Systems Newsletter

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Center for Gifted Education
The College of William & Mary

How We Know, Not What We Know, Matters Most: Why Students Should Design Their Own Experiments

Johns Hopkins University's President William Brody, in his 2007 commencement speech to JHU graduates, said:

"No serious scientist says that everything we know today will still be correct tomorrow. Far from it. I teach a class in which I tell my students that half of what they learn here may one day be proved wrong. If we could only figure out which 50 percent is wrong, we could cut their schooling time in half." (Brody, 2007, available at http://www.jhu.edu/commencement/speeches/brody.html)

For most pre-college students, almost all of their time in science class is spent learning what scientists "know". Many textbooks present scientific ideas as if they had been handed down at Mt. Sinai, divorced from the experimental evidence that underlies them. This focus on what scientists "know" is reinforced by the strong pressure for students to demonstrate what they have learned by passing standardized tests. Unfortunately, scientific progress will continue to be rapid, and much of the information taught in pre-college science classes in 2007 will be outdated – "wrong" – by 2017.

This is a problem not only for science teachers and textbook publishers, but for the general public. Cynics say that there's no point in paying attention to what "scientists say", since it seems to shift with every news cycle. Butter was bad for you, and margarine was the healthy substitute; now margarine, with its high transfat content, is bad for you, and butter is the safer alternative. Beta carotene was an essential addition to every vitamin pill, its antioxidant properties thought likely to prevent cancer; now, it's dangerous, having been shown to actually increase the likelihood of developing lung cancer in smokers, and some scientists question the advisability of

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taking vitamin supplements at all. The heavily advertised painkiller Vioxx was safer than aspirin; now, Vioxx causes heart attacks, and has been removed from the market. Even elementary school verities are threatened. Pluto was the ninth planet; now, Pluto's not a planet at all.

How can teachers and school administrators prepare students for the scientific changes that they will experience over the course of a lifetime? The key is to teach even the youngest students that science is a process, not a collection of "facts": students need to develop a strong, intuitive understanding of how science works. They need to understand *how* we know, not just *what* we know.

Many pre-college textbooks contain chapters on the "scientific method": the idea that scientists first form hypotheses, then test their hypotheses experimentally, then analyze their results to find out whether the hypothesis is true or false. The problem with these chapters is that they are too abstract, and that they leave out too much of the scientific process. As a child, I wondered how scientists came up with hypotheses in the first place, and what happened after the hypotheses had been tested.

My excellent high school science courses helped answer some of these questions for me, because I had the opportunity not only to perform the many well-designed textbook experiments laid out by my 1970s-era textbooks, but to struggle with designing my own experiments in my Physics II and Biology II courses. My teachers, Dr. Kim Mehlbach and Mr. Rod Bolin, had stockrooms full of equipment that students could use for their required research projects. The experiments that I designed and performed, despite their many scientific limitations, showed me that I could ask questions of Mother Nature and get answers-or at least data, messy and confusing as it sometimes was.

My sons, who were high school students from 1999 to 2006, had a very different high school science experience from mine. Although they took Avanced Placement (AP) science courses, they did very little lab work, and never had the opportunity to design their own experiments. Most of their class time was spent in lecture, in reading, in lecture review, or in exams. The pressure was on to cover the material, and cover the material they did. The sense of excitement that I remember from my high school science courses was totally absent from our conversations about what they did in class, even though they earned consistent 5's on their AP exams.

Thus, I was delighted when my freshman son, Nick, called me one afternoon last spring to share an amusing scientific experience. That morning, he had managed to wake up and get dressed by the unreasonably early hour of 11:00 AM to attend Haverford's annual Demo Day, staged on the College's cricket field by the Chemistry Department. He enthusiastically described the best demonstrations he had seen. His favorites were the explosions, naturally. "Demo" can be translated either as "demonstration" or as "demolition."

In the most complicated demo, the professor in charge of Demo Day had attached a large balloon filled with methane gas to a long pole, and then, holding the other end of the pole, maneuvered the balloon until it touched an open flame. A moderate bang resulted; as Nick explained to me, methane is

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From the Editor

The focus of the current issue of Systems is Math and Science for gifted learners. Dr. Bev Sher of the College of William and Mary and frequent collaborator with the Center provides an argument for the importance of students designing their own experiments to ensure their understanding of the scientific method and scientific thinking. Valija C. Rose, doctoral student at the Center interviewed three major academics in the field on the topic of gifted education and math instruction. The annotated bibliography on recent math and science publications was also compiled by Ms. Rose.

Also included in this issue is an interview with Michael Clay Thompson conducted by Dr. Suzanne Henshon, a graduate of the doctoral program William and Mary, abstracts from the dissertations from this year's graduates, as well as an update on some recent changes and happenings at the Center.

2008 will be the 20th anniversary of the Center for Gifted Education. Stay tuned for information on our plans to celebrate. Join us at our National Curriculum Network Conference, March 5-7, where much of the action will occur!

Experiments

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not especially flammable. Next, the professor attached a large balloon filled with hydrogen gas to the pole and touched it to the flame. The crowd expected a miniature version of the Hindenburg disaster, but was disappointed; while there was a loud bang, it did not meet anyone's expectations. When a large balloon filled with a mixture of hydrogen and oxygen gas was touched to the flame, though, the fireball was at least ten feet high, and the explosion was audible inside Nick's nearby dormitory, making his sleepy friends come running out to see what was happening.

Nick explained that the last explosion had been much larger than the pure hydrogen explosion because essentially every hydrogen molecule in the last balloon was close to an oxygen molecule, allowing all of the molecules present in the balloon to react with each other at once. In his college chemistry course, he had learned about exothermic reactions and the factors that influence their rates and so the idea that thoroughly mixing the reactants in advance led to a more satisfying explosion did not surprise him. The demo hadn't taught him anything new, but it had been great fun.

Memorable as Demo Day was, it was not the most valuable scientific experience that Nick had that semester. Earlier in the spring, he had called me several times in great frustration to vent about his chemistry lab course:; for the first time in his life, he was required to design an experiment of his own. He was given the challenge of identifying three unknown gas samples from a list of seven different possibilities using a method of his choice, and the open-ended nature of the assignment made him very uneasy. As Haverford's honor code precluded him from asking for parental help, I could only listen as he worried out loud.

After thinking about all of the possible experimental approaches he could take, he finally settled on determining the density of each gas sample and then comparing the measured densities of his unknowns with the textbook-provided densities of the "known" gases. First, he measured the volumes of his gas samples by immersing the balloons containing the samples in water and subtracting the volume of the water from the volume of the balloon plus the water. Then, he weighed each gas sample on an analytical balance, carefully balancing the balloon filled with gas in a large beaker; finally, he broke the balloon to release the gas, then weighed the empty balloon and the beaker, and subtracted this value from the mass of the combined gas, balloon and beaker to obtain the mass of the gas. He then divided the mass of the gas sample by its volume to calculate the density of the gas.

Unfortunately, the calculated densities of Nick's gas samples did not line up with the densities of the "knowns." He was frustrated by the failure of his experimental data to conform with the textbook values, but interpreted his experimental results as best he could, thinking carefully about the possible sources of systematic error in his procedure. Fortunately, his educated guesses turned out to be correct, and his lab report earned a good grade. The main problem with his method turned out to be that the beaker was too heavy for the analytical balance, so the masses that he had measured were off.

