, illustrative videos, and further resources.

Just-in-Time Teaching (JiTT) is a pedagogical approach that requires students to answer questions related to an upcoming class a few hours beforehand, using an online course management system. While the phrase 'Just in time' may evoke shades of slap-dash work and cut corners, JiTT pedagogy is just the opposite. It helps students to view learning as a process that takes time, introspection, and persistence. Students who experience JiTT come to class better prepared, and report that it helps to focus and organize their out-of-class studying. Their responses to JiTT questions make gaps

in their learning visible to the teacher prior to class, enabling him or her to address learning gaps while the material is still fresh in students' minds - hence the label 'just in time'. JiTT questions differ from traditional homework problems in being designed, not only to build cognitive skills, but also to help students confront misconceptions, make connections to previous knowledge, and develop metacognitive thinking practices. Students consequently spend more time on course concepts and ideas, but also read their textbooks in ways that result in more effective and deeper learning. Starting the class with students' work also dramatically changes the classroom-learning environment, creating greater student engagement. This book demonstrates that JiTT has broad appeal across the academy. Part I provides a broad overview of JiTT, introducing the pedagogy and exploring various dimensions of its use without regard to discipline. Part II of the book demonstrates JiTT's remarkable cross-disciplinary impact with examples of applications in physics, biology, the geosciences, economics, history, and the humanities.

Peer InstructionA User's ManualPearson

This issue of Rheumatic Disease Clinics, guest edited by Drs. Karina Torralba and James D. Katz, will discuss Education and Professional Development in Rheumatology. This issue is one of four each year selected by our series consulting editor, Dr. Michael Weisman. Articles in this issue include, but are not limited to: From Classroom to Clinic: Clinical Reasoning via Active Learning Strategies; Self-directed Learning of

Musculoskeletal Ultrasound for clinicians in practice; Enhancing the inpatient consult service with the Fellow as a Teacher; Translating Quality Improvement in Education to clinical practice; Beyond Class-Rheum: Applying Clinical Epidemiology into Practice; Ethics and Industry Interactions: Impact on Specialty Training, Clinical Practice and Research; Mind the Gap: Improving Care in Pediatric-to-Adult Rheumatology Transitional Clinics; Underserved Communities: Enhancing care with Graduate Medical Education; Turning OSCE into reality; Online Resources for Enhancing Clinical Skills; and Addressing Health Disparities in Medical Education and Clinical Practice. Experiential Education in the College Context provides college and university faculty with pedagogical approaches that engage students and support high-impact learning. Organized around four essential categories—active learning, integrated learning, project-based learning, and community-based learning—this resource offers examples from across disciplines to illustrate principles and best practices for designing and implementing experiential curriculum in the college and university setting. Framed by theory, this book provides practical guidance on a range of experiential teaching and learning approaches, including internships, civic engagement, project-based research, service learning, game-based learning, and inquiry learning. At a time when rising tuition, consumer-driven models, and e-learning have challenged the idea of traditional liberal education, this book provides a compelling discussion of the purposes of higher education and the role experiential education plays in sustaining and broadening

notions of democratic citizenship. .

ÔThe International Handbook on Teaching and Learning Economics is a power packed resource for anyone interested in investing time into the effective improvement of their personal teaching methods, and for those who desire to teach students how to think like an economist. It sets guidelines for the successful integration of economics into a wide variety of traditional and non-traditional settings in college and graduate courses with some attention paid to primary and secondary classrooms. . . The International Handbook on Teaching and Learning Economics is highly recommended for all economics instructors and individuals supporting economic education in courses in and outside of the major. This Handbook provides a multitude of rich resources that make it easy for new and veteran instructors to improve their instruction in ways promising to excite an increasing number of students about learning economics. This Handbook should be on every instructorÕs desk and referenced regularly.Õ Ð Tawni Hunt Ferrarini, The American Economist ÔIn delightfully readable short chapters by leaders in the sub-fields who are also committed teachers, this encyclopedia of how and what in teaching economics covers everything. There is nothing else like it, and it should be required reading for anyone starting a teaching career Ð and for anyone who has been teaching for fewer than 50 years!Õ Ð Daniel S. Hamermesh, University of Texas, Austin, US The International Handbook on Teaching and Learning Economics provides a comprehensive resource for instructors and researchers in economics, both new and

