Performance In General Chemistry

Stetig hohe Studienabbruchquoten in den MINT-Fächern an deutschen Hochschulen, welche auch aus geringem Kurserfolg in einführenden Laborpraktika resultieren könnten, und die wachsende Kritik an der Qualität und Wirksamkeit ebendieser machen eine eingehende Betrachtung von Laborpraktika notwendig. Diese Studie untersuchte die Lernziele des Laborpraktikums Allgemeine Chemie für Lehramtsstudierende im ersten Semester sowie Faktoren für den Kurserfolg, um daraus Aussagen über den Stellenwert von Laborpraktika in der universitären Bildung, insbesondere für langfristigen Studienerfolg, abzuleiten. Dazu wurde ein theoretisches Modell zu Grunde gelegt, welches das Vorwissen der Studierenden und die Lernzielpassung zwischen Studierenden und Lehrenden als zwei entscheidende Faktoren für Kurserfolg berücksichtigt. Constantly high student dropout rates in STEM subjects at German universities, which could be the result of low course success in introductory laboratory courses among other things and increasing criticism about their quality and effectiveness necessitate these laboratory courses to be examined thoroughly. This study investigated the learning goals of the General Chemistry laboratory course for first-year students in teacher training and factors for course success in order to make statements about the significance of laboratory courses for university education, particularly for long-term study success. For this purpose, a theoretical model that

assumes the students prior knowledge and learning goal alignment between students and their lab instructors to be two defining factors for lab course success was used as a framework.

Issues in Education by Subject, Profession, and Vocation: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Health Education Research. The editors have built Issues in Education by Subject, Profession, and Vocation: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Health Education Research in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Education by Subject, Profession, and Vocation: 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

The key idea of the book is that scientific and practical advances can be obtained if researchers working in traditions that have been assumed to be mutually incompatible make a real effort to engage in dialogue with each other, comparing and contrasting their understandings of a given phenomenon and how these different understandings

can either complement or mutually elaborate on each other. This key idea applies to many fields, particularly in the social and behavioral sciences, as well as education and computer science. The book shows how we have achieved this by presenting our study of collaborative learning during the course of a four-year project. Through a series of five workshops involving dozens of researchers, the 37 editors and authors involved in this project studied and reported on collaborative learning, technology enhanced learning, and cooperative work. The authors share an interest in understanding group interactions, but approach this topic from a variety of traditional disciplinary homes and theoretical and methodological traditions. This allows the book to be of use to researchers in many different fields and with many different goals and agendas.

The book describes up-to-date applications and relevant theoretical results. These applications come from various places, but the most important one, numerically speaking, is the internet based educational system ALEKS. The ALEKS system is bilingual English-Spanish and covers all of mathematics, from third grade to the end of high school, and chemistry. It is also widely used in higher education because US students are often poorly prepared when they reach the university level. The chapter by Taagepera and Arasasingham deals with the application of knowledge spaces, independent of ALEKS, to the teaching of college chemistry. The four chapters by Albert and his collaborators strive to give cognitive interpretations to the combinatoric structures obtained and used by the ALEKS system. The contribution by Eppstein is

technical and develops means of searching the knowledge structure efficiently.
This volume offers a critical examination of a variety of conceptual approaches to teaching and learning chemistry in the school classroom. Presenting up-to-date research and theory and featuring contributions by respected academics on several continents, it explores ways of making knowledge meaningful and relevant to students as well as strategies for effectively communicating the core concepts essential for developing a robust understanding of the subject. Structured in three sections, the contents deal first with teaching and learning chemistry, discussing general issues and pedagogical strategies using macro, sub-micro and symbolic representations of chemical concepts. Researchers also describe new and productive teaching strategies. The second section examines specific approaches that foster learning with understanding, focusing on techniques such as cooperative learning, presentations, laboratory activities, multimedia simulations and role-playing in forensic chemistry classes. The final part of the book details learner-centered active chemistry learning methods, active computer-aided learning and trainee chemistry teachers` use of student-centered learning during their pre-service education. Comprehensive and highly relevant, this new publication makes a significant contribution to the continuing task of making chemistry classes engaging and effective.
MindTap General Chemistry is a personalized teaching and learning experience that allows instructors to control what students see and focus on relevant assignments that