Nick did not enjoy doing this experiment. In fact, he told me at the end of the semester that his experiences in chemistry lab had cemented his decision to major in something other than science. As a result of his gas experiment, though, he has a much better intuitive understanding of the challenges scientists face when designing experiments and obtaining, analyzing, and evaluating experimental data than he had before taking the course. This experience will serve him well in the economics and public policy courses that fascinate him. Social scientists have to be able to design studies and collect and interpret data, too.

A student who has grappled with the limitations of his or her own data will approach data from other sources more skeptically than a student who has only assimilated "facts" from a textbook possibly could. This important scientific habit of mind can be reinforced by science courses that use class time to describe famous experiments and their results, rather than just presenting textbook wisdom. It can be strengthened by the opportunity to read and discuss current scientific papers, and to think critically about the data and methods the papers describe. A student who has done all of these things will have a deep, intuitive understanding of how science really works. He or she will truly be scientifically literate.

As educators, we need to resist the pressures that the system creates to just "cover the material." For the good of our students, and for the good of our country, which desperately needs a scientifically literate citizenry in order to grapple effectively with the major problems of our time, we need to help students to understand *how* we know, not just *what* we know. As a beginning step, we need to invest the time, energy, and money needed to help even our youngest students design and perform their own experiments.

Dr. Beverly Sher received her BA in Molecular, Cellular and Developmental Biology and Russian from the University of Colorado in 1979, and received her Ph.D. in Biology from Caltech in 1985. After postdoctoral work at Stanford and Washington University in St. Louis, she retired from biological research to raise her small children. In the early 1990s, she served as the Center for Gifted Education's science consultant during the development of the Problem Based Learning science units for K-8 students. She is currently a Visiting Assistant Professor of Biology at the College of William and Mary, where she teaches a freshman seminar on emerging infectious diseases and serves as the College's Health Professions Advisor. 🕮

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From the Executive Director

Dr. Joyce VanTassel-Baska

The Quality of the Gifted Education program or what do students take away tomorrow at the ritual called graduation?

In 1950 a high school dropout by the name of Robert Pirsig wrote a best-selling book called *Zen and the Art of Motorcycle Maintenance*. The book chronicled the authentic quality of life experiences to be derived from driving across country on a motorcycle, a decade before the film *Easy Rider* made it a true cultural phenomenon. More importantly, however, the book introduced a metaphysical or philosophical interpretation of quality, one where subject and object (read romantic and classical) actually merged into a higher synthesis. He opined that static quality was found in the patterns of nonliving things, in biological systems, and in social and intellectual systems, and that these systems were arranged in hierarchal order that led to evolutionary breakthroughs. Thus when higher order biology (flight of birds) could overcome nonliving things (gravity), static quality improved. In his system, the intellectual power of ideas was at the highest level as it is in Plato's system of thought as well. Yet this view of static quality, in Pirsig's model, is always interrelated with dynamic quality, the force of change in the universe (the preintellectual cutting edge of reality) where quality lies in the moment, which for artists like Virginia Woolfe meant that life quality was best captured in moments of being.

This philosophical view of quality, however, must be juxtaposed with the practical or functional view of quality, espoused in the worlds of business and engineering and indeed education. That view of quality is concerned with product-building that meets certain specifications that satisfy perceived or real needs of clients. These specifications include: conformance to requirements (standards of quality based on lateral judgement), fitness for use (customized to specialty area opportunities), products/services that meet or exceed client satisfaction (student and employer perceptions of program quality), and quality assurance and management processes such as speed, dependability, flexibility, and cost (effective and efficient delivery system for the program). These practical criterial standards are the basis on which all university programs in education are judged and ones that allow the School of Education here to be considered annually in the top 50 of schools of education nationally by *US News and World Report*.

In asking graduates to reflect on their experiences with our program here at William & Mary, it may be helpful to reflect on the degree to which they have internalized the standards of quality addressed in their program of studies. There are 10 of them that speak to important aspects of learning in this field. They center around the important themes of diversity, differentiation in curriculum, instruction and assessment, and collaboration.

Standard 1 (foundations) emphasizes the knowledge-based foundation of the gifted education field that traces the theoretical, historical and research-based constructs central to understanding this specialized area of individual differences and the manifestation of them in policies at all levels of the educational enterprise. This component also emphasizes key issues and societal and economic factors that affect the development of intellectual talent more broadly. Standards 2 and 3 emphasize how gifted learners are different from other learners in respect to characteristics, developmental trajectories, and idiosyncratic ways of learning. Attention is given to the added differences that accrue because of cultural background, poverty, and learning problems that sometimes accompany giftedness.

Standards 4 and 7 focus on instructional strategies and instructional planning, respectively. Standard 4 emphasizes the pedagogical approaches that have been found effective in working with gifted learners, including those from diverse backgrounds. It also stresses the importance of using management strategies, including assistive technology, that respond to exceptional student learning needs. Standard 7 focuses on the products necessary to differentiate curriculum for gifted learners including learning plans, units, and scope and sequence documents. Emphasis is also placed on differentiation features that can be matched to different domains and student differences.

Standards 5, 6, and 10 emphasize the nature of learning environments for the gifted that provide optimal contexts for learning personal, social, and intellectual skills; the development of oral and written language and communication skills at appropriate levels of advancement; and using appropriate technologies. Moreover, the collaboration standard focuses on the multiple types of collaboration necessary in developing programs for these learners from families, to school personnel, to various community groups. Standard 8 explicates the knowledge and skills essential for identification of gifted learners, including the use of multiple methods for finding underrepresented populations, and the knowledge and skills needed to assess learning in programs. Finally, Standard 9 focuses on professional and ethical practice in relating to students and other individual stakeholders in the gifted education enterprise and challenges educators to strive for continuous improvement through professional development and reflection on

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practice.

In addition to demonstrating competencies in these standards of quality, our graduates are also fit in every way to fulfill the roles we have defined as the outcomes from the program—being teacher leaders or administrators of gifted programs across the country, being directors of special schools or projects nationally, or being teacher-scholars at universities. All who have actively sought such employment have procured it and done well.

Students and their employers (superintendents or Deans) have found that the program has allowed our students to rise to the top in their respective chosen career path. Since some were already well-respected in their career, the program has served to enhance their skills and provided greater capacity to broaden their application to new endeavors.

Our gifted education faculty continue to work diligently at regular intervals throughout the year to improve the productivity processes and products of the program—from portfolios to theses and dissertation work to course design and delivery to strategies for making the program work for each student.

Yet the real test of quality programs, in my view, goes back to the philosophical: how well do our students come away appreciating the larger picture, the connections between reason and emotion in all of its manifestations, the need to live in the moment as well as in one's head, and the appreciation for the role of both tradition and innovation in the world of education that they inhabit or will soon inhabit. This test of program quality is more difficult to assess, especially in the short term, because it speaks to lifelong habits of mind and attitudes of heart that carve a way of being in the world—a way of being that does not draw artificial lines between the personal and professional, between the roles of administrator and teacher, or of counselor and parent, or even between educational issues such as equity and excellence in our schools.