experienced. This wide-ranging collection is designed to enhance student learning by helping economic educators learn more about course content, pedagogic techniques, and the scholarship of the teaching enterprise. The internationally renowned contributors present an exhaustive compilation of accessible insights into major research in economic education across a wide range of topic areas including: ¥ Pedagogic practice Ð teaching techniques, technology use, assessment, contextual techniques, and K-12 practices. ¥ Research findings Ð principles courses, measurement, factors influencing student performance, evaluation, and the scholarship of teaching and learning. ¥ Institutional/administrative issues Ð faculty development, the undergraduate and graduate student, and international perspectives. ¥ Teaching enhancement initiatives Ð foundations, organizations, and workshops. Grounded in research, and covering past and present knowledge as well as future challenges, this detailed compendium of economics education will prove an invaluable reference tool for all involved in the teaching of economics: graduate students, new teachers, lecturers, faculty, researchers, chairs, deans and directors.

Flipped learning is an approach to the design and instruction of classes through which, with appropriate guidance, students gain their first exposure to new concepts and material prior to class, thus freeing up time during class for the activities where students typically need the most help, such as applications of the basic material and engaging in deeper discussions and creative work with it. While flipped learning has generated a

great deal of excitement, given the evidence demonstrating its potential to transform students' learning, engagement and metacognitive skills, there has up to now been no comprehensive guide to using this teaching approach in higher education. Robert Talbert, who has close to a decade's experience using flipped learning for majors in his discipline, in general education courses, in large and small sections, as well as online courses – and is a frequent workshop presenter and speaker on the topic – offers faculty a practical, step-by-step, "how-to" to this powerful teaching method. He addresses readers who want to explore this approach to teaching, those who have recently embarked on it, as well as experienced practitioners, balancing an account of research on flipped learning and its theoretical bases, with course design concepts to guide them set up courses to use flipped learning effectively, tips and case studies of actual classes across various disciplines, and practical considerations such as obtaining buy-in from students, and getting students to do the pre-class activities. This book is for anyone seeking ways to get students to better learn the content of their course, take more responsibility for their work, become more self-regulated as learners, work harder and smarter during class time, and engage positively with course material. As a teaching method, flipped learning becomes demonstrably more powerful when adopted across departments. It is an idea that offers the promise of transforming teaching in higher education.

Teachers view homework as an opportunity for students to continue learning after the

bell rings. For many students, it's often just the dreaded "H" word. How can educators change the way students view homework while ensuring that they still benefit from the additional learning it provides? It's easy. Flip the learning! In Solving the Homework Problem by Flipping the Learning, Jonathan Bergmann, the co-founder of the flipped learning concept, shows you how. The book outlines why traditional homework causes dread and frustration for students, how flipped learning—completing the harder or more analytical aspects of learning in class as opposed to having students do it on their own—improves student learning, and how teachers can create flipped assignments that both engage students and advance student learning. Bergmann introduces the idea of flipped videos, and provides step-by-step guidance to make them effective. The book also includes useful forms, a student survey, and a sample letter to send to parents explaining the flipped learning concept. You want your students to learn, and your students want learning to be accessible. With that in mind, read through these pages, flip the learning in your classroom, and watch students get excited about homework! Are you looking for new ways to engage your students? Classroom voting can be a powerful way to enliven your classroom, by requiring all students to consider a question, discuss it with their peers, and vote on the answer during class. When used in the right way, students engage more deeply with the material, and have fun in the process, while you get valuable feedback when you see how they voted. But what are the best strategies to integrate voting into your lesson plans? How do you teach the full

curriculum while including these voting events? How do you find the right questions for your students? This collection includes papers from faculty at institutions across the country, teaching a broad range of courses with classroom voting, including college algebra, precalculus, calculus, statistics, linear algebra, differential equations, and beyond. These faculty share their experiences and explain how they have used classroom voting to engage students, to provoke discussions, and to improve how they teach mathematics. This volume should be of interest to anyone who wants to begin using classroom voting as well as people who are already using it but would like to know what others are doing. While the authors are primarily college-level faculty, many of the papers could also be of interest to high school mathematics teachers. --Publisher description.

