Systems Newsletter

Center for Gifted Education
The College of William and Mary

Fall 2004 Volume 13 Number 1

Online Support for the Self-Regulated Learning of Gifted Students

Gifted learners have several characteristics which make them especially good candidates for the use of educational technologies at all levels of learning. Many of these learners are independent in their learning preferences, often not liking to work in groups or preferring to tackle a different topic or problem than the rest of a group. Clearly, the use of online tools, resources, and services offers an optimal match to this style of learning as well as gifted students' preference for complexity and novelty in the learning experience. Students can choose topics, researchable questions, modes of exploration, and models for representation of ideas with the assistance of varied online tools, resources, and services.

A desire to make connections in order to understand a difficult problem is another key characteristic of gifted learners. They love to explore cause and effect relationships and to delve deeper into the "why" of a particular phenomenon. This characteristic of curiosity is present in very young gifted children as well as gifted adults. What better tool to help them to make such connections — many of which are inspired by extracurricular learning experiences — than the Web, which hypertextually links learners to interrelated topics and issues?

Another characteristic of note in gifted learners is their preference for complexity. Not only can they think abstractly at earlier ages than their age peers; they can also engage in more complex thinking, using multiple higher order skills in their learning processes. Teacher-developed scaffolding that ensures an emphasis upon higher levels of thought in the context of resource choices may help gifted learners to explore complex topics in project-based formats. Thus students can engage in analysis, synthesis, evaluation, and creation of a product of choice. Moreover, they can conference with their teachers by email about the project, set and revise timelines for completion of project components, and

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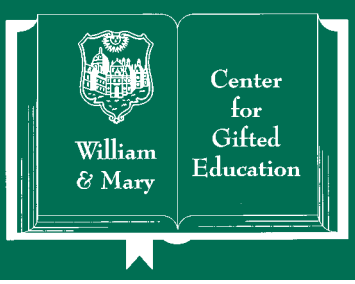

From the Editors

We would like to welcome you to the second in a series of *Systems* that address themes in gifted education from multiple perspectives. This fall issue focuses on appropriate uses of technology with gifted learners.

The first article, co-authored by the Center's Executive Director, Dr. Joyce VanTassel-Baska, and Dr. Judith Harris of the College of William and Mary School of Education, describes how several online tools can support the self-regulated learning of gifted students. Dr. Harris is the Pavey Family Chair in Educational Technology and has been active in the field of educational technology since helping her sixth graders learn with BASIC, Logo, and Bank Street Writer nearly 25 years ago. The second article, by Bess Worley II and Dr. Catherine Little, former Visiting Assistant Professor in gifted education at William and Mary ,addresses ways to help teachers of the gifted incorporate technology in their curriculum planning and instructional strategies. Bess is a third year doctoral student with a background in K-12 music education with interests in technology that include maintaining the Center website. The third article is written by another one of our doctoral students, Tamra Stambaugh; it shares several practical considerations for the use of technology with gifted learners. Tamra has served as a teacher of the gifted in pull-out and inclusionary settings, as coordinator of gifted programs for a local school district, regional consultant of gifted programming for ten school districts, and currently serves as adjunct professor for master's level gifted courses at Muskingum College in Ohio.

We continue some of the new features in these theme-based *Systems* that we began in the spring 2004 issue. The first is an annotated bibliography and list of recommended readings centered on the theme of the current issue. The purpose of the bibliography is to serve as a resource of research-based and theory-related publications related to the use of technology in curriculum and instruction, and to enhance student learning. In this issue, we decided to substitute more content in place of the book review, as well as include links to websites that can be used to integrate technology into curriculum development and planning. Finally, information about current events and the current status of the various foci of the Center for Gifted Education at the College of William and Mary is still included.

We hope that you continue to be enriched and enlightened by the new format of *Systems*. We strive to continue the high level of content provided by this publication as well as the depth of information and insights that our readers have come to expect. Please take a moment to complete our survey about the new format of *Systems* by visiting http://cfge.wm.edu/publications.php, and selecting *Systems* Newsletter from the list at the top of the page, and then clicking on the appropriate link under Fall 2004 issue. We appreciate your feedback and suggestions as we work to honor and support the lifelong development of talent in students, families, and professionals.

From the Executive Director

Dr. Joyce VanTassel-Baska

The following are excerpts from my remarks at the special luncheon conducted for graduating gifted education students and faculty, held on May 14, 2004 in the Wren Building on the campus of William and Mary.

An old friend who was visiting from California brought me a book called *Credo* by William Sloane Coffin, a former chaplain at Yale and Williams College, best known as an anti-war activist in the Vietnam War era. His "credos" made me think about my own, especially as a gifted educator.

1) I believe that this society must nurture all talents, must acknowledge that its national security hinges on helping all students develop knowledge, skills, and attitudes to the levels possible in relevant domains. Plato said "What's honored in a country will be cultivated there." We have superior athletes and inferior linguists and politicians, with freedom and virtue perceived as separate phenomena. These areas, however, must include international currency – not economics but rather language and diplomacy, two areas of great need in American society. We are one of very few countries in the world that does not systematically prepare its youth in two languages from first grade on. Moreover, we offer courses in history, politics, and economics as if they are separate disciplines rather than interconnected understandings in a global society.
2) I believe in teaching gifted students how to think and reason, not to make them more clever but to make them more aware of the processes necessary to make good choices in the world and to understand the consequences of making bad ones. We have become a world of options – from buying a car to choosing financial plans. We also have become a world where choice-making is not between "better and best" but between "less and least." Deciding to go to war and deciding to provide a hollow drug prescription plan rather than offer universal care are two examples of these "lesser" choices. The choices we make define us as people as well as nations and reveal the extent of the use of our analytical powers.
3) I believe that we must be proactive in promoting balanced development in gifted learners and in ourselves – developing the cognitive skills necessary to be effective in chosen professions but developing the habits of the heart as well - the ability to empathize, to care, and to love. These qualities are undervalued in our curriculum and in our program of studies and clearly overshadowed by the needs of the moment in daily life. The twin tensions of challenge and support must co-exist in order for such balance to sustain itself in educational contexts.
4) I believe we must develop habits of mind in gifted individuals that will prepare them well for the real world as well as the worlds they can create. Complexity, flexibility or nimbleness of thinking, and tolerance for ambiguity must be cultivated if we are to avoid the easy answers, the comfortable lies, and a herd mentality.
5) I believe that our capacity to act has always outstripped our understanding of its consequences. Tempering action with judgment is a crucial process for all of us in education. We have to look no farther than No Child Left Behind or the state assessment translation of standards to see the limitations in taking broad-based actions without foreseeing the consequences. If all administrators and politicians were forced to work through the Paul reasoning model, we all would be better off as time would be spent on making valid inferences from data and judging consequences and implications for all stakeholder groups on a short-term and long term basis.
6) I believe that we must develop a continuum of services and support for gifted learners in this country that begins with signs of advanced development and proceeds through elder hostel learning opportunities. We need to have available a menu of options that includes programs for talent development but also psycho-social services for support including counseling, guidance, and career development and that we include, not exclude, the top students from all racial and ethnic groups and from the lower socio-economic levels as well. In this ideal educational world, the search for multiple talents and their development would be taken as seriously as the grooming of athletes through Little League or tennis camps.
7) I believe we must embrace the major research findings of the past not only as a part of our history but also as an ongoing part of our current practice and future work. The IQ test will continue to have viability in