guide them to analyze, apply, and improve thinking. Seamlessly integrating simulations, videos and diagnostic quizzes, it helps students achieve course learning outcomes by bringing chemistry to life. Measure skills and outcomes with ease using powerful analytics that provide a visual dashboard with at-a-glance performance and engagement data that is used to provide direction regarding class and student needs. This version is accompanied by a print text that includes the narrative from the MindTap General Chemistry course.

Students' perceived difficulty was compared with performance of scientific tasks typically found in general chemistry courses. These differences were analyzed via direct comparison of a survey (perceived difficulty) administered to participants both directly preceding and following performance of various tasks discussed in survey. The pre/post comparison allowed researchers to determine whether perceived difficulty was affected by task performance as well. A thorough analysis of transcripts of interviews, as well as time on task during performance was also conducted.

This book addresses key issues concerning visualization in the teaching and learning of science at any level in educational systems. It is the first book specifically on visualization in science education. The book draws on the insights from cognitive psychology, science, and education, by experts from five countries. It unites these with the practice of science education, particularly the ever-increasing use of computer-managed modelling packages.

th th The 20 International Conference on Chemical Education (20 ICCE), which had rd th “Chemistry in the ICT Age” as the theme, was held from 3 to 8 August 2008 at Le Méridien

Hotel, Pointe aux Piments, in Mauritius. With more than 200 participants from 40 countries, the conference featured 140 oral and 50 poster presentations. th Participants of the 20 ICCE were invited to submit full papers and the latter were subjected to peer review. The selected accepted papers are collected in this book of proceedings. This book of proceedings encloses 39 presentations covering topics ranging from fundamental to applied chemistry, such as Arts and Chemistry Education, Biochemistry and Biotechnology, Chemical Education for Development, Chemistry at Secondary Level, Chemistry at Tertiary Level, Chemistry Teacher Education, Chemistry and Society, Chemistry Olympiad, Context Oriented Chemistry, ICT and Chemistry Education, Green Chemistry, Micro Scale Chemistry, Modern Technologies in Chemistry Education, Network for Chemistry and Chemical Engineering Education, Public Understanding of Chemistry, Research in Chemistry Education and Science Education at Elementary Level. We would like to thank those who submitted the full papers and the reviewers for their timely help in assessing the papers for publication. th We would also like to pay a special tribute to all the sponsors of the 20 ICCE and, in particular, the Tertiary Education Commission (http://tec.intnet.mu/) and the Organisation for the Prohibition of Chemical Weapons (http://www.opcw.org/) for kindly agreeing to fund the publication of these proceedings.

Advisor: Daniel B. King.

Competition for admission to American medical schools has always been intense. Now, with more than 40,000 pre-med students applying for the few available slots each year, scoring well on the Medical College Admission Test (MCAT) is more critical than ever. The MCAT Preparation Guide offers students a systematic, sensible way to improve MCAT test scores. It

recognizes their need to understand not only the subject areas covered but also the way the MCAT is structured and what test scorers look for. Extensively field tested at the University of Chicago, Tulane University, Howard University, and the University of Kentucky, this Guide has already helped hundreds of students to boost their MCAT scores significantly. With this edition, the Guide becomes available nationwide for the first time. One excellent feature is the chapter on preparing writing samples, a section of the MCAT often omitted or slighted in other guides. Here is a step-by step process for attacking writing sample prompts to produce superior essays.