At an affective level, how well will our graduates cope with the "traps of stupidity" to which gifted people are prone (paraphrasing Robert Sternberg's phraseology)? Can they handle procrastination, the black devil that emerges from being overwhelmed and depressed because of work load and therefore immobilized or feeling overconfident in the capacity to pull off big projects at the last minute? Can they learn to focus on learning goals rather than performance ones that lead to self and other-blame for mistakes? Can they understand the delicate balance between available energy and capacity to produce at quality levels, leading them not to overcommit or develop a superwoman complex of being able to do it all? Can they recognize that striving for perfection can develop bad habits of perseveration which leads to unfinished projects rather than treating all work as a draft in progress? These too are questions about program quality, especially a gifted program that needs to be sensitive to individual differences, emotional intensities and sensitivities, and the very real challenges of being a creative producer in the real world.

At a social level, how well will our graduates demonstrate cultural competency in their dealings with others of different ethnic and racial groups? How well will they truly understand the twice exceptional learner, the one who is both gifted and disabled, and the delicate balance in providing both support and challenge to meet needs? How will they resist the personal desire and need to work alone with the call for collaborative enterprise in all corners of education? How will they cope with conflict and manage to resolve it in personal and professional matters? How will they resist attempts at marginalization because they are advocates for gifted students? These too are program quality issues that pervade work in all educational spheres that serve gifted learners.

Finally, at an intellectual level, how well will our graduates fare in the world of competing ideas in education? Can they build skillful arguments that allow them to debate and hold fast to their principles? Can they craft their ideas into intellectually sound conceptual frameworks that explain the way the world works in some aspect of education? Can they advocate successfully for gifted education at the level of the individual student as well as at the institutional level of programs and services? Can they exhibit both intellectual courage and humility in dealing with others? Can they create new solutions to seemingly intractable problems in education? These are but a few of the intellectual challenges facing today's graduates of this program.

Only each group of graduates can truly know if they are on a path that will allow their work and life to exhibit both the practical and philosophical aspects of quality that I have briefly addressed. I only hope that the gifted program experience at William and Mary has provided some markers to assist in that journey. The Roman playwright Terence once observed that *nothing is so difficult but that it may be found out by seeking*. Continue to strive to seek, and to find your place in the world of education and return often to William and Mary to share both your triumphs and your ongoing challenges.

Adapted from remarks made by Dr. VanTassel-Baska at the Center for Gifted Education graduation luncheon.

An Interview with Three Leaders in the Fields of Mathematics and Gifted Education

by Valija C. Rose

Susan G. Assouline, Ed.S., Ph.D. is the associate director of the Belin-Blank Center at the University of Iowa and adjunct clinical associate professor in school psychology. Her research interests include academically talented elementary students, self-concept, underachievement, and learning disabilities. She is the co-author of *Developing Math Talent: A Guide for Educating Gifted and Advanced Learners in Math*.

M. Katherine Gavin, Ph.D. is an associate professor at the NEAG Center for Gifted Education and Talent Development at the University of Connecticut where she serves as the math specialist. She is currently the principal investigator and director of a five-year Javits Grant, Project M3: Mentoring Mathematical Minds, that involves the development of math curriculum units for talented students in grades 3, 4, and 5.

Linda Jensen Sheffield, Ph.D. is the Regent's Professor at Northern Kentucky University and executive director of the Kentucky Center for Mathematics. She is the chair of the National Council of Teachers of Mathematics' Task Force on Promising Students and coordinator of the National Association for Gifted Children Special Strand on Mathematics for High Ability Students. She is the author of *Extending the Challenge in Mathematics: Developing Mathematical Promise in K - 8 Students*.

In these interviews, Drs. Assouline, Gavin, and Sheffield made observations and recommendations for gifted educators and gifted education in developing math talent. Despite their varying backgrounds, experiences, and hence perspectives, they share a passion for and commitment to improving the mathematics experiences of advanced learners. Together their suggestions make a strong, clear, and cohesive call for action in our field. The piece that follows is a synthesis of their views on the issue of mathematics in gifted education.

Question: What, in your opinion, is the state of mathematics in gifted education?

Dr. Sheffield referred to the efforts that the National Association for Gifted Children (NAGC) has made in trying to address this very pressing issue. The organization has a math/science taskforce, as well as a math/science strand at the annual conference that was established within the past few years. In the larger context, gifted education has been directly or indirectly responsible for improving opportunities and experiences for numerous talented math students. Dr. Assouline declared, "Thanks to gifted educators, many mathematically talented students are able to move systematically through a rigorous math curriculum, at an appropriate pace." Some of these curricular advances are the result of federally funded Jacob Javits grants supporting mathematics programs and projects in gifted education.

Notwithstanding these milestones in mathematics in gifted education, one cannot talk about the state of the field without mentioning the impact of the No Child Left Behind legislation. According to Dr. Gavin, far too many talented students in mathematics continue to "sit in classrooms very bored as the class drills on skills they already have learned." Clearly this indicates that there is much work to be done in order to continue to improve talented math students' experiences.

Question: What role can gifted education play in the adequate preparation of students in mathematics given the recent STEM (science, technology, engineering, and mathematics) initiatives and the increased awareness of America's relative success in these areas?

Gifted education can and should play a vital role in the adequate preparation of students in mathematics. Historically, gifted education has been a leader in teaching students how to think critically and creatively. Emphases in the field of gifted mathematics education have been on challenge, rigor, patterns, generalizations, problem solving, and problem posing. All of these elements are essential if we want our mathematics students to compete successfully on an international level.

Best practices in gifted education, such as differentiation through depth, complexity, and curriculum compacting, identifying areas of strength, and building and maintaining student interest should be shared with regular classroom teachers. It is only through the sharing of information that opportunities for students can improve.

Dr. Gavin summarized these ideas quite well in stating, "Our practices in gifted education encourage students not only to seek answers but to think beyond and create new questions from the answers they find. Through this process, students come to love mathematics and find joy in their learning. This type of enrichment teaching and learning is essential in helping create our future mathematicians as world leaders and enabling America to maintain its competitiveness in this increasingly technological global world."

Question: What specific recommendations would you make to gifted educators as they promote and encourage math talent?

Dr. Assouline suggested that the first step we can take as gifted educators in promoting and encouraging math talent is to simply find talent and then to cultivate it. In discovering that talent, Dr. Sheffield insisted that we must look beyond traditional students. "We really need to broaden the pool… We really need to look for talent in all students, certainly in girls, students of color, [and] non traditional students." This declaration aligns with the United States Department of Education's 1993 report, *National Excellence in Developing Talent* (Office on Educational Research and Improvement) which states, "Outstanding talents are present in children and youth from all cultural groups, across all economic strata, and in all areas of human endeavor."

Once talent or potential talent has been identified, the question then becomes how we can develop that talent. All of the interviewees agreed that educators of the gifted must serve in both advocacy and facilitative roles in ensuring that talented children get the opportunities they so desperately need. Regular classroom teachers and parents must be made aware of appropriate resources, both inside and outside of schools. Additionally, we need to consider long-range planning and vertical teaming opportunities as we focus on the big ideas

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of mathematics. Dr. Gavin argues, "We must move away from enrichment worksheets, logic puzzles and mindbenders… Talented students may enjoy these experiences by they are not enough. Students need to explore the big ideas of mathematics in depth with a cohesive challenging curriculum that is designed for them over a period of time." Not only does this require that every high school offer advanced placement classes in math and science as Dr. Sheffield suggested, but that it also requires regular and gifted teachers alike to arm themselves with rich and deep mathematical content knowledge, as Dr. Gavin suggests.