Offers a practical guide for improving schools dramatically that will enable all students from all backgrounds to achieve at high levels. Includes assessment forms, an index, and a DVD.

Contains abstracts of innovative projects designed to improve undergraduate education in science, mathematics, engineering, and technology. Descriptions are organized by discipline and include projects in: astronomy, biology, chemistry, computer science, engineering, geological sciences, mathematics, physics, and social sciences, as well as a selection of interdisciplinary projects. Each abstract includes a description of the project, published and other instructional materials, additional products of the project,

and information on the principal investigator and participating institutions. Educational strategies have evolved over the years, due to research breakthroughs and the application of technology. By using the latest learning innovations, curriculum and instructional design can be enhanced and strengthened. The Handbook of Research on Driving STEM Learning With Educational Technologies is an authoritative reference source for the latest scholarly research on the implementation and use of different techniques of instruction in modern classroom settings. Featuring exhaustive coverage on a variety of topics including data literacy, student motivation, and computer-aided assessment, this resource is an essential reference publication ideally designed for academicians, researchers, and professionals seeking current research on emerging uses of technology for STEM education. Praise for Social Media for Educators "At last, a book that provides a straightforward discussion ofthe pedagogical reasons to use social media, and how to effectivelyuse the tools to enhance learning experiences. A practicalmust-have!"—Rita-Marie Conrad, instructional strategist andtechnologist, Duke University School of Nursing; coauthor, Engagingthe Online Learner and The Online Teaching Survival Guide "This insightful and in-depth exploration effectively makes acase for embracing the best characteristics of social media tofoster deeper learning experiences, promote collaboration, andprovide timely feedback. This book is a can't-miss foreducators."—Amy M. Collier, associate director for technologyand teaching, Center for Teaching and Learning,

StanfordUniversity "Thought about using social media in your online courses butdon't know where to begin? Joosten's comprehensive hands-on bookdescribes step-by-step how social media can add richness to yourcourse content and have a positive impact on student outcomes."—Rosemary Lehman and Simone ConceiÇão, eInterface;coauthors, Creating a Sense of Presence in Online Teaching andManaging Online Instructor Workload "Many faculty are hesitant to incorporate social media intotheir teaching for fear that it will be a distraction or too timeconsuming. Tanya Joosten has done a remarkable job outlining thebenefits—and considerations—of doing so. Faculty who readthis book will be able to make informed, educated decisions aboutthe best approach to take." —John Dolan, director, digitalmedia and pedagogy, College of the Liberal Arts, Penn StateUniversity Social Media for Educators This is a down-to-earth resource filled with strategies fordesigning learning activities that work toward specific outcomes.It illustrates the ways in which social media will improve learningand contains case studies that clearly demonstrate social media'sability to: Increase communication and interactivity in a course Facilitate engaging learning activities Enhance students' satisfaction, learning, and performance

The movement away from teacher-centered toward student-centered learning and teaching (SCLT) in higher education has intensified in recent decades. Yet in spite of its widespread use in literature and policy documents, SCLT remains somewhat poorly defined, under-researched and often misinterpreted. Against this backdrop, The

Routledge International Handbook of Student-Centered Learning and Teaching in Higher Education offers an original, comprehensive and up-to-date overview of the fundamentals of SCLT and its discussion and applications in policy and practice. Bringing together 71 scholars from around the world, the volume offers a most comprehensive and up-to-date overview of the fundamentals of SCLT and its applications in policy and practice; provides beacons of good practice that display how instructional expertise manifests itself in the quality of classroom learning and teaching and in the institutional environment; and critically discusses challenges, new directions and developments in pedagogy, course and study program design, classroom practice, assessment and institutional policy. An essential resource, this book uniquely offers researchers, educators and students in higher education new insights into the roots, latest thinking, practices and evidence surrounding SCLT in higher education. The mission of the book series, Research in Science Education, is to provide a comprehensive view of current and emerging knowledge, research strategies, and policy in specific professional fields of science education. This series would present currently unavailable, or difficult to gather, materials from a variety of viewpoints and sources in a usable and organized format. Each volume in the series would present a juried, scholarly, and accessible review of research, theory, and/or policy in a specific field of science education, K-16. Topics covered in each volume would be determined by present issues and trends, as well as generative themes related to current research

and theory. Published volumes will include empirical studies, policy analysis, literature reviews, and positing of theoretical and conceptual bases.