In October of 2011, CLSI published a new guideline EP23A on “Laboratory Quality Control Based on Risk Management. In March, 2012, CMS announced its intention to incorporate key concepts from EP23A into its Interpretative Guidelines and QC policy for “Individualized Quality Control Plans. Thus begins a new era of Quality Control in the Age of Risk Management. This issue is intended to help laboratories with the transition between traditional QC practices and the new risk management approach. Laboratories face a steep learning curve to apply risk analysis for identifying and prioritizing failure-modes, developing and implementing control mechanisms to detect those failure-modes, and assessing the acceptability of the residual risks that exist after implementation of a QC Plan. One of the main benefits of the new risk analysis based QC Plans should be an integration of all the control mechanisms that are needed to monitor the total testing process, including pre-analytic, analytic, and post-analytic controls. One of the main risks of the new approach is an expectation that Statistical QC is no longer important, even though SQC still remains the most useful and flexible approach for monitoring the quality of the analytic process. The key to the

future is the successful integration of all these control mechanisms to provide a cost-effective quality system that monitors all phases of the total testing process. This issue should help laboratories understand the evolution of QC practices to include risk management, but also to recognize the need to maintain traditional techniques such as Statistical QC, especially during the transition to well-designed and carefully-validated QC Plans. Risk analysis may be risky business unless laboratories proceed carefully and cautiously.

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Over 1,200 total pages .... Parasitic infection can greatly interfere with a soldier's ability to complete his mission. The presence of parasites in a soldier's system can not only interfere with his ability to function, but also can make him susceptible to certain diseases. Since soldiers may serve in most areas of the

world, you must be able to identify parasites that are found in the various parts of the globe. In your job as a medical laboratory specialist, you will perform a variety of test procedures on samples taken from humans. Some of these samples will include feces and tissue scrapings used in the diagnosis and treatment of parasitic infection. Therefore, you must be knowledgeable in several areas of parasitology. The knowledge you will need is reflected in the two subcourses you are about to study. Subcourses Parasitology I and Parasitology II address areas of particular importance in parasitology. The whole purpose of clinical laboratory procedures is to provide the clinician doing diagnostic work with specific information needed to round out his picture of the disorders he has observed in the patient. Clinical bacteriology can contribute its part by supplying data about the microscopic life involved and the susceptibility of such life to particular drugs. To identify bacterial growth, you must take certain steps that will enable you, through a process of elimination, to choose the microscopic form that fits the findings you have obtained. Steps that are often essential include: 1. Observing the type of growth when first isolated on culture media. 2 Making a microscopic examination on stained material from an isolated culture of that colony. 3. Performing various tests to obtain a list of the characteristics of the organism. 4. Making a complete identification of the organism. This subcourse was developed

to prepare and sustain your mathematical skills as a Medical Laboratory Specialist. The emphasis is upon computations related to solutions and their concentrations. If you feel that you need a more basic review of mathematics before taking this subcourse, you should request Subcourse Basic Mathematics, which covers addition, subtraction, multiplication, and division of whole numbers; decimals, and fractions; and conversions to and from the metric system. In the process of achieving and maintaining proficiency in your military occupational specialty (MOS), you will be learning concepts and performing tasks that are based on important chemical principles. As you become more proficient with these principles, you may reach the point where you will not need to give them much conscious thought. Meanwhile, however, you should study this subcourse to gain a working knowledge of the fundamental principles of chemistry.
Subcourse Clinical Chemistry I, provides you with a background in the laboratory basics of clinical chemistry. Laboratory safety; collection, preservation, and shipment of specimens; measurement of weights and volumes; introduction to quality control; and introduction to organic chemistry are presented in this subcourse.
Examining the Examinations looks at the required advanced science and mathematics examinations taken by university-bound students in seven

countries. This research focuses on topics covered, types of questions used, and performance expected from students. The book concentrates on comparisons of the examinations, illustrating their similarities and differences with selected questions taken from the actual examinations. The international comparisons presented offer a window on educational `laboratories' in seven countries. Chemical speciation and source apportionment of size fractionated atmospheric aerosols were investigated using laser desorption time-of-flight mass spectrometry (LD TOF-MS) and source apportionment was carried out using carbon-14 accelerator mass spectrometry (14C AMS). Sample collection was carried out using the Davis Rotating-drum Unit for Monitoring impact analyzer in Davis, Colfax, and Yosemite, CA. Ambient atmospheric aerosols collected during the winter of 2010/11 and 2011/12 showed a significant difference in the types of compounds found in the small and large sized particles. The difference was due to the increase number of oxidized carbon species that were found in the small particles size ranges, but not in the large particles size ranges. Overall, the ambient atmospheric aerosols collected during the winter in Davis, CA had and average fraction modern of F14C = 0.753 ± 0.006, indicating that the majority of the size fractionated particles originated from biogenic sources. Samples collected during the King Fire in Colfax, CA were used to determine the