Drs. Assouline, Gavin, and Sheffield individually and collectively make a clarion call to gifted educators as we encourage and develop math talent. We as gifted educators must: 1) find and develop talent in students; 2) improve opportunities for high-ability learners; 3) advocate for a challenging cohesive curriculum that allows for continuous progress; and 4) share gifted strategies that we know to be successful and appropriate with this population. Although we have made gains in mathematics in gifted education, we must continue to advocate and work tirelessly on behalf of our nation's talented students.

Dissertation Abstracts

An Exploratory Study of the Use Critical and Creative Thinking in Elementary Language Arts Classrooms

by Susan MacGowan

This exploratory study examined how well elementary language arts teachers participating in a federal project to raise students' critical thinking abilities scored on tests of critical and creative thinking. Furthermore, it investigated the ways in which these teachers of the language arts have developed their understanding of critical thinking skills, what types of training they bring to the classroom which might enhance the teaching of critical thinking skills, and the methods by which they foster critical thinking in the classroom. Finally, this study examined the relationship among teacher scores on critical and creative thinking tests, their professional development hours, and results on a scale of teacher behaviors.

The study was a mixed design that employed the Watson-Glaser Critical Thinking Assessment, the Abbreviated Torrance Test for Adults, the Wenglinsky Questionnaire, and an interview protocol. Descriptive statistics were used to analyze data and a correlation was run to determine if a relationship existed between tested dimensions.

Overall, the research findings suggest that experimental teachers sought professional development options that dealt with higher order thinking skills more regularly than did comparison teachers. Familiarity with higher order thinking skills may have enabled this group to achieve a slightly higher score on a critical thinking test existed. Implications for practice suggest that further research should replicate this study with a larger sample size to substantiate findings.

An Exploratory Study of the Academic Journey of Successful Twice Exceptional Students at a Selective Institution of Higher Learning

by Paula Ginsburgh

This study was designed to identify inhibitors and facilitators of the educational journey of twice exceptional students at a selective institution of higher learning. Questionnaire and interview techniques were used to elicit responses from 13 qualified students about their talent development journey. Five cases were selected based on their uniqueness and their ability to be articulate. Parents were also interviewed to provide verification for student commentary and additional insights.

Results of the study across the five cases focused on key themes facilitating the development of these college students as well as those that inhibited their talent development. Factors facilitating student development included: parent support, appropriate accommodations, teacher support and positive regard, perseverance, and the willingness to make changes in their major or career path in order to succeed.

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Dissertation

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Factors inhibiting student development were: the role of the disabilities office as gate keepers, late identification, lack of accommodations at key junctures, feelings of being different, and resource/time management.

Implications for practice include: the need for educators to acquire a deeper understanding of twice exceptional students to ensure sensitivity to their condition, awareness of the twice exceptional student's need for appropriate accommodations, the need for practitioners to work closely with parents of twice exceptional students, the need for programs and provisions targeted to address both the disability and the high ability of the twice exceptional student, and the need to develop support systems for twice exceptional students lacking parental involvement.

Implications for future research include: an exploratory study designed to probe the experiences of the parents of twice exceptional students, a prospective study of recently identified twice exceptional students in regard to cognitive and social emotional dimensions of their functioning at key transition points, creation and validation of a scale for characteristics of twice exceptional students that could be used at the elementary level, a longitudinal study of successful twice exceptional students through age 40, and a study targeting counseling interventions for twice exceptional students at the middle school level.

The Effects of the Jacob's Ladder Reading Comprehension Program on Third, Fourth, and Fifth Grade Students' Reading Comprehension and Critical Thinking in Rural, Title I Schools

by Tamra Stambaugh

The purpose of this study was to examine the effects of the *Jacob's Ladder Reading Comprehension Program* on 3rd, 4th, and 5th grade students' reading comprehension and critical thinking skills in rural, Title I schools.

The Jacob's Ladder Reading Comprehension Program was written as a supplemental curriculum targeted toward Title I students in the third, fourth, and fifth grade. The program focuses on scaffolding reading instruction from lower to higher level thinking skills with an emphasis on higher level thinking and textual analysis.

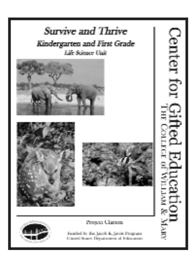
This quasi-experimental study measured the effects of the program on rural Title I students' critical thinking and reading comprehension (N = 495). Within the experimental group, students who were exposed to the *Jacob's Ladder* curriculum revealed significant and very high practical gains in subject-specific critical thinking behaviors. Between-group analyses suggest that when compared to the basal reader series alone, the *Jacob's Ladder Reading Comprehension Program* produces significant and important gains in students' reading comprehension, as measured by the Iowa Test of Basic Skills, and critical thinking, as measured by the Test of Critical Thinking.

New Science Units for Primary Grades

Eight science units for primary grades have been designed to introduce young students to science concepts, science processes, and overarching concepts. A hands-on, constructivist approach allows children to build their knowledge base and skills as they explore science topics through active exploration and planned investigations. Students are engaged in creative and critical thinking, problem finding and solving, process skill development, and communication opportunities. Each unit is also designed to strengthen essential concepts including quantity, direction/position, comparison, size, texture/material, shape, and time/sequence. Each unit focuses on the overarching concept of systems or change. These units were developed through Project Clarion, a curriculum intervention focusing on students in Title I schools, funded by the Jacob K. Javits Program, U.S. Department of Education.

The following eight NEW units are now available for order from the Center for Gifted Education. Please visit www.cfge.wm.edu/curriculum.htm for more information and an order form.

Survive and Thrive



Survive and Thrive, a K-1st grade unit, engages students in a study of animals, their characteristics, and their natural environments. Students learn how to distinguish features and life needs of animals. Activities include observing and classifying animals according to whether they are

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Science Units

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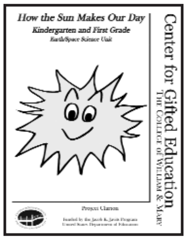
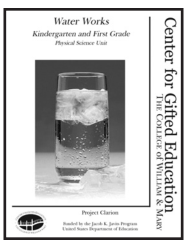
tame or wild and living on land or in water, as well as raising mealworms in the classroom to observe their life cycle. The concept of change is used to deepen understanding of the scientific concepts in the unit.

How the Sun Makes Our Day



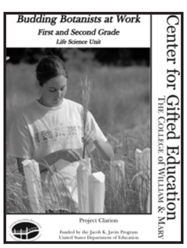
How the Sun Makes Our Day, a K-1st grade unit, engages students in investigations and observations that support their learning about the Sun as a source of light and energy, the nature of shadows, and the need for humans to conserve natural resources. Students explore natural and man-made sources and develop a conservation plan for their home, school, or community. The overarching concept of change is used to deepen understanding of the scientific concepts in the unit.