The classic teaching toolbox, updated with new research and ideas Teaching at Its Best is the bestselling, research-based toolbox for college instructors at any level, in any higher education setting. Packed with practical guidance, proven techniques, and expert perspectives, this book helps instructors improve student learning both face-to-face and online. This new fourth edition features five new chapters on building critical thinking into course design, creating a welcoming classroom environment, helping students learn how to learn, giving and receiving feedback, and teaching in multiple modes, along with the latest research and new questions to facilitate faculty discussion. Topics include new coverage of the flipped classroom, cutting-edge technologies, self-regulated learning, the mental processes involved in learning and memory, and more, in the accessible format and easy-to-understand style that has made this book a much-valued resource among college faculty. Good instructors are always looking for ways to improve student learning. With college classrooms becoming increasingly varied by age, ability, and experience, the need for fresh ideas and techniques has never been greater. This book provides a wealth of research-backed practices that apply across the board. Teach students practical, real-world problem solving Interpret student ratings accurately Boost motivation and help students understand how they learn Explore alternative techniques, formats, activities, and exercises Given the ever-growing body of research on student learning, faculty now have many more choices of effective teaching strategies than they used to have, along with many more ways to achieve excellence in the classroom. Teaching at Its Best is an invaluable toolbox for refreshing your approach, and providing the exceptional education your

students deserve.

Teaching Electromagnetics: Innovative Approaches and Pedagogical Strategies is a guide for educators addressing course content and pedagogical methods primarily at the undergraduate level in electromagnetic theory and its applications. Topics include teaching methods, lab experiences and hands-on learning, and course structures that help teachers respond effectively to trends in learning styles and evolving engineering curricula. The book grapples with issues related to the recent worldwide shift to remote teaching. Each chapter begins with a high-level consideration of the topic, reviews previous work and publications, and gives the reader a broad picture of the topic before delving into details. Chapters include specific guidance for those who want to implement the methods and assessment results and evaluation of the effectiveness of the methods. Respecting the limited time available to the average teacher to try new methods, the chapters focus on why an instructor should adopt the methods proposed in it. Topics include virtual laboratories, computer-assisted learning, and MATLAB® tools. The authors also review flipped classrooms and online teaching methods that support remote teaching and learning. The end result should be an impact on the reader represented by improvements to his or her practical teaching methods and curricular approach to electromagnetics education. The book is intended for electrical engineering professors, students, lab instructors, and practicing engineers with an interest in teaching and learning. In summary, this book: Surveys methods and tools for teaching the foundations of wireless communications and electromagnetic theory Presents practical experience and best practices for topical coverage, course sequencing, and content Covers virtual laboratories, computer-assisted learning, and MATLAB tools Reviews flipped classroom and online teaching methods

that support remote teaching and learning Helps instructors in RF systems, field theory, and wireless communications bring their teaching practice up to date Dr. Krishnasamy T. Selvan is Professor in the Department of Electronics & Communication Engineering, SSN College of Engineering, since June 2012. Dr. Karl F. Warnick is Professor in the Department of Electrical and Computer Engineering at BYU.

Student engagement relies on the students and their willingness to participate in the learning process and can be enhanced through the application of various technologies within learning environments. However, strategies for implementing these technologies need research and development to be implemented effectively. The Handbook of Research on Fostering Student Engagement With Instructional Technology in Higher Education is a comprehensive academic publication that focuses on the engagement of learners with academics in higher education and especially how this engagement can be fostered with the integration of new technologies. Featuring an array of topics such as gamification, digital literacy, and social networking, this book is ideal for instructors, educators, administrators, curriculum developers, instructional designers, IT consultants, educational software developers, researchers, academicians, and students.

This book offers new ways of investigating relationships between learning and the spaces in which it takes place. It suggests that we need to understand more about the distinctiveness of teaching and learning in post-compulsory education, and what it is that matters about the design of its spaces. Starting from contemporary educational and architectural theories, it suggests alternative conceptual frameworks and methods that can help map the social and spatial practices of education in universities and colleges; so as to enhance the architecture of

post-compulsory education.