contribution of biomass burning (wildfire) aerosols. Factor analysis was used to reduce the ions found in the LD TOF-MS analysis of the King Fire samples. The final factor analysis generated a total of four factors that explained an overall 83% of the variance in the data set. Two of the factors correlated heavily with increased smoke events during the sample period. The increased smoke events produced a large number of highly oxidized organic aerosols (OOA2) and aromatic compounds that are indicative of biomass burning organic aerosols (WBOA). The signal intensities of the factors generated in the King Fire data were investigated in samples collected in Yosemite and Davis, CA to look at the impact of biomass burning on ambient atmospheric aerosols. In both comparison sample collections the OOA2 and WBOA factors both increased during biomass burning events located near the sampling sites. The correlation between the OOA2 and WBOA factors and smoke levels indicates that these factors can be used to identify the influence of biomass burning on ambient aerosols. The effectiveness of using the ChemWiki instead of a traditional textbook was investigated during the spring quarter of 2014. Student performance was measured using common midterms, a final, and a pre/post content exams. We also employed surveys, the Colorado Learning Attitudes about Science Survey (CLASS) for Chemistry, and a weekly time-on-task survey to quantify students'

attitudes and study habits. The effectiveness of the ChemWiki compared to a traditional textbook was examined using multiple linear regression analysis with a standard non-inferiority testing framework. Results show that the performance of students in the section who were assigned readings from the ChemWiki was non-inferior to the performance of students in the section who were assigned readings from the traditional textbook, indicating that the ChemWiki does not substantially differ from the standard textbook in terms of student learning outcomes. The results from the surveys also suggest that the two classes were similar in their beliefs about chemistry and overall average time spent studying. These results indicate that the ChemWiki is a viable cost-saving alternative to traditional textbooks. The impact of using active learning techniques in a large lecture general chemistry class was investigated by assessing student performance and attitudes during the fall 2014 and winter 2015 quarters. One instructor applied active learning strategies while the remaining instructors employed more traditional lecture styles. Student performance, learning, learning environments, and attitudes were measured using a standardized pre/post exams, common final exams, classroom observations, and the CLASS chemistry instrument in large lecture general chemistry courses. Classroom observation data showed that the active learning class was the most student centered and of the other classes two

instructors were transitional in their teaching style and the remaining two primarily employed traditional lecture techniques. The active learning class had the highest student performance but the difference was only statistically significant when compared to the two traditional lecture classes. Overall, our data showed a trend that student performance increased as the instructional style became more student centered. Student attitudes didn't seem to correlate with any specific instructional style and the students in the active learning class had similar attitudes to the other general students. The active learning class was successful in increasing the average time students spent studying outside of the class, a statistically significant difference of about 1.5 to 3.0 hrs/week.

Under the broad research question, "Can multiple electronic learning resources improve students' academic performance in a large first-year General Chemistry course?", this study examines how students used a wide range of online resources during the Fall 2011 and Winter 2012 academic terms and correlates this information with their academic success, measured by their grades on two midterms, a final exam and their final course grade.

The fifth edition of this critically acclaimed approach to curriculum planning continues to receive accolades for its balanced presentation, pertinent case studies, and advice from practicing educators. It skillfully interweaves the themes

of multicultural education, constructivism, and education reform. The author documents the latest trends, such as e-learning, blended learning and flipped learning, the controversial Common Core State Standards, and the impact of technology in our schools, including the BYOD (bring your own device) movement, digital citizenship, and technological literacy. This well-researched text spotlights ways to involve parents, students, and teachers in the curriculum-planning process and engages the reader in critical thinking and analysis about curriculum planning and education reform.