Water Works



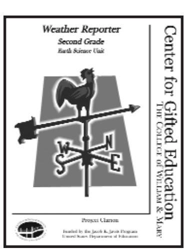
The unit *Water Works* engages K-1st grade students in close observation and experimentation with water. The overarching concept of change is reinforced as students notice, react to, reflect on, and discover more about force and change. Students ask questions and design experiments to reinforce their learning. Generalizations about how things change are developed through students' analysis of their findings. Students explore the characteristics of water, discover whether objects sink or float, experiment to make things float, and examine materials and their interactions with water.

Budding Botanists



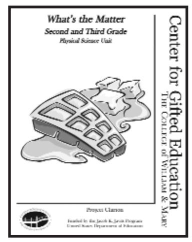
Budding Botanists, a 2nd grade life science unit, engages students in a scenario-based approach to investigating plant life. While assuming the role of botanists to understand the structure, nature, and life cycle of plants, the team members seek to answer questions through problem solving activities. This unit builds upon students' prior knowledge of plant life and encourages them to use inquiry skills to observe, gather evidence, analyze data, and make inferences. The overarching concept of systems is used to deepen understanding of the scientific concepts in the unit.

The Weather Reporter



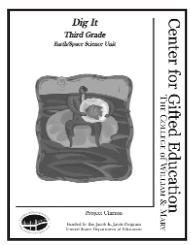
The Weather Reporter, a 2nd grade Earth/Space Science unit, provides students with opportunities to observe, measure, and analyze weather phenomena. *The Weather Reporter* includes a scenario-based approach to allow students to make decisions about observing, predicting, and forecasting the weather. Building upon students' prior knowledge of weather and their newly acquired understanding of meteorology, the *Weather Reporter* promotes life-long learning by encouraging students to investigate naturally occurring weather patterns. This unit includes literary and math components to engage students in discussions and to reinforce the concepts addressed in the unit. Additionally, the overarching concept of change is used to deepen student understanding of unit's scientific concepts.

What's the Matter



What's the Matter? is a 2nd-3rd grade unit that focuses on the properties of solids, liquids, and gases and the processes by which matter changes states. Students work on problem-solving scenarios where they use their new knowledge of matter, change in physical properties, and the measurement of matter to prepare a presentation to share new ideas and discoveries about matter for a "science conference." The overarching concept of change is used to deepen understanding of the scientific concepts in the unit.

Dig It!



Dig It! is a 3rd grade Earth & Space science unit. Students are encouraged to investigate humanity's effects on the environment, the importance of Earth's natural resources, and sound conservation practices. Using a scenario-based approach, the unit builds upon students' prior knowledge by providing opportunities to relate local examples of environmental pollution and conservation to hands-on scientific experiments and demonstrations. *Dig It!* also includes literary and math components to engage students in discussions and to reinforce the concepts addressed in the unit. The overarching concept of change is used to deepen understanding of scientific concepts in this unit.

Invitation to Invent

Invitation to Invent, a 3rd grade unit, engages students in investigations and observations that support their learning about simple machines and their uses. Students explore force, motion, and friction as they learn about the six simple machines and how they are put together to form compound machines. The overarching concept of systems is used to deepen understanding of the scientific concepts in the unit.

What's Happening at the Center

Where are they now?

This year has seen quite a few personnel changes at the Center. While we are saddened by the departure of several key Center members, we wish them all the best in their new endeavors.

Dr. Elissa Brown, formerly the Director of the Center, and a graduate of the doctoral program in gifted education at the College of William and Mary, has left the Center to take on a new role as the Academically/Intellectually Gifted Consultant with the North Carolina Department of Public Instruction.

Dr. Annie Feng, the Center's Research and Evaluation Coordinator, is now at the National Cancer Institute of the National Institute of Health, working as a cancer research training award fellow in evaluation.

Dr. Valerie Gregory worked at the Center as the project manager for Project Clarion. She is now with Chesterfield County Public Schools in Virginia, bringing her expertise to the county in her role as assistant director of staff development.

New Graduate Assistants

We are pleased to welcome the following new graduate assistants at the Center.

Sarah Brodfueher graduated from the College of William and Mary in May of 2007 with a B.A. in Government and Elementary Education. She is currently pursuing a M.A.Ed in Secondary Education with a concentration in Social Studies. She is very excited to be working at the Center and is looking forward to applying things she learns to her work in the classroom.

Kathryn Holt is a first year graduate student in the School of Education. She is working toward her masters in Couples and Family Counseling. Kathryn received her bachelors degree is Psychology from Wittenberg University in Ohio.

Chris McCormick is from Pasadena, Maryland. He is currently pursuing a Master's in Gifted Education. In May of 2007, Chris graduated from Salisbury University, where he received a Bachelor of Science degree in Elementary Education with minors in Mathematics and Earth Science.

Kellie McKay is currently pursuing a Master's in Gifted Education. She graduated in May of 2007 with a Bachelor's degree in Elementary Education and minors in Mathematics and Earth Science from Salisbury University in Maryland.

Rebecca Walter is pursuing a Master's degree in Gifted Education. Having graduated with a BA in Psychology from the University of Notre Dame in 2005, she taught middle school Science for two years in Baton Rouge before coming to William and Mary. Rebecca enjoys cooking, tap dancing, and winter weather.

Kudos

We are always excited to share when any Center staff or student in the gifted education graduate programs receive the recognition they deserve.

Dr. Joyce VanTassel-Baska, Executive Director of the Center, and President of the National Association for Gifted Children, was honored by the Council for Exceptional Children - Talented and Gifted (CEC-TAG) organization at their annual conference for her role both in

Joyce with Diane Montgomery, President of CEC-TAG and Susan Johnsen, President-Elect, CEC-TAG.

advocating for the adoption of the new NCATE standards and for ensuring that the new standards place strong emphasis on diversity issues.

Dr. Carol Tieso, Assistant Professor in Gifted Education, has received the 2007 NAGC Early Leader award. She will be honored at NAGC's 54th annual convention in November for her significant contributions to the field of gifted education.

Kianga Thomas, doctoral candidate, received the Outstanding Brother of the Year award from the Xeta Lambda Chapter of Alpha Phi Alpha Fraternity for demonstrating scholarship, manly deeds, and love for all mankind.

The P.E.O. Board of Trustees selected Bronwyn MacFarlane, Center graduate assistant and doctoral candidate, to receive the 2007-2008 P.E.O. Scholar Award. The P.E.O. Scholars are selected nationally from across all career fields. Bronwyn is also the doctoral student recipient of the 2007 Excellence in Gifted Education Award at the College of William and Mary.

The master's student award was received by Brig Lampert.

Senator Grassley of Iowa was honored by the Council for Exceptional Children for his leadership on behalf of gifted and talented children. CEC president Mary Ruth Coleman and then-NAGC president (Joyce) both thanked the Senator at a reception on Capitol Hill in June.