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identification as will other standardized measures even as newer tests and approaches emerge that will enhance our ability to identify talent. The role of acceleration in developing talent will continue to dominate our understanding and service to gifted learners, despite its unpopularity with educators. Technology availability will make fast-paced and self-paced learning the modes of choice for many gifted learners from early childhood on. Colleges never have cared much about the starting age for learners – high school today by eleventh grade is early college, with the provision of Advanced Placement (AP), International Baccalaureate (IB), and dual enrollment opportunities. Grouping practices too will survive out of necessity as we see the need for greater flexibility in organizing students to achieve learning goals.

8) I believe we must value depth over novelty in our approaches to teaching and learning. In a world of ever-expanding knowledge, we must be responsible for "postholing" – providing students important mental schemas that capture the nature of disciplines, their concepts and tools, at the same time we provide a few select discrete experiences that illustrate the real world of that discipline or field. In education, case studies and problem-based learning (PBL) are strategies to provide such understanding at a discrete level while concept maps are ways to grasp the bigger picture. We can provide students with the functions of administration through the mnemonic POSCORB model (i.e. planning, organizing, staffing, coordinating, reporting, and budgeting), but they come to understand it through a PBL episode that forces depth of understanding and complexity in finding solutions.
9) I believe that "finding patterns of fit," and "making connections" are the essence of one's work as a gifted educator. Recognizing how to create a niche yet how to connect to the work of general education and special education to our own is crucial to being successful in today's school settings. We must both "stand out" and "fit in", the true exercise for tolerating ambiguity.
10) Finally, a comment on credos in general: I believe that commitment to life goals that are consonant with your values and beliefs is central to meaningful success in life. I wish that all of you leave this program with a set of credos by which you will do your work in this field – a blueprint for experiencing the *summum bonum* in life. You leave here with a toolkit to make that possible. There is a Zen paradox that suggests we may lack everything yet want for nothing. The reason is that deep inner peace comes in the release from the power of desires in the face of a larger reality – in your case service to gifted children and the field that nurtures them.

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Our two doctoral graduates in May, 2004, have already made important contributions to the field of gifted education.

Ellen Fithian has distinguished herself as a parent advocate of highly gifted children. For years, she worked as a volunteer with the Poquoson School District, creating surveys and conducting studies on relevant education issues in order to advance the cause of gifted education. Ellen came into the EPPL-Gifted program already well-schooled in research, having had a former career as a dermatologist but as a career-switcher eagerly embraced this new world of education. She won the Galfo Award in the School of Education last year for her research prowess, including institutional research studies here at William and Mary on the college program of students coming with high numbers of AP or dual enrollment credits and on the use of the Scholastic Aptitude Test to predict college success. Over the past academic year she has served in a post doctoral position in the Center for Gifted Education as Director of Precollegiate Learner Programs. Her dissertation was "The rate of AP Exam-taking Among AP-Course Enrolled Students."

Kim Chandler came into the doctoral program as a classroom teacher and is exiting it in her second administrative job seven years later, attesting to her ability to broker her program experiences into real world career mobility. She is currently the Curriculum Coordinator at the Center for Gifted Education. Kim received her undergraduate, master's, and now her doctoral degree from the College of William and Mary. She has brought wonderful skills to her work in gifted education – a desire to excel, a desire to make a difference, and the perseverance to make things happen for herself and those around her. She is chair of the Professional Development division of the National Association for Gifted Children (NAGC) and newsletter editor of the Virginia Association for the Gifted (VAG). She is an active presenter and writer in the field with the publication of an article from her dissertation as a next important step. Her recent awards include the NAGC Doctoral Student Award and the Hollingworth award for outstanding dissertation research. Kim's dissertation was "A National Study of Perceptions of Curriculum Policies and Practices in Gifted Education," a study on which the work of the Center and NAGC will draw in the future.

Students graduating from the master's program in gifted education in May included both full time and part time students, some continuing in their

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Center for Gifted Education
announces

The Tenth Annual National Curriculum Network Conference

March 7-9, 2005

Preconference: Monday, March 7
Conference: Tuesday - Wednesday, March 8-9
University Center
College of William and Mary, Williamsburg, Virginia

Featuring

Richard Paul
Foundation for Critical Thinking

Joyce VanTassel-Baska
Center for Gifted Education

Rena Subotnik
American Psychological Association

Del Seigle
University of Connecticut

Michael Thompson
Educational Consultant

Ann Robinson
University of Arkansas Little Rock

Executive Director

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professional roles and others beginning their teaching careers.

Wilma Sharp, a teacher at Clara Byrd Baker Elementary School here in Williamsburg who was selected as a Teaching Fellow by the gifted education program in 2001.

Florence Lee was a teacher at Raffles Boys' School in Singapore. Flo was with us for two years and worked as a graduate assistant in the Center for Gifted Education. She has been accepted into the doctoral program in gifted education at Columbia University.

Ai Lian Chee is a curriculum specialist for primary social studies in the Ministry of Education in Singapore, a position she returned to in June.