Includes a section called Program and plans which describes the Center's activities for the current fiscal year and the projected activities for the succeeding fiscal year.

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This workbook is a comprehensive collection of solved exercises and problems typical to AP, introductory, and general chemistry courses, as well as blank worksheets containing further practice problems and questions. It contains a total of 197 learning objectives, grouped in 28 lessons, and covering the vast majority of the types of problems that a student will encounter in a typical one-year chemistry course. It also contains a fully solved, 50-question practice test, which gives students a good idea of what they might expect on an actual final exam covering the entire material.

This volume emphasizes the role of chemical education for development and, in particular, for sustainable development in Africa, by sharing experiences among specialists across the African continent and with specialists from other continents. It considers all areas and levels of chemistry education, gives specific attention to known major challenges and encourages explorations of novel approaches. The chapters in this book describe new teaching approaches,

approach-explorations and in-class activities, analyse educational challenges and possible ways of addressing them and explore cross-discipline possibilities and their potential benefits for chemistry education. This makes the volume an up to date compendium for chemistry educators and educational researchers worldwide.

MOLECULES AND THE CHEMICAL BOND & Other Leading Chemical Concepts Simplified This highly original book by a noted chemist and chemical educator may change the way newcomers to chemical thought learn and the way its connoisseurs think about - * Atomic Theory * The Mole Concept and Avogadro's Constant * The Gas Laws * Solving Problems in Chemical Stoichiometry * The Saturation and Directional Character of Chemical Affinity * The Pauli Exclusion Principle * Linnett's Double Spin Set Theory * Pauling's Rules of Crystal Chemistry * The Octet Rule * Lewis Structures for O2, NO, CO, SO2 and SO3 * Construction of Bond Diagrams * VSEPR Theory * Dative Bonding * Multicenter Bonding * Bonding in Metals * pH Calculations * The Periodic Table * The Energy Function and the First Law of Thermodynamics * The Entropy Function and the Second Law of Thermodynamics * How an Inductive Science Advances Dedicated to students, teachers, and professionals in the pure and applied sciences who might welcome an account of molecular structure that, in Einstein's

words is as simple as possible but [it's believed] no simpler and that provides, thereby, in Gibbs' words, a point of view from which the subject appears in its greatest simplicity, MCB is several books interlaced. It is a novel account of evidence for atoms; an historical account of the development classical structural theory of molecules; a simple, step-by-step guide on how to draw scientifically sound bond diagrams; an exclusive orbital model of bonding that embraces from one point of view covalent, ionic, and metallic bonding; philosophical justifications for uses of molecular models; explanations for a number of previously unexplained molecular features; domestication for easy use in valence theory of fundamental principles of quantum physics; and, withal, a short textbook of general chemistry in a new key. Principally MCB is a highly visual account of a chemical mechanics of the Pauli Exclusion Principle, in the form of the story of a stroke, a stick, and a sphere and what happens if one takes chemists' seemingly unsophisticated cartoons of molecules and their corresponding tinker-toy-like ball-and-stick models seriously. One theme runs through the book: the nature of the inductive sciences, illustrated by the union of facts and ideas with creation of concepts and models, principles and rules that, jointly, comprise what is called in MCB "Conceptual Valence Bond Theory". The book has been described "as a pedagogical hierarchy of progressively more sophisticated treatments of an

easily visualizable model of the chemical bond." In the words of the author's daughter (a chemist) - "This book is the culmination of my Father's insights into the molecules he has literally breathed, consumed, and digested, for the past 84 years. It is his intimate knowledge about the elements, learned from a lifetime of reading, experimenting, and teaching that makes this book different. Dad truly loves (and believes in!) molecules, and that single tenet comes across on every page. Flat valence stroke diagrams are inflated to three dimensional valence sphere models whose geometries correlate with calculations and provide, with ease, explanations for reaction mechanisms, multicenter bonds, and molecular geometries considered exceptions or unexpected . Describing molecules as hypervalent or electron deficient suggests something abnormal or unnatural, and is misleading since nature is always natural . Concepts such as the gas laws and the energy function are presented from an historical perspective, and with algebraic rigor, eliminating inconsistencies that bug you as a chemistry student, but you can't really put your finger on why. From the correct placement of helium above beryllium in the periodic table, to pointing out the problems with omitting nucleus-electron attractions in the popular Valence Shell Electron Pair Repulsion theory (where correct conclusions regarding molecular shapes support an incorrect conce