How Things Work provides an accessible introduction to physics for the non-science student. Like the previous editions it employs everyday objects, with which students are familiar, in case studies to explain the most essential physics concepts of day-to-day life. Lou Bloomfield takes seemingly highly complex devices and strips away the complexity to show how at their heart are simple physics ideas. Once these concepts are understood, they can be used to understand the behavior of many devices encountered in everyday life. The sixth edition uses the power of WileyPLUS Learning Space with Orion to give students the opportunity to actively practice the physics concepts presented in this edition. This text is an unbound, three hole punched version. Access to WileyPLUS sold separately.

Teaching Chemistry in Higher Education celebrates the contributions of Professor Tina Overton to the scholarship and practice of teaching and learning in chemistry education. Leading educators in United Kingdom, Ireland, and Australia—three countries where Tina has had enormous impact and influence—have contributed chapters on innovative approaches that are well-established in their own practice. Each chapter introduces the key education literature underpinning the approach being described. Rationales are discussed in the context of attributes and learning outcomes desirable in modern chemistry curricula. True to Tina's personal philosophy, chapters offer pragmatic and useful guidance on the implementation of innovative teaching approaches, drawing from the authors' experience of their own practice and evaluations of their implementation. Each chapter also offers key guidance points for implementation in readers' own settings so as to maximise their adaptability. Chapters are supplemented with further reading and supplementary materials on the book's website

(overtonfestschrift.wordpress.com). Chapter topics include innovative approaches in facilitating group work, problem solving, context- and problem-based learning, embedding transferable skills, and laboratory education—all themes relating to the scholarly interests of Professor Tina Overton. About the Editors: Michael Seery is Professor of Chemistry Education at the University of Edinburgh, and is Editor of Chemistry Education Research and Practice. Claire Mc Donnell is Assistant Head of School of Chemical and Pharmaceutical Sciences at Technological University Dublin. Cover Art: Christopher Armstrong, University of Hull

This book brings together researchers from Israel and Canada to discuss the challenges today's teachers and teacher?educators face in their practice. There is a growing expectation that the 21st century STEM teachers re?examine their teaching philosophies and adjust their practices to reflect the increasing role of digital technologies. This expectation presents a significant challenge to teachers, who are often asked to implement novel technology?rich pedagogies they did not have a chance to experience as students or become comfortable with. To exacerbate this challenge, the 21st century teachers function not only in a frequently?changing educational reality manifested by continuous reforms, but are also bombarded by often contradictory and competing demands from the legislators, administrators, parents, and students. How do we break the vicious circle of reforms and support STEM teachers in making a real change in student learning? This book is unique for at least three reasons. First, it showcases research situated in Israel and Canada that examines the challenges today's teachers and teacher?educators face in their practice. While the governments of both countries emphasize STEM education, their approaches are different and thus provide for interesting comparisons. Second, in addition to including research-based

chapters, prominent scholars discuss the contributions in each of the book sections, problematizing the issues from a global perspective. Third, technology has a potential to empower teachers in this era of change, and this book provides the unique insights from each country, while allowing for comparisons, discussing solutions, and asking new questions. This book will be of interest to all involved in STEM teacher education programs or graduate programs in education, as well as to educational administrators interested in implementing technology in their schools.

"Since K–12 students taught using the new [Next Generation Science Standards]will be arriving in college classrooms prepared in a different way from those in our classrooms currently, it would behoove college teachers to be prepared to alter their teaching methods ... or be perceived to be dinosaurs using the older teaching methods." — From Exemplary College Science Teaching If you're looking for inspiration to alter your teaching methods to match new standards and new times, this book is for you. As the first in the Exemplary Science series to focus exclusively on college science teaching, this book offers 16 examples of college teaching that builds on what students learned in high school. Understanding that college does not exist in a vacuum, the chapter authors demonstrate how to adapt the methods and frameworks under which secondary students have been working and make them their own for the college classroom, adding new technologies when appropriate and letting the students take an active role in their learning. Among the innovative topics and techniques the essays in this book explore are • Lecture-free college science teaching • Peer-led study groups as learning communities • Jigsaw techniques that enhance learning • Inquiry incorporated into large-group settings • Interactive video conferences for assessing student attitudes and behaviors The