UPCOMING EVENTS

Focusing on the Future Career Conference
Saturday, January 19, 2008

Saturday Enrichment Program
February 9 - March 22, 2008 (Saturdays)

National Curriculum Network Conference
March 5 - 7, 2008

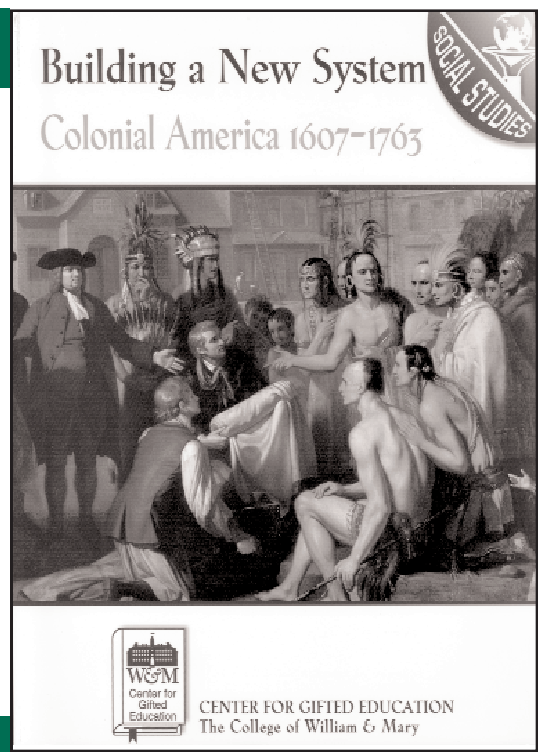
Curriculum Award

At the National Association for Gifted Children's (NAGC) annual conference in November, the curriculum division will present an outstanding curriculum award to the Center for the unit *Building a New System: Colonial America 1607-1763.* This will be the 13th unit developed by the Center to receive this award.

Unit Description

This unit begins with an in-depth study of the interrelationships between the Chesapeake Bay System and both the Native Americans and the early English colonists in Virginia. The unit then turns to an exploration of the economic, social, and political systems of early America across the colonies, comparing and contrasting lifestyles of different groups in different regions. Frameworks for reasoning and document analysis support students in their explorations of this period of history.

This unit can be ordered by calling Kendall/Hunt Publishing at (800) 247-3458 visit their website: www.kendallhunt.com.



Empirical Research on Mathematics and Science in Gifted Education: An Annotated Bibliography

by Valija C. Rose

Science, technology, engineering, and mathematics (STEM) continue to be hot topics in education in general and in gifted education in particular. American students are not performing as well as their international counterparts on math and science assessments. Many leaders in the business industry have sounded an alarm, foreseeing a shortage of adequately trained workers and innovators in the STEM areas. The K-12 educational system plays a vital role in addressing these issues, as it has the capacity to provide early and enriched opportunities and experiences. As we become better consumers of educational research, we are better able to improve those opportunities and experiences for gifted learners. This annotated bibliography is a gateway to some of that research. It represents a small sample of some of the recent empirical research articles on mathematics and science in gifted education. These articles were selected based on their recent publication and diversity in methodology, topic, and grade level.

Math

Howley, A., Pendarivs, E., & Gholson, M. (2005). How talented students in a rural school district experience school mathematics. *Journal for the Education of the Gifted, 29*(2), 123-160.

This article presents a study of the mathematics experiences of 16 identified gifted 7-14 year-olds living in a disadvantaged rural Appalachian community. Through hour-long interviews, the researchers found three themes that summarized participants' mathematics experiences. These themes related to the substance and value of mathematics, the nature and quality of mathematics instruction, and support from home. Although the participants overwhelmingly considered mathematics to be important, their mathematics experience was largely limited to computations and algorithms. Participants described slow, unchallenging, and repetitive mathematics instruction in the regular classroom. All of the participants indicated receiving some mathematics support at home.

Kerr, B., & Robinson, S. E. (2004). Encouraging talented girls in math and science: Effects of a guidance intervention. *High Ability Studies, 15*, 85-102.

This intervention program targeted girls age 11 to 20 who had high grades in math and science but seemed to be at-risk for failing to achieve their career goals. The goal of the program was to strengthen career development through increased self-esteem and self-efficacy, mentorship, and guidance. More than 500 young women participated in the program over a 7-year period. Girls who participated in the program showed significant increases in the extent to which they sought career information. Measures of self-esteem and self-efficacy showed mixed results, although significant increases from the pre-test to the 3-to 4-month follow-up were found in four of the five measures.

Ma, X. (2005). A longitudinal assessment of early acceleration of students in mathematics on growth in mathematics achievement. *Developmental Review, 25*, 104-131.

The Longitudinal Study of American Youth (2000), which focuses on math and science education, was used to investigate the mathematics achievement over time of students who had been mathematically accelerated in junior high school. Mathematics achievement was compared for gifted, honors, and regular accelerated and non-accelerated students. Results among gifted students suggested that schools had virtually no impact on mathematics achievement for accelerated and non-accelerated students. Additionally, the rate of growth among accelerated gifted students was virtually the same as the rate of growth among non-accelerated gifted students. For regular students however, acceleration significantly increased mathematics achievement.

McKenna, M. A., Hollingsworth, P. L., & Barnes, L. L. B. (2005). Developing latent mathematics abilities in economically disadvantaged students. *Roeper Review, 27*, 222-227.

In this study, economically disadvantaged students were given the opportunity for sequential, yet individualized self-paced mathematics acceleration through the use of Kumon mathematics materials as a supplement to traditional textbooks and instruction. Second and fourth grade students who received Kumon instruction showed increased gains in Kumon achievement in comparison to the non-Kumon control group. Nationally normed standardized achievement tests were administered one and two years later to determine the residual effect of Kumon instruction. Students who had received Kumon instruction scored significantly higher than students in the non-Kumon control group.

Nokelainen, P., Tirri, K., & Merenti-Välimäki, H. L. (2007). Investigating the influence of attribution styles on the development of mathematical talent. *Gifted Child Quarterly, 51*, 64-81.

"Reasons people give for an outcome, such as success or failure in a task, are called attributions" (p. 66). Attributions and attribution styles impact motivation, expectations, and self-esteem. This study examined and compared the attribution of effort and ability among Finnish adolescents and adults (*N* = 203) who were highly, moderately, or mildly mathematically gifted. The results suggest that there are differences in attribution styles based on the level of giftedness and gender, although differences between levels of giftedness appear to be more significant. Highly and moderately gifted participants were more likely to attribute success to ability, while mildly gifted participants were more likely to attribute success to effort. Highly gifted participants attributed failure to lack of ability.

Continued on page 13, Annotated Bibliography

Annotated Bibliography

(Cont'd from page 13)

Reid, P. T., & Roberts, S. K. (2006). Gaining options: A mathematics program for potentially talented at-risk adolescent girls. *Merrill-Palmer Quarterly, 52*, 288-304.

This intervention program, collaboratively established by two research universities, sought to increase participants' mathematics confidence, skills, and interest through the integration of mathematics and social science research. University student mentors worked with small groups of participants as they explored data analysis, communication, and representation, as outlined in *Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics, 2000) for grades six through eight. The intervention program increased participants' mathematics confidence and skills, but did not increase career or educational aspirations. The authors suggest that this was due to the high career and educational aspirations participants possessed at the start of the program.

Reynolds, N. G., & Conway, B. J. (2003) Factors affecting mathematically talented females' enrollment in high school calculus. *Journal of Secondary Gifted Education, 14*, 218-228.