This study examined the effects of the muddiest point technique on student performance and potential metacognitive benefits in two sections of general chemistry. The muddiest point is a learning model that is used to engage students in large lecture-based chemistry classes. A tally of students' responses to concepts that need the most clarification, hence any "muddy" points was collected. The study analyzed data from three unit tests and one final exam in each of the two experimental sections. Student performance was evaluated based on the muddiest point-correlated exam questions in the four assessments. The two experimental sections were compared against three controlled general chemistry sections in which the instructors did not employ the muddiest point technique. The results of this investigation indicate no statistical differences between the experimental and control sections, but do imply positive benefits for students whose instructor chose to review confusing topics that were chosen by the majority of the students in the class. These conclusions demonstrate a need for further research to determine whether the muddiest point technique benefits specific types of content understanding that were not evident from the multiple-choice questions or data collection used in this study.

Do you ever feel like more and more of your students come to your classroom not knowing how to study or what to do in order to be successful in your class?

Some students come to college knowing the ropes, knowing what it takes to be successful as STEM students. But many do not. Research shows that students who are the first-generation in their family to attend or complete college are likely to arrive at your classroom not knowing what it takes to be successful. And data shows that more first-generation students are likely to be arriving on your doorstep in the near future. What can you do to help these students be successful? This book can provide you with some research based methods that are quick, easy, and effortless. These are steps that you can take to help first-generation college students succeed without having to change the way you teach. Why put in this effort in the first place? The payoff is truly worth it. First-generation college students are frequently low-income students and from ethnic groups underrepresented in STEM. With a little effort, you can enhance the retention of underrepresented groups in your discipline, at your institution and play a role in national efforts to enhance diversity in STEM. "This book provides an excellent description of dealing with immigrant and first generation college STEM students whose socioeconomic backgrounds often hinder them from reaching their full potential. The text touches on various aspects of student, faculty and mentor interaction that will lead to the exploitation of the student natural talents and provide life changing outcomes." ~ Paris Svoronos, Ph.D.

Queensborough Community College of CUNY "Gail Horowitz's new book Teaching STEM to First Generation College Students is a timely and important resource to improve the success of college students who come from families with little or no experience in the US higher education system. "First-gens" are a growing population whose academic success is important to both the institutions they attend and our nation's economy. Dr. Horowitz, an experienced chemistry educator, describes in detail the challenges first-gens face in historically difficult STEM classes. In doing so, she is honest but also optimistic. First-gens encounter difficulty not merely with the technical subject matter they may have been poorly prepared for in high school, but also with their own wrong-headed beliefs about how to study and where to find help on campus. At the same time, Horowitz is also highly respectful of the strengths that many first-gens bring to college, strengths often under the radar of instructors who may only see inexplicable behaviors they attribute to first-gens being clueless, unmotivated, or irresponsible. Horowitz provides an excellent review of constructs from psychology about students' and teachers' beliefs about academic success and failure, demonstrating that first gens are too often tripped by self-defeating and often incorrect beliefs about their legitimacy as college students and what it takes to pass difficult STEM courses. These, she explains, fuel first-gen students' fear