Kristen Sharp came to us from New York with a secondary mathematics background. She will work as a mathematics teacher at Bruton High School in York County where she will also coach volleyball. Kristen worked as a graduate assistant in the School of Education during her time at William and Mary.

Julie Thompson is also a New York native with a background in secondary mathematics. She worked at the Center for Gifted Education for a year with primary responsibility for the Focusing on the Future conference. Julie has returned to New York as a mathematics teacher and soccer coach at Tamarac Secondary School in Troy.

Katie Andrews received the inaugural Master's Level Award for Excellence in Gifted Education from the School of Education. She is now a third grade teacher in one of Fairfax County's full-time gifted centers. While at William and Mary, Katie worked as a graduate assistant in the central office for York County Public Schools.

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confer with other students as they are learning. The teacher, in turn, can provide question probes for deeper exploration and ensure that the resources explored encourage consideration of multiple perspectives upon the topic being investigated.

The characteristic of creative thinking is also central to the makeup of gifted learners. These students many times have greater fluency of expression, flexibility in thinking, and elaboration of ideas than do same-age peers. Original thought emerges from the capacity to ruminate in unique ways as well as at deeper levels with reference to an area of inquiry about which gifted students have considerable knowledge. Thus the use of multiple and varied educational technologies with the gifted can provide an important toolset for encouraging creative expression and self-generated learning products.

The exploitation of these characteristics of the gifted for learning requires flexible use of time and resources. Gifted students have the potential to advance their learning exponentially if technology can be systematically and supportively applied to the learning process. Yet teachers and parents are the gatekeepers to making this intention a reality for the gifted. They must see themselves as facilitators of individual learning rates, styles, and levels. They must be comfortable with moderating differentiated learning agendas and outcomes as long as standards are met. They must be able to scaffold the skills of learning to higher levels and beyond the standards in order to accommodate the gifted. Thus teachers and parents are key to changing learning structures to favor student-centered approaches and to respond to more individualized learning needs. (VanTassel-Baska, 1998; 2003)

Self-regulated Learning

The idea of self-regulated learning for the gifted has deep roots in Bandura's self-efficacy research (Bandura, 1989; Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003) and Csikszentmihalyi's intrinsic motivation theories about gifted learners (Csikszentmihalyi, 1996; Csikszentmihalyi, Rathunde, & Whalen, 1993). Many models of curriculum for the gifted also include major emphases on project-based or problem-based learning approaches (i.e., Gallagher & Stepien, 1996; Gallagher, Stepien, & Rosenthal, 1992; Renzulli & Reis, 2003). Such models are typically characterized by the following features:

1. The learning is student-centered, based on aptitude and interest.
2. The problem or topic of interest is ill-defined or ill-structured.
3. The learning requires application of multiple higher-level thinking skills.

"Gifted students have the potential to advance their learning exponentially if technology can be systematically and supportively applied to the learning process."

4. The process for problem solving is unclear (i.e. students cannot use predetermined algorithms to solve problems).
5. Access to multiple types of resources is essential to support effective learning.

The prototypical example of the use of technology for self-regulated learning is structured learning opportunities such as online coursework. Participation in online courses can help to develop deeper content knowledge, as well as providing broader applications for that knowledge. For the highly accelerated student, many universities utilize online courses to facilitate learning at more advanced educational levels. For example, Stanford's Education Program for Gifted Youth ("EPGY;" www-epgy.stanford.edu) developed courses for gifted learners delivered with a combination of CD-ROM-based content and online or telephone-based individualized assistance. Other universities allow students of high-school age and younger to attend online lectures or earn credit in correspondence courses. Many gifted learners wish to accrue college credits while in high school either to speed graduation or demonstrate their capacity to handle rigor, a key requirement for admission to many selective universities. For example, Advanced Placement ("AP;" e.g.; www.pen.k12.va.us/VDOE/Technology/VAPS.html) courses are now available on-line through selected educational agencies, including universities.

Web Support for Self-Regulated Learning

As an alternative to structured online coursework, a host of Web-based activities and resources can be exploited in learner-centered inquiry. Twenty different types of learning activities that make worthwhile use of what can be found and done online have been identified to date (Harris, 1998 & 2005). Of these, the following three seem to be among the most appropriate for use in gifted students' self-regulated learning.

1. Web-based topic exploration

One of the most popular ways to scaffold students' self-regulated problem-based inquiry is with teacher-developed WebQuests (webquest.sdsu.edu/webquest.html), which are "inquiry-oriented [activities] in which most or all of the information used by learners is drawn from the Web." WebQuests are designed to "support learners' thinking at the levels of analysis, synthesis and evaluation" (webquest.sdsu.edu/overview.htm). Yet many WebQuests are structured for use only by groups of students in classroom-based situations, and often are more heavily scaffolded than many self-

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directed learners need. Rather than selecting such predetermined paths through subject matter, gifted learners may benefit more from allowing their own emerging questions and interests to guide their learning. To do so, they should use a combination of online indexes, search engines, question-and-answer sites, and telementoring services.

As you probably already know, there is an abundance of information available via the Web. Educational sites that prescreen this information for content and reading levels appropriate for children and teenagers are becoming more common. Notable among these are, for example, indexes such as Library in the Sky's Student Home Page (www.nwrel.org/sky/index.asp?ID=2), B.J. Pinchbeck's Homework Helper (school.discovery.com/homeworkhelp/bjpinchbeck/), Fact Monster (www.factmonster.com), and search engines such as those found at Yahooligans (yahooligans.yahoo.com) or Ask Jeeves for Kids (www.ajkids.com). Self-regulating learners can use the searching and indexing features at these sites to find answers to many of their content-based questions.

Inevitably though, gifted learners will ask questions that can't be answered fully by using one of these sites or searching the Web with a filtered search engine such as Google's SafeSearch (www.google.com/help/customize.html#safe). Substantive answers to more complex or emerging questions may require, instead, either sustained or short-term interaction with subject matter experts. A convenient way to do this is via email or a Web-based discussion forum.

Yet in seeking to help gifted learners to communicate with subject matter experts, there is an instructional decision to make. Will responding to the student's query in a way that s/he will understand require an extended or a brief online conversation? Is it likely that an expert's response will inspire many more follow-up questions—or will this exchange be short-lived? How teachers and parents respond to these questions will suggest whether to suggest that a self-regulating learner consult a telementoring service or a question-and-answer site.