National Educational Longitudinal Study (NELS:88) and 1992 follow-up data were utilized to identify and explore factors associated with taking high school calculus among talented high school females. Eighth grade girls enrolled in algebra and scoring in the fourth quartile of standardized tests in 1988 were included in this study. The author investigated the impact of number of siblings, mother's and father's educational attainment, socioeconomic status, and educational aspirations on calculus taking. Having no siblings, a mother who had completed at least some college, and a base-year family income greater than $74,999 were each found to be statistically significant predictors of calculus-taking.

Tsui, J. M., & Mazzocco, M. M. M. (2007). Effects of math anxiety and perfectionism on timed versus untimed math testing in mathematically gifted sixth graders. *Roeper Review, 29*, 132-139.

This study sought to examine the impact of math anxiety and perfectionism on mathematics performance on both timed and untimed assessments. The authors hypothesized that students would perform more poorly on timed versus untimed assessments and that there would be a positive relationship between math anxiety and the discrepancy in performance. The authors also hypothesized that there would be a negative relationship between perfectionism and performance discrepancy. Results suggested that the order in which the two tests were administered mattered. Students who received the untimed test first did not show a significant discrepancy in performance. Students with low math anxiety and low perfectionism scores were more likely to show discrepancies in timed versus untimed performance.

Science

Coates, D. (2006). 'Science is not my thing': Primary teachers' concerns about challenging gifted pupils. *Education 3-13, 34*(1), 49-64.

This qualitative research study examined teachers' perceptions of factors that impeded their ability to provide appropriately challenging science lessons to gifted learners age 5-11. The author interviewed 13 teachers, all working at the same primary school in Oxfordshire, England. Four primary themes emerged from the study: teachers' subject knowledge and understanding, performing science investigations, organization of science teaching to allow for extension and differentiation, and boredom of gifted and talented students. Lack of confidence in subject knowledge and understanding appeared to be the most salient factor impacting instruction, as it significantly affected teachers' perceived ability to adequately address the remaining areas of concern.

Feist, G. J. (2006). The development of scientific talent in Westinghouse finalists and members of the National Academy of Sciences. *Journal of Adult Development, 13*, 23-35.

Westinghouse finalists and members of the National Academy of Science (NAS) are recognized for outstanding scientific talent and work. This study examined the academic and career path of U.S. Westinghouse finalists, as well as early predictors of achievement among NAS members. Eighty-three percent of the Westinghouse finalists sample completed the doctoral degree, with many of those degrees earned at the nations' most selective institutions. The average Westinghouse finalists were on average 11.48 years old when they first knew they wanted to be scientists. The average age of first publication for NAS was 23.57, with nearly 75% of the group having first published by the time they were 25 years old. Intrinsic enjoyment of science appeared to be a motivating factor for both groups.

Feng, A. X., Van-Tassel-Baska, J., Quek, C., Bai, W., & O'Neill, B. (2005). A longitudinal assessment of gifted students' learning using the Integrated Curriculum Model (ICM): Impacts and perceptions of the William and Mary Language Arts and Science Curriculum. *Roeper Review, 27*, 78-83.

This two-fold study assessed the effects of a differentiated curriculum over time among third, fourth, and fifth grade students, and stakeholders' perceptions of the effectiveness of that curriculum. Performance-based assessments were utilized to assess student learning, while surveys were used to capture parents', educators', and students' perceptions of curriculum implementation and effectiveness. Statistically significant and educationally important student learning growth was realized at each grade level, irrespective of the length of exposure to the curriculum (one, two, or three years). The majority of both parents and teachers found the curriculum to be sufficiently challenging; however the majority of students found the curriculum to be "challenging sometimes but not always."

Continued on page 14, Annotated Bibliography

Annotated Bibliography

(Cont'd from page 13)

Hsu, L. (2003). Measuring the effectiveness of summer intensive physics courses for gifted students: A pilot study and agenda for research. *Gifted Child Quarterly, 47*, 212-218.

Intensive summer courses for gifted students are often advertised as being equivalent to year-long courses, with some students earning high school credit for successfully completing such a course. This study measured the effectiveness of eight summer intensive physics courses by comparing each class' gains to the gains published for high school and college students enrolled in traditional, year-long physics courses. Students enrolled in the summer intensive physics courses gained as much as students enrolled in ordinary length physics courses. When compared to students enrolled in ordinary length honors physics courses, gifted students enrolled in the intensive summer courses gained more than those who were in traditional lecture-based courses, but not as much as those enrolled in "interactive engagement" courses.

Melber, L. M. (2003). Partnerships in science learning: Museum outreach and elementary gifted education. *Gifted Child Quarterly, 47*, 251-258.

This study investigated the impact of a museum science program on the content knowledge, career attitudes, and understanding of scientific work among academically gifted elementary school students. Thirty-one fourth and fifth grade students participated in a month long after school program that incorporated inquiry-based activities, many of which simulated the processes museum scientists practice. In terms of content knowledge, participants reported on average having learned "a good amount" about marine biology, insects/arthropods, archaeology/Native Americans, and dinosaurs/paleontology. Students showed increased interest in becoming scientists, even with high existing interest in scientific study, and an increase in their understanding of the varied work scientists do.

Park, S. K., Park, K. H., & Choe, H. S. (2005). The relationship between thinking styles and scientific giftedness in Korea. *Journal of Secondary Gifted Education, 16*, 87-97.

More than 350 gifted and nongifted Korean high school students participated in this study to determine the relationship between thinking styles, as outlined in Sternberg's theory of mental self-government, and scientific giftedness. Mental self-government theory suggests that the manner in which people "govern and manage their everyday activities" is analogous to various dimensions of government. These ways of governing are called thinking styles. Although individuals may have preferences for a particular style, their use is situation dependent. In this study, the researcher found that gifted Korean science students were more likely to have a preference for "creativity-generating and more complex" thinking styles that involve comparing, evaluating, and other higher-order skills, than their nongifted counterparts.

Richards, M. R. E., & Omdal, S. N. (2007). Effects of tiered instruction on academic performance in a secondary science course. *Journal of Advanced Academics, 18*, 424-453.

Tiering has long been recommended as an appropriate instructional strategy for gifted learners in heterogeneously grouped classrooms. Using a sample of 293 freshmen enrolled in general science classes at one high school, this study sought to measure the effects of tiered instruction on academic performance. Seven classes serving as the control group received middle level instruction, while another seven classes received tiered instruction commensurate with their level of background knowledge. Tiering proved to be most successful for students in the lower background knowledge group. Not only were their posttest scores significantly higher than the lower background knowledge learners in the control group, their scores were nearly equal to those in both the control group and the midrange background knowledge treatment group.

Ziegler, A., Finsterwald, M., & Grassinger, R. (2005). Predictors of learned helplessness among average and mildly gifted girls and boys attending initial high school physics instruction in Germany. *Gifted Child Quarterly, 49*, 7-18.