about revealing their ignorance and illegitimacy as college students. With clear-eyed and experienced-based optimism about techniques that help first-gens succeed, she then gives excellent, specific suggestions for faculty, graduate teaching assistants, and the students themselves to help first-gens learn to “do” STEM courses and college successfully. This is an important and highly-recommended book, a gift of honesty and hope, by an experienced STEM instructor who clearly cares deeply about first-gen students and their college experience." ~ Dr. Louise Hainline CUNY - Brooklyn College Director, Center for Achievement in Science Education (CASE) Director of NYS Collegiate Science and Technology Entry Program (CSTEP) Director of NIH Minority Access to Research Careers (MARC) Director, NSF Improving Undergraduate STEM Education (IUSE) Peer-Assisted Team Research program Director, Brooklyn College subcontract, NSF Institutional Research and Academic Career Development Awards (IRACDA) to SUNY Stony Brook "As the college population becomes more diverse, STEM instructors have a responsibility to cultivate the success of all students. In this important and engaging book, Gail Horowitz provides a valuable resource for understanding the educational experiences of first-generation students and why they often struggle in STEM courses. The author persuasively conveys two important insights. First, that first-generation

students can achieve success in STEM courses by becoming self-regulated learners. Second, that college faculty and graduate instructors can easily introduce effective learning strategies into their courses. These arguments are supported by extensive references to the research literature, which provide a wealth of additional resources. Just as important, however, is the deep humanity that the author brings to her subject—a sincere belief that our classrooms and colleges are made better by the aspirations, resilience, and experiences of first-generation students." ~ Dr. Trace Jordan New York University "G. Horowitz's book should be required reading for both teachers and students. It provides valuable insights into the behaviors and coping mechanisms of not only many first-generation college students, but also continuing generation students who struggle with STEM coursework. Recognizing these behaviors and mindsets is the first step towards becoming a better educator." ~ Leda Lee, M.S. Brooklyn College

Focus on frequent, accurate feedback with this newly expanded guide to understanding assessment. Field-tested and classroom ready, it's designed to help you reinforce productive learning habits while gauging your lessons' effectiveness. The book opens with an up-to-date discussion of assessment theory, research, and uses. Then comes a wealth of sample assessment

activities (nearly 50 in all, including 15 new ones) in biology, chemistry, physics, and Earth science. You'll like the activities' flexibility. Some are short tasks that zero in on a few specific process skills; others are investigations involving a variety of skills you can cover in one or two class periods; and still others are extended, in-depth investigations that take several weeks to complete. Keyed to the U.S. National Science Education Standards, the activities include reproducible task sheets and scoring rubrics. All are ideal for helping your students reflect on their own learning during science labs.

This work has been selected by scholars as being culturally important and is part of the knowledge base of civilization as we know it. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. To ensure a quality reading experience, this work has been proofread and republished using a format that seamlessly blends the original graphical elements with text in an easy-to-read typeface. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and

relevant.

This comprehensive collection of top-level contributions provides a thorough review of the vibrant field of chemistry education. Highly-experienced chemistry professors and chemistry education experts at universities all over the world cover the latest developments in chemistry learning and teaching, as well as the pivotal role of chemistry for shaping the future world. Adopting a practice-oriented approach, they offer a critical view of the current challenges and opportunities of chemistry education, highlighting the pitfalls that can occur, sometimes unconsciously, in teaching chemistry and how to circumvent them. The main topics discussed include the role of technology, best practices, science visualization, and project-based education. Hands-on tips on how to optimally implement novel methods of teaching chemistry at university and high-school level make this is a useful resource for professors with no formal training in didactics as well as for secondary school teachers.

Published annually since 1985, the Handbook series provides a compendium of thorough and integrative literature reviews on a diverse array of topics of interest to the higher education scholarly and policy communities. Each chapter provides a comprehensive review of research findings on a selected topic, critiques the research literature in terms of its conceptual and methodological rigor and sets

forth an agenda for future research intended to advance knowledge on the chosen topic. The Handbook focuses on a comprehensive set of central areas of study in higher education that encompasses the salient dimensions of scholarly and policy inquiries undertaken in the international higher education community. Each annual volume contains chapters on such diverse topics as research on college students and faculty, organization and administration, curriculum and instruction, policy, diversity issues, economics and finance, history and philosophy, community colleges, advances in research methodology and more. The series is fortunate to have attracted annual contributions from distinguished scholars throughout the world.