2. Question-and-answer exchanges

For students who are simply in search of an answer to a question or an explanation of a phenomenon, a question-and-answer activity might be most appropriate. These are usually quite brief in duration, lasting for only one or two conversational turns.

Question-and-answer activities often make use of "ask-the-expert" online services. Pitsco, Inc., has organized more than 300 such services into an index (www.askanexpert.com), making it much easier and more efficient for learners to find appropriate places to get their questions answered. The Ask an Expert site categorizes question-and-answer services into 14 subgroups (e.g., science/technology, health, arts, law). It also provides a search engine to help visitors locate and link to the service best suited to answer the question at hand—whether it is Ask a Volcanologist, Ask a Venture Capital Expert, Ask a Veteran, Ask a Veterinarian, or another service on the site's ever-expanding list.

The Center for Improved Engineering and Science Education (CIESE) at Stevens Institute of Technology has compiled another helpful index of ask-an-expert sites (k12science.ati.stevens-tech.edu/askanexpert.html) that organizes question-and-answer services by broad curriculum areas, such as "Science and Math" and "History and Social Studies."

While many question-and-answer services serve learners of all ages, others are designed specifically with primary through secondary learners in mind. Sponsored by Washington University's Medical School in St. Louis, the Mad Sci Network (www.madsci.org), for example, "collective crania of [more than 700] scientists answering questions in many areas of science," offers an Ask-a-Scientist service with K-12 students in mind. The site offers a database of thousands of already-posed-and-answered questions that visitors are encouraged to search before sending in science-related queries that have not been posed previously.

Other question-and-answer sites offer similar collections of previously posed questions. Notable among these are How Things Work (howthingswork.virginia.edu/home.html), Ask Dr. Universe (www.wsu.edu/DrUniverse/), and Go Ask Alice (www.goaskalice.columbia.edu/). These collections of questions and answers should be consulted as the Mad Sci Network organizers have suggested: before sending in a question for an expert to answer. This is to ensure that participating experts are not asked to answer similar questions multiple times, and so that users get the information they're seeking as quickly as possible.

3. Telementoring

There are now more than 605 million people worldwide with access to on-line information and computer-assisted communication (www.nua.ie/surveys/how_many_online). Many of these millions are subject matter specialists whose knowledge encompasses a wide spectrum of expertise in many content areas of interest to gifted learners. Telementoring efforts, such as the International Telementor Program (www.telementor.org), CyberSisters (www.cyber-sisters.org), and the Electronic Emissary Project (emissary.wm.edu) bring volunteers from this group into contact with K-12 learners virtually to communicate directly and longitudinally with students who are studying about the experts' specialties.

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According to a set of recently-released national guidelines, telementoring – also called "E-mentoring"

- Is a caring, structured relationship.
- Focuses on the needs of the mentored participants.
- Adds value to the lives of those involved.
- Uses technology to connect people across time and/or distance.

(Source: National Mentoring Partnership, "Elements of Effective E-Mentoring Practices," http://www.mentoring.org/common/effective_ementoring/effective_ementoring.adp?Menu=nav_left_run.adp&Preload=resources)

Telementors typically communicate with students over time, both asking and answering questions as they guide students' learning and thinking in a particular discipline. Telementors can also help learners to explore career options in a personal and active way, as they do in online efforts such as icouldbe (www.icouldbe.org), iMentor (www.imentor.org), and NetMentors (www.netmentors.org). Though the operational details of telementoring differ from project to project, typically, communication continues for months, semesters, or years—and is often characterized by genuine interpersonal connections forming between mentors and learners.

Matching Web-based Resources and Activities to Learning Needs

It is particularly important for us, as educators, to help gifted students understand which kinds of online resources—content indexes, search engines, question-and-answer sites, or telementoring services, are most appropriate to consult for each type of question they have at each stage of their self-regulated learning.

If a thorough search of content indexes and "safe" search engines do not yield the type or depth of information that a gifted student seeks, question-and-answer services should be consulted – first to see if they have information stored from previous queries that can satisfy the student's curiosity. If not, then a question can be offered through an appropriate Q-and-A service. Answers from experts may spawn more questions, and a few can usually be posed as follow-up questions to the same service. More than a few probably require a longer-term and more in-depth interaction with a subject matter expert – an online, content-related mentoring relationship.

In exploring topics of interest, gifted learners often do not need the sophisticated level of understanding offered by a subject matter specialist. Telementoring services are not meant to be used interchangeably with content indexes or question-and-answer services. They should not be gifted learners' first (or second) stop when looking for information. Instead, they should be consulted when a content-related question is complex enough to warrant a direct and interactive response from someone very knowledgeable in a particular subject area. The question should be interesting enough for a student's curiosity to be sustained over time and through multiple interactions with a knowledgeable and communicative mentor.

Conclusion

The match of Web support for the self-regulated learning needs of gifted students is a critical one. This article has begun to explore key opportunities and strategies for deliberately forging such connections. The roles of teachers and parents as facilitators in this process can enhance the overall goal of such learning: to spur student interest to new levels of original and creative work.

by Judi Harris, Ph.D. &
Joyce VanTassel-Baska, Ed.D.

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Dr. Judi Harris, Pavey Family Chair in Educational Technology

Curriculum Activities Update

Curriculum development and dissemination represent one of the Center for Gifted Education's five main goals, and projects related to curriculum support all of the goals and the central mission of the Center. We are pleased to provide an update on our progress and to introduce some of our new efforts.

William and Mary Navigators

In the spring of 2003, the Center initiated a new curriculum development project in the language arts: the William and Mary *Navigators*, which are designed to support teachers and students in the study of selected novels. Each *Navigator* is designed to be used as an instructional tool by a teacher or as an independent study guide by a student or group of students. Several of the William and Mary teaching models are incorporated in each *Navigator*, as well as higher order questioning, activities, and research opportunities, which provide wonderful options for advanced readers to develop their skills in the analysis and itnerpretation of literature. *Navigators* are currently available for the following books:

The Call of the Wild by Jack London
Charlotte's Web by E.B. White
The Dark is Rising by Susan Cooper
The Day They Came to Arrest the Book by Nat Hentoff
The Egypt Game by Zilpha Keatley Snyder
Everything on a Waffle by Polly Horvath
Hamlet by William Shakespeare
Henry IV, Part I by William Shakespeare
*Number the Star*s by Lois Lowry
Sarah Bishop by Scott O'Dell
Sarah, Plain and Tall by Patricia MacLachlan
Snow Treasure by Marie McSwigan
Summer of My German Soldier by Bette Greene
Tuck Everlasting by Natalie Babbitt
Walk Two Moons by Sharon Creech

Additional *Navigators* are being developed and titles will be posted on the Center's website as they become available. Plans for gathering data relative to the implementation and format of the *Navigators* are being made. If you have purchased Navigators, we would appreciate your feedback when you receive a survey from us.