clichéd image of the professor droning on before a packed lecture hall is a thing of the past. The essays in this book explain why—and offer the promise of a better future. Traditional classroom learning environments are quickly becoming a thing of the past as research continues to support the integration of learning outside of a structured school environment. Blended learning, in particular, offers the best of both worlds, combining classroom learning with mobile and web-based learning environments. Blended Learning: Concepts, Methodologies, Tools, and Applications explores emerging trends, case studies, and digital tools for hybrid learning in modern educational settings. Focusing on the latest technological innovations as well as effective pedagogical practice, this critical multi-volume set is a comprehensive resource for instructional designers, educators, administrators, and graduate-level students in the field of education. Moderne Lehrmethoden sind in akademischen Diskussionen allgegenwärtig. Die Wissenschaft schreitet voran, daher muss die Lehre zum Nutzen der Studierenden folgen. Auf einer internationalen Konferenz in Hannover (Dezember 2019) unter der Ägide des renommierten ELPIS-Netzwerkes wurde die Angelegenheit anhand der Vielfalt der Rechtsausbildung in den EU-Mitgliedstaaten erörtert, um gemeinsame Grundlagen für die moderne Rechtslehre zu finden. Der vorliegende Band erzielt eine Balance relevanter

Erkenntnisse von Wissenschaftlern und Studierenden. Er besteht aus Beiträgen von Wissenschaftlern verschiedener Rechtsgebiete an unterschiedlichen Universitäten wie Bernd Oppermann (Hannover), Claas Friedrich Germelmann (Hannover), Vasco Pereira da Silva (Lissabon), Francisco Balaguer Callejón (Granada), Andreas Schwartze (Innsbruck), Arndt Künnecke (Brühl), Maria Meng-Papantoni (Athen), Patrick R. Hugg (New Orleans), Rui Guerra da Fonseca (Lissabon), Balázs Rigó (Budapest), Dimitrios Parashu (Hannover), Kersi Kurti (Hannover) und Kire Jovanov (Hannover).

Starting from studies on language attrition, this book goes deeper into the area of educational technologies. Considering that language attrition might be a reverse process of language acquisition, proper use of educational technologies could promote language acquisition but slow down or diminish language attrition. This book attempts to combine the threshold hypothesis and regression hypothesis with use of educational technologies so that language attrition could be hindered. Chinese Mandarin Attrition among Tertiary Students in Malaysia was identified to pave a solid way for researches on both threshold hypothesis and regression hypothesis. Language attrition in terms of mandarin Chinese, the threshold and regression hypotheses were also discussed in this monograph. This book also covers topics related to educational technologies such as clickers, QQ,

multimedia, together with blended learning and indicators of satisfaction. This book includes in-depth reviews of literature and plentiful data to support the studies, which is worth reading. Readers will acquire something new in the fields of language attrition and educational technologies since few studies have been conducted combining these both areas.

This book explores evidence-based practice in college science teaching. It is grounded in disciplinary education research by practicing scientists who have chosen to take Wieman's (2014) challenge seriously, and to investigate claims about the efficacy of alternative strategies in college science teaching. In editing this book, we have chosen to showcase outstanding cases of exemplary practice supported by solid evidence, and to include practitioners who offer models of teaching and learning that meet the high standards of the scientific disciplines. Our intention is to let these distinguished scientists speak for themselves and to offer authentic guidance to those who seek models of excellence. Our primary audience consists of the thousands of dedicated faculty and graduate students who teach undergraduate science at community and technical colleges, 4-year liberal arts institutions, comprehensive regional campuses, and flagship research universities. In keeping with Wieman's challenge, our primary focus has been on identifying classroom practices that encourage and support meaningful learning