Learned helplessness describes a behavior that develops when adverse outcomes negatively impact a person's perception of their ability to attain positive outcomes, regardless of their own actions. This study investigates the explanations and predictors of learned helplessness, as well as its relationship to gender and talent level. Participants were 392 German high school students enrolled in their first physics course. The researchers found that helplessness increased in both boys and girls over time, although girls were more likely to experience a sense of helplessness. Higher levels of giftedness showed lower levels of helplessness which suggests that giftedness may serve as a protective factor against helplessness.

Creativity in the Classroom: An Interview with Michael Clay Thompson

by Dr. Sue Henshon

Michael, how did you decide to write curriculum for gifted students?

I was hired to teach English at a junior high school, but no one told me that three of my classes were identified gifted. Two days before school started, a colleague asked me what I was going to do in my gifted classes. I said, "My what?" I didn't even know what she meant. I began a struggle to understand the needs, to get certified, and to develop lesson plans that would be right for those students. Eventually, a professor, Dr. Julie Long, told me to get my lesson plans published-something that would never have occurred to me.

How does your knowledge of creativity theory affect your writings?

I studied creativity theory as part of my Masters program in gifted education, and it immediately had a strong effect on my teaching. It changed the way I developed questions. It led me into a far more open-ended approach to content. It helped me explain the thinking stage of research papers to students. I was especially drawn to the Wallas model: preparation, incubation, illumination, and verification. The model is simple but valid, and helps explain many crucial things; it is especially important for students to learn about the need for incubation. Dr. Zoa Rockenstein once said to me that incubation feels like failure; it does, and realizing that this difficult stage is normal, that it is good, that great ideas don't just pop out on demand, that you must give yourself time to read and think and read more...this is so important. I also taught my students the rules of brainstorming, and had them practice it.

You are very interested in the poetics of literature, and this theme is evident in many of your books, particularly the series about Thomas Jefferson, Abraham Lincoln, and Martin Luther King Jr. How did you become interested in writing these books?

I wanted a way to put language arts to the test and thereby prove to students that language arts is the core of all content, that if they are great at language arts, they will be better at everything else too. I kept thinking about how there were three documents that share the same sentence: “All men are created equal.” I decided to apply language arts in an interdisciplinary way, analyze those documents with grammar, poetics, writing elements, vocabulary, and see if such an analysis would be worthwhile. It proved to be powerful beyond my wildest expectations. The language of the Gettysburg Address is amazing, a ten-sentence university education. Lincoln was an alpha genius.

What inspired you to write *The Word Within the Word*?

It was like an epiphany. I was reading a research study, and it said that if you knew the 100 most common Latin and Greek stems in English, that as a result you would have a knowledge of 5,000 words. The more I thought about it, the more sense it made. I wanted to use that idea to develop a vocabulary program to teach the high end of scholarly English vocabulary, but I wanted to build a program that was not just memorization, one that applied all of the great thinking skills to the great content. I only viewed it as lesson plans; it was Julie Long who told me it was a book. It was her active mentorship that opened the world of writing to me.

You often describe Abraham Lincoln as a poet. How does he bring poetry into his political speeches?

Abraham Lincoln was a poet, ballad stanzas mostly, long before he was a president, and when he wrote the Gettysburg Address, he used classical techniques of poetry to lift his speech to the highest power. In the Address he used iambic meter, hidden rhyme, assonance, and other techniques to make those ten sentences communicate.

Your work, Classic Words, has been well received. How did you come up with the idea for this project? How long did it take to bring this project to fruition?

Classic Words is my research database of the rigorous vocabulary that appears in the classics of British and American literature. For years I kept wondering if there really were certain words that students had to know. I bought a computer and a database language and learned to write the language, and began analyzing the rigorous vocabulary of the classics. I would enter the word, its sentence, the author, title, and so forth, for every big word on every page of, for example, *Frankenstein*. More than a decade later, I have 35,000 entries from over 140 books, and I have found that there are indeed words that are required knowledge, such as countenance, visage, manifest, odious, serene, grotesque, and so forth.

How did you decide to write *Classics in the Classroom*?

I always had my high school students read two classics per term outside of class, in addition to any titles that we were reading together. The students had to have a talk with me about each book they read. They were always asking me for title suggestions. Eventually, I tried to put together a list of 100 great titles for them. After lots of thought, I printed out a list of 100 titles, in large font, and put it on the classroom wall. Then they wanted more titles, and they wanted information about the books. In time, a document for students evolved into a book. Almost everything I have written arose from the classroom context, the experienced need of the students. I don't think I could have become a textbook writer if I had not first been a classroom teacher for several decades; there are too many things that only teachers know.

What projects are you currently working on?

I'm writing a series of six practice books that go with my other books but that give teachers more assignments to use. Each book is 100 pages long; each page has a sentence, with the grammar analyzed at four levels (parts of speech, parts of sentence, phrases, and clauses), and in each sentence there is a vocabulary word (or more) from the corresponding vocabulary book. Poetics and writing techniques are also featured in each example. I'm also writing a series of books about writing; I finished one on the sentence and one on the paragraph, and I'm working on the next one about the essay.

Continued on page 16, Annotated Bibliography

Join us at the National Curriculum Network Conference

March 5-7, 2008

to celebrate the Center for Gifted Education's 20th Anniversary.

Keynote Speakers

Joyce VanTassel-Baska, The College of William and Mary

&

Karen Rogers, University of St. Thomas, Minnesota

Creativity in the Classroom

(cont'd from page 15)

Additional Comments

I think that we, as teachers of gifted children, are especially fortunate to work in a field that is rich in powerful theory and research. My exposure to the great texts in the field and to hundreds of research articles completely transformed my classroom practice. As I wrote dozens of papers in my graduate gifted program, I found myself, in a sense, face to face with the great thinkers in the field, such as James Gallagher and Joyce VanTassel-Baska, Paul Torrance and Barbara Clark. After my close encounter-through their books and articles-I was never the same again. I did not teach the same way, did not lecture the same way, did not give the same assignments, did not create test essay questions the same way. Everything was lifted to a higher level. Eventually, I actually got to know some of the figures who influenced me most, and I discovered that our field permits that; you can find yourself in a conversation with someone whose knowledge is immense, world-class, and it magnifies your professional life. I would encourage every young teacher to join the National Association for Gifted Children (NAGC), to focus on the quality of curriculum, to read extensively in the field, to begin presenting at conferences and to participate in this challenge of meeting these serious needs that gifted children have.

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Michael Thompson, who, through his teaching, his books and presentations, has inspired thousands of students and educators with a new love of language and literature, was a classroom teacher, middle school head and academic, over a period of thirty years. He is now a full-time author and consultant, and an acclaimed speaker and workshop presenter.

He serves on the Board of Directors of the National Association for Gifted Children and is an instructor in the internet Learning Links program for Northwestern University. He has been a faculty member of the Wake Forest University Summer Institute for Gifted Education, also the University of North Carolina/Charlotte Summer institute for Gifted Education and The Cullowhee Experience. He has served on the Board of Directors for the North Carolina Association of Gifted & Talented and on the regional Board of Advisors to the North Carolina/South Carolina Future Problem Solving Program. He has been consultant to the Center for Gifted Education at the College of William and Mary, consultant and Lead Scholar for the National Javits Project for Language Arts, and President of the Indiana Gifted Association. Michael Thompson's materials may be purchased through Royal Fireworks press. (http://www.rfwp.com/mctbiog.php)