Center for Gifted Education Web Site

Please check out the *Curriculum* link on the Center's web site (http://cfge.wm.edu/) for information about curriculum materials, their use, and related resources. The William and Mary Teaching models are available on the site, as well as ordering information and other resources related to the Center's curriculum.

Revisions of Existing Materials

Social studies units developed under the Arthur Vining Davis Foundations grant will be prepared for publication by Kendall/Hunt in 2005. The problem-based science units are also currently being revised to reflect advancements in science and technology. In addition, features are being added that will allow for greater interdisciplinary connections. The revisions will continue in 2004 – 2005, with publication occurring in mid-2005.

Development of New Materials

The development of mathematics mini-units was initiated during 2004 and will continue with piloting efforts and revisions prior to publication by the Center. These units are being developed to supplement existing math curricula and provide appropriate enrichment experiences for high-ability students, and are aligned with national mathematics content standards.

We are pleased with the possibilities that all of these projects represent for strengthening curriculum and instruction for gifted learners. Contact the Center with your questions or inquiries regarding training opportunities for teachers and administrators.

Executive Director

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George Fohl is an eighth grade science teacher at N.B. Clements Junior High School in Prince George County, VA. While pursuing his Master's degree, George also took on the role of gifted coordinator for his school. He will continue in both roles after his graduation from William and Mary.

Melodye Hughes works as the gifted resource teacher and mathematics specialist at Patrick Copeland Elementary School in Hopewell, VA. Following completion of her Master's degree at William and Mary, she is immediately embarking on another program to further her expertise as a mathematics specialist.

Center Announcements

Congratulations to our own **Dr. Elissa Brown**, Director of the Center and Project Manager for Project Athena. Elissa will receive the *NAGC Early Leader Award* at the annual convention held this November in Salt Lake City, UT. Dr. VanTassel-Baska shares, "Elissa has accomplished so much in her time here in Virginia—at the College and statewide. Her leadership skills are very strong as attested to by the roles she has held and the organizations she has positively influenced. Her administrative talents have impacted Virginia's Governor's Schools, the Virginia Association for the Gifted, the Virginia Advisory Committee for the Education of the Gifted, our Center, and the school districts with whom she has worked closely as well as those who participate in Project Athena. She is a credit to our program."

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The beginning of a new academic year always brings an air of excitement for opportunities to come while we reflect on the changes that have brought us to where we are today. This year is no different as we welcome new staff and students and bid a fond farewell to those who have been a vital part of our program in gifted education.

Dr. Catherine Little, who served as Visiting Assistant Professor in Gifted Education for 2003-2004, is now Assistant Professor in Gifted Education at the University of Connecticut. Prior to serving as a Visiting Professor, Catherine served as the Curriculum and Program Development Coordinator for the Center from 1999-2003, and was also an adjunct instructor during that time. Dr. VanTassel-Baska shares, "Catherine has been a cornerstone of Center work since she arrived as a Master's student. Her particular skills and abilities in curriculum development are non pareil, and she has tackled the difficult and somewhat thankless task of revising the language arts units as well as being lead developer on much of the social studies work. Moreover, this past year Catherine has distinguished herself as an outstanding teacher in our program."

Dr. Valerie Hastings Gregory has joined us as Visiting Assistant Professor in Gifted Education in the School of Education. Valerie is a graduate of the Educational Policy, Planning, and Leadership (EPPL) program, taking all of the courses available in gifted education as her cognate. Dr. VanTassel-Baska shares, "Valerie has worked at the Center for Gifted Education as initiator of the Writing Talent Search and Focusing on the Future. She has also worked extensively with the School Leadership Institute at William and Mary on a number of projects. Formerly, she was a gifted education specialist at the Virginia Department of Education. She has deep experience in designing and implementing learning experiences for adult learners and in building learning communities to increase learning. She also has written in-depth about professional development."

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We welcome the following new students to the graduate programs this year.

Doctoral Students:

Denise Drain comes to the Center with 20 years of experience teaching pre-K-8 students in Oklahoma City and Indianapolis, and she holds a master's degree in educational psychology from Ball State University. She is working as a graduate assistant with Project Clarion and Project Athena.

Joanne Funk comes from Norfolk Public Schools where she serves as the High School Gifted Education Resource Teacher. She has also served as an elementary teacher, a History/Social Science department chair at the secondary level, an adjunct teacher of the Hearing Impaired and Lecturer at Old Dominion University in Sign Language.

Joy Selberg comes to us on sabbatical from the Extended Learning Program of Salt Lake City School District where she taught in an elementary pullout program for gifted learners. She is a graduate assistant at the Center.

Master's Students:

Denise Almas graduated from the College of William and Mary in 2003 and recently taught in the Center's Summer Enrichment Program.

Suzanne Carley graduated in 2004 from Randolph Macon College with a double major in Latin and Classical Studies. She shares that she is very excited to be a part of the program at William and Mary and looks forward to working in the field of gifted education.

Katie Nason comes to the Center from Stetson University, Florida, where she completed her studies in secondary education with a specialization in social science. She will be working as a

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Considerations for Using Technology with Gifted Learners

The field of gifted education recognizes specific, optimal learning conditions for gifted students including a learner-centered focus, opportunities to explore complex and real-world problems, opportunities to pursue interests in depth, acceleration and enrichment, grouping with those of like interests and abilities, flexibility in programming and learning options, the creation of innovative products, opportunities to work at an appropriate pace, the elimination of previously mastered material, higher order thinking skills, and opportunities for independent study (Maker & Nielson, 1996; VanTassel-Baska, 1998a, 1998b; Poftak, 1998; Renzulli & Reis, 1997). Technology software, Internet use, and exposure to hardware unequivocally support these conditions and thus, differentiation for gifted learners. Technology can be used to supplement or supplant the curriculum for gifted learners through modifying content, processes, and/or products.

Figure 1 provides a list of specific characteristics of gifted learners, suggested learning opportunities, and potential technology options that support gifted learner needs. Though there are separate categories, many of the options overlap and could complement many characteristics.

Characteristics	Learning Options	Technology Modifications and Suggestions
Precocity (Advanced Content)	• Learner-Centered • Flexibility in Programming • Acceleration and Elimination of Known Content • Grouping with Like Peers • Pacing	• Computer Assisted Instruction • Distance Learning • Internet Research • Discussion Boards and Chats • Software Programs • Hardware (e.g., electron microscopes, graphing calculators) • Computer Programming
Complexity (Connections and Relationships Across Disciplines)	• Real-World Problem Solving • Grouping with Like Peers • Pacing • Independent Study • Higher Order Thinking Skills	• Simulations and WebQuests • Ask-An-Expert • Tele-mentoring • Internet Research • Discussion Boards and Chats • Software Programs • Robotics (e.g., Pitsco Lego Sets)
Intensity (Process and Product Options)	• In-depth Pursuit of Interests • Creation of Innovative Products • Grouping with Like Peers • Pacing	• Internet Research • Webpage Creation on Topic of Interest • Virtual Field Trips • Discussion Boards and Chats • Service Learning Options • Word, Data, Presentation, Publication and Product - Based Programs (e.g., Excel, Word, PowerPoint, Hyperstudio, Corel -Draw and Corel Paint, PageMaker, Publisher)

Figure 1. Technology options related to gifted characteristics and learning needs
VanTassel-Baska & Stambaugh (in preparation)

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The suggestions listed in the Technology Modification column of Figure 1 can be further categorized into content, process, and product-based options for gifted learners. Selected examples of ways teachers can utilize technology to adjust the content, processes, and products of gifted learners are discussed below.

Content-Based Options. Content-based options such as WebQuests, telementoring, and ask-an-expert sites as explained in the article by VanTassel-Baska and Harris, can easily be used to modify the content for gifted learners. Content-based curricular modifications include advanced content beyond a specified grade level. Students who have a documented understanding of content for a specific grade level could complete an online WebQuest or simulation, access advanced level content through ask-an-expert sites, or be connected with a telementoring site that provides in-depth content on a specific topic of interest. Simulations and WebQuests, specifically, provide experiences for gifted students to grapple with real world issues. For example, when studying the Civil War, students who can easily grasp the details of the Civil War could examine the causes and effects of the Civil War through an online Webquest or simulation by embracing the role of a specific stakeholder and discussing assumptions and points of view through a variety of media and online resources, thus providing advanced level content within the curriculum. Links to online simulations and Webquests can be found at the Center for Gifted Education website, http://cfge.wm.edu. When selecting simulations and Webquests, educators must consider state content standards, student readiness, and lesson-specific goals.

Ask-an-expert sites and telementoring options provide in-depth content to students and allow them to obtain timely information from knowledgeable persons in a field. Many gifted students, especially those with insatiable curiosity and intensity, benefit from ask-an-expert sites because they have direct contact with experts in the field, timely feedback, correct information from practicing professionals, and contact with someone else who shares their passion. Ask-an-expert sites could also be created by gifted students as a product option to illustrate their knowledge of in-depth content in a given discipline.

Process-Based Options. Process-based technological options encompass how gifted students obtain advanced content. While it could be argued that all of the technology-based options are process-based, this section will deal specifically with alternate processes to gather information that potentially taps in to student learning styles or preferences. The use of virtual field trips and distance learning options are two potentially effective options. Virtual field trips allow

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graduate assistant at the Center where she will serve as Coordinator for Focusing on the Future program.

Beth Anderson is a graduate of William and Mary and is currently a gifted specialist at Prince George High School in Prince George County, VA.

Susan Sharp is a secondary AP English teacher in Gloucester County Public School System.

Rhonda Taylor is a teacher of a multi-age team of fourth and fifth grade students at Botetourt Elementary School in Gloucester, VA. She graduated from James Madison University, then heard a call to teach, gained her teaching credentials from Christopher Newport University, and is now enrolled in the master's program in curriculum and instruction.

The Center is also fortunate to have new graduate assistants working with Project Clarion from areas of expertise outside of gifted education.

Elizabeth Outlaw is working with Project Clarion this year. She is in the doctoral program for Educational Policy Planning and Leadership, in the new emphasis area of Curriculum Leadership. Her prior experiences include teaching English to elementary and middle school students in France, as well as high school French, kindergarten, and fifth grade in Florida and Georgia.

Andrew Wnek is working with Project Clarion. He is from Buffalo, NY, and holds elementary and special education certification from SUNY Geneseo.

Finally, **Susan Clark** is visiting William and Mary as part of the Nancy Astor Scholarship Program for women from Plymouth, UK, who wish to study for a year at William and Mary. Nancy Astor was the first female Minister of Parliament to take a seat in the House of Commons and scholars have been attending William and Mary in her name for many years. Susan joins us in her studies in gifted education with hopes to establish a program in the secondary school at which she teaches in England.

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students to experience places and things not readily available, accessible, affordable, or timely in their particular setting. They also provide visuals for students who need to "see" things in order to make advanced learning connections to a topic of study. Museums, colleges, institutes, national parks, aquariums and zoos have virtual tours available online where students can observed select galleries and special exhibits.

As with any web-based opportunity, the virtual field-trip itself may not explicitly meet the needs of gifted learners. When considering virtual fieldtrips for use in gifted education, educators must provide guiding questions to help students make connections and add depth. For example, if students are studying art and taking virtual art gallery field trips the teacher may ask students to write generalizations regarding various art forms from different time periods based on their visits. Depending on the objective, guided questions may include a closer look at the statement "form follows function" and how that is supported or ignored in the art viewed online.

Sometimes zoo or aquarium fieldtrips allow students to virtually observe animals in their natural habitat. As with the art example, observation may not be enough. Teachers of the gifted must adjust the questions based on the outcomes to make the fieldtrips more than online busywork.

Distance learning methods are another process-oriented option for those students who are self motivated and prefer to work independently, or for those students who need advanced content that cannot be provided within the regular classroom setting. Not all students who are gifted may succeed in distance learning opportunities. Studies suggest that there are specific characteristics of successful online learners. For example, successful online learners: 1) must have access to high speed Internet and computer availability, 2) are comfortable learning through text-based methods as opposed to auditory or pictorial means, 3) are comfortable with independent learning and are proficient with self-motivation and self self-discipline, 4) possess critical thinking and self-reflective skills, 5) believe that learning can happen anywhere and at any time, including online, and 6) have the time to work on online projects and discussions on a daily basis (Palloff & Pratt, 2003). Consideration of these characteristics is important when weighing the option of distance learning for specific gifted students. Personality, learning styles and support networks are critical factors that could hinder success if ignored.

When examining potential online learning options, educators of the gifted must be extremely selective. Virtual classrooms vary in degrees and desired audiences. Educators of the gifted should seek those specifically dedicated to gifted students if the expected levels of complexity and depth are to be reached. Online instructor understanding of the unique needs of gifted and the ability to differentiate the curriculum for gifted is a non-negotiable factor. Online learning options for gifted students include: Stanford University's Electronic Programs for Gifted Youth, EPGY, http://www. epgy.org, and Johns Hopkins' Center for Talented Youth online projects, http://www.jhu.edu/gifted. Apex Learning, Inc., www.apexlearning.com, also provides online courses for secondary students (or gifted middle school students) offering a variety of content area courses including Advanced Placement courses. Though online courses may be costly ($500-$750 per student), many districts find them less cost prohibitive than providing a classroom and teacher for a course with limited enrollment or requiring specialized expertise. Distance learning options, if specifically catered to gifted students, are an excellent alternative for those gifted students, especially in schools with limited course offerings due to finances, staff availability, or demographics or for their advanced students who desire or need atypical or specialized content.

"Educators of the gifted should seek those specifically dedicated to gifted students if the expected levels of complexity and depth are to be reached."

Product-Based Options. Technology also provides multiple opportunities for students to illustrate their learning through a variety of products. Students can use software programs, drawing programs, and databases to show charts and graphs, visually depict a concept, or outline a presentation for a real-world audience. Many times educators allow gifted students to create a PowerPoint or Hyperstudio presentation, for example, and consider that a high level learning opportunity. This is not true. Product-based computer options are only used as a tool for advanced content. The use of the software programs by themselves does not exemplify advanced learning. Instead, the use of higher level questions, projects, interdisciplinary connections, and out-of-grade level content drive the type of product to be created and the level of difficulty. Product-based software is simply a tool to illustrate advanced learning and is only as good as the advanced level questions and content required.

Considerations for Programming

The technological options available may begin to redefine how gifted students are served, how time is spent in the classroom, and their exposure to available information for differentiation. There are several considerations educators must be aware of when

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utilizing technology to differentiate instruction.

1. Seek professional development. Professional development is essential to effective instruction and many educators have argued about the need for teachers to be specifically trained in web-based and Internet practices (Berger, 2000). However, the National Council of Educational Statistics [NCES] (2003) found that though 87% of public schools with Internet access offered professional development only 30% of schools had more than three-fourths of their staff attending the training. Even though educators may know how to use technology on a personal level, training for incorporation within the curriculum is still needed. Based on gifted students' characteristics and the unlimited opportunities for curriculum integration, teachers of the gifted must continue to seek professional development in technology-related curriculum options.

2. Help students evaluate Internet sites. Due to the increased use of the Internet and the freedom with which persons can publish, students must be taught how to become good consumers of Internet information. Kathy Schrock's ABC's of Website Evaluation (1999) includes considerations for examining websites, www.kathyschrock.com.

3. Use technology during the school day. Many proponents of technology cite the value of exposure for low socio-economic students. However, not all students have appropriate access. There is a "digital divide" in computer use and availability based on socioeconomic status (NCES, 2003). Many students with family household incomes of less than $35,000 per year rely only on school access for computer and Internet usage at a rate of 52% versus 26% reliance for those not in poverty. The incorporation of technology in the curriculum and the broadening of virtually-created experiences during the school day become more critical for these students. The students who do have access cannot be ignored, either. Students who have computer access at home tend to use their computer to play videogames and type homework (NCES, 2003). Therefore, structured opportunities must be presented during the school day with supervision to ensure access and exposure for all students.

4. Technology use alone is not differentiated. Educators sometimes report that they differentiate for advanced learners by allowing them to use the computer to create a product or search information. While there is a level of skill and sophistication involved, that is not necessarily differentiation. Students, regardless of ability, must not be deprived of computer access as many future careers will require the use of technology in some form. Differentiation using technology is evident through the required content-oriented tasks and questions posed. Differentiation is manifest through the complexity of the task. Technology is another process tool utilized to meet the demands of the task, acquire information, and inquire about areas of interest at more complex levels.

5. Be aware of Internet access policies. Know and teach the logistics of Internet and computer usage, safety, policies and needed permissions. Find out what your school policies are for student Internet and computer usage. Many districts now have policies that delineate appropriate and inappropriate uses of computers, privacy policies for minors (especially when using chat rooms, mentors, e-mail, or discussion boards) and require parent permission forms for under-age students to use web-based instruction. Students and teachers also need to be made aware of plagiarism. Many websites offer free, downloadable term papers, book reports, and projects for students (e.g., www.schoolsucks.com), normalizing cheating. Other organizations counter that and help educators decipher plagiarized work (e.g., http://www.turnitin.org). Protecting students and the school through specific policies, actions, permissions, and other precautions is a necessary expectation for Internet and computer-based curriculum integration.

Conclusion

In gifted education, technology can be a critical component for a teacher trying to provide access to more advanced resources and activities for gifted students. Technology is an invaluable tool to differentiate content, processes, and products. The incorporation of technology allows students to extend the regular curriculum; provides access to a greater depth and breadth of information; allows for advanced product opportunities; equips students with tools for advanced analysis; and exposes students to contests, problems, resources, and ideas not included in conventional texts (Johnson, 2000).

Technology is an integral part of our national and global culture; it supports the exchange of ideas and information, goods and services over vast distances. Educators are increasingly responsible both to prepare students to enter the global technological community and to continually improve their own technology skills. Beyond the need for technological literacy in general, technology applications in the classroom represent an important opportunity to support teachers in the ongoing struggle to provide appropriate differentiation for students of varying ability and achievement levels.

References for this article can be accessed by visiting http://cfge.wm.edu/publications.php#systems

by Tamra Stambaugh

Technology and Gifted Education: Advancing Teacher and Student Competency Through Differentiated Practice

Educators of the gifted have embraced the idea that technology can be useful in planning instruction for gifted learners since the modern technology era began in the early 1980s. However, the relationship between implementing technology as a tool for learning and the specific learning needs of gifted students has not always been clearly articulated (see Harris & VanTassel-Baska, and Stambaugh articles in this issue of *Systems*). In this article we present information about a grant that proposed to help teachers of gifted learners integrate technology into their curriculum and instruction, and indicate some key considerations in planning for technology integration, both in K-12 settings for the gifted and in graduate programs in gifted education.

In the fall of 2002, Dr. Catherine Little, previously the Visiting Assistant Professor in Gifted Education at the College of William and Mary and now an Assistant Professor in Educational Psychology at the University of Connecticut, received a faculty mini-grant from the Advancing Creative Technology (ACT2) project of the William and Mary School of Education. The purpose of ACT2 is to "produce highly competent teachers who can seamlessly integrate technology into subject matter content areas by designing, implementing, and assessing authentic, student-centered learning activities in diverse educational settings" (Advancing Creative Technologies, n. d.). The purpose of the faculty mini-grants was to encourage movement toward this goal through greater infusion of technology into graduate and undergraduate courses in the School of Education. In the gifted education graduate program, the mini-grant supported more systematic technology integration into all of the courses required for Master's level students, most of whom are currently practicing teachers or plan to work in teaching positions upon program completion, and into some of the courses required for doctoral students. Specific project components included in-class technology-based activities as well as assignments that encouraged graduate students to develop their technology use in their own practice, always with an eye to the specific needs of the population of gifted students and their families. Sample projects included reviews of on-line gifted program resources for school divisions, preliminary development of sites to support gifted students' affective needs, and the development of technology-based learning centers specifically differentiated for the needs of high-end learners. These and other technology-based assignments were piloted across several different graduate courses, with the eventual goal of incorporating such assignments in all of the courses.

"The purpose of ACT2 is to 'produce highly competent teachers who can seamlessly integrate technology into subject matter content areas...'"

In the spring of 2003, a needs assessment related to technology skills and use in practice was conducted with students registered in the Master's and doctoral classes in gifted education as well as graduates of the program from the past five years. The data from the needs assessment indicated an interest in improving personal technology skills as well as incorporating technology more effectively into instruction. Some responses described an interest in developing websites to facilitate communication with and disseminate information to gifted students and their families. A few respondents also stated that they wanted to create websites to support student access to the vast range of information available on the Internet more effectively, and to provide pathways to accelerated content for gifted learners.

The graduate students were also asked to comment on the relationship between gifted education and technology and on issues of technology and differentiation. The wide range of responses reflected the same questions that are still unanswered in the field about technology and gifted education. Issues included how technology can and should be used by all learners, how technology education should be differentiated, and whether the infusion of technology only as a product alternative (e.g., using presentation software instead of a poster) sufficiently supports student growth and demonstrates effective classroom differentiation.

Based on the needs assessment results and in alignment with the original goals of the ACT2 mini-grant, a plan was developed to incorporate technology-based assignments into the Master's program courses in gifted education beginning fall semester, 2003. Four goals were included in the program plan: (a) to integrate technology into graduate courses in Gifted Education, (b) to promote an understanding of the relationship between technology as an instructional tool and the characteristics and needs of gifted learners, (c) to explore technology as a tool to differentiate curriculum and instruction in response to the characteristics and needs of gifted learners, and (d) to promote technology as a communication tool between various stakeholders in a gifted education program.

During the 2003-2004 school year, students in graduate courses in gifted education completed a survey of attitudes, readiness, and knowledge and understanding of the needs of gifted learners and the relationship of technology to gifted education. In addition to responding to questions about their own technology skills and use, students also completed an applied section that demonstrated both their technology skills and their

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understanding of specific course content, thus providing a basis for instructional planning around both of these components within the courses. Fall semester courses, including an introductory survey course in gifted education and a course in curriculum and instruction for the gifted, explored the use of technology information and for classroom differentiation. Fall semester project assignments, as in the previous year, emphasized exploring resources available on the Internet for gifted education programs, designing websites as information sources about gifted programs and for teachers of the gifted, and developing learning centers that incorporated technology components as relevant to content areas.

Spring semester courses, including a course on socio-emotional needs of the gifted and a course in gifted program planning, facilitated the development of technology skills for the graduate students. The courses made extensive use of online discussion to promote this form of expression and communication, and projects included opportunities to use data analysis and presentation software. In order to support these technology applications, several optional workshops were offered on collecting and analyzing survey data using a spreadsheet software program. In addition, throughout both semesters, various technology applications were modeled through class activities, lectures, and out-of-class communications.

Conversations about technology use throughout the project focused on the rationale for using specific tools for specific instructional purposes, and the importance of promoting technology as a support to effective differentiation and communication, rather than using technology for its own sake. The courses attempted to build graduate students' facility with technology and to provide examples of ways to integrate technology in their own classroom settings currently and in the future. Moreover, use of online discussions as a course component in multiple graduate courses throughout the year provided opportunities for both graduate students and faculty to engage in this increasingly prevalent learning mode, enriching class discussions thru conversations beyond the classroom walls.

Ideas to Consider

There are several findings from this project that have transformed into areas of considerations for teachers and administrators who work with gifted learners, and for graduate programs serving professionals in the field of gifted education.

First, there seems to be a threshold comfort level with technology that is required for teachers to incorporate technology tools successfully into curriculum planning and instruction. Therefore, we suggest that professional development in a variety of basic software programs and multimedia design programs, with hands-on applications relevant to what teachers are currently doing with students, be one part of the plan to integrate technology in gifted education.

A second part of this integration plan is to incorporate possibilities for technology in curriculum development and the planning of curriculum and instructional strategies. If technology is one tool to advance student learning, the various options