and conceptual understanding in the natural sciences. The content is structured as follows: after an Introduction based on Constructivist Learning Theory (Section I), the practices we explore are Eliciting Ideas and Encouraging Reflection (Section II); Using Clickers to Engage Students (Section III); Supporting Peer Interaction through Small Group Activities (Section IV); Restructuring Curriculum and Instruction (Section V); Rethinking the Physical Environment (Section VI); Enhancing Understanding with Technology (Section VII), and Assessing Understanding (Section VIII). The book's final section (IX) is devoted to Professional Issues facing college and university faculty who choose to adopt active learning in their courses. The common feature underlying all of the strategies described in this book is their emphasis on actively engaging students who seek to make sense of natural objects and events. Many of the strategies we highlight emerge from a constructivist view of learning that has gained widespread acceptance in recent years. In this view, learners make sense of the world by forging connections between new ideas and those that are part of their existing knowledge base. For most students, that knowledge base is riddled with a host of naïve notions, misconceptions and alternative conceptions they have acquired throughout their lives. To a considerable extent, the job of the teacher is to coax out these ideas; to help students understand how their ideas differ from

the scientifically accepted view; to assist as students restructure and reconcile their newly acquired knowledge; and to provide opportunities for students to evaluate what they have learned and apply it in novel circumstances. Clearly, this prescription demands far more than most college and university scientists have been prepared for.

For courses in Introductory Astronomy. Peer Instruction is a simple yet effective method for teaching science. Techniques of Peer Instruction for introductory college Physics classes were developed primarily at Harvard, and have aroused interest and excitement in the Physics Education community. This approach involves students in the teaching process, making physics more accessible to them. Peer Instruction is a new trend in astronomy that is finding strong interest and is ideally suited to introductory Astronomy classes. This book is an important vehicle for providing common ground for instructors using the method nationwide, and also provides a bridge to future collaborative efforts by instructors. It is key that the instructor has a large number of thought-provoking, conceptual short-answer questions aimed at a variety of class levels. While significant numbers of such questions have been published for use in Physics, Peer Instruction for Astronomy provides the first such compilation for Astronomy.

There is a need in the higher education arena for a book that responds to the

need for using technology in a classroom of tech-savvy students. This book is filled with illustrative examples of questions and teaching activities that use classroom response systems from a variety of disciplines (with a discipline index). The book also incorporates results from research on the effectiveness of the technology for teaching. Written for instructional designers and re-designers as well as faculty across disciplines. A must-read for anyone interested in interactive teaching and the use of clickers. This book draws on the experiences of countless instructors across a wide range of disciplines to provide both novice and experienced teachers with practical advice on how to make classes more fun and more effective."--Eric Mazur, Balkanski Professor of Physics and Applied Physics, Harvard University, and author, Peer Instruction: A User's Manual "Those who come to this book needing practical advice on using 'clickers' in the classroom will be richly rewarded: with case studies, a refreshing historical perspective, and much pedagogical ingenuity. Those who seek a deep, thoughtful examination of strategies for active learning will find that here as well—in abundance. Dr. Bruff achieves a marvelous synthesis of the pragmatic and the philosophical that will be useful far beyond the life span of any single technology." --Gardner Campbell, Director, Academy for Teaching and Learning, and Associate Professor of Literature, Media, and Learning, Honors College,

Baylor University

Nations around the globe consider physics education an important tool of economic and social development and currently advocate the use of innovative strategies to prepare students for knowledge and skills acquisition. Particularly in the last decade, a series of revisions were made to physics curricula in an attempt to cope with the changing needs and expectations of society. Educational transformation is a major challenge due to educational systems' resistance to change. Updated curriculum content, pedagogical facilities (for example, computers in a school), new teaching and learning strategies and the prejudice against girls in physics classes are all issues that have to be addressed. Educational research provides a way to build schemas and resources to promote changes in physics education. This volume presents physics teaching and learning research connected with the main educational scenarios.

The integration of technology into modern classrooms has enhanced learning opportunities for students. With increased access to educational content, students gain a better understanding of the concepts being taught. Flipped Instruction: Breakthroughs in Research and Practice is a comprehensive reference source for the latest scholarly perspectives on promoting flipped learning strategies, tools, and theories in classroom environments. Featuring a

range of extensive coverage across innovative topics, such as student engagement, educational technologies, and online learning environments, this is an essential publication for educators, professionals, researchers, academics, and upper-level students interested in emerging developments in classroom and instructional design.

Copyright: 379dff63e55f3685287c6692211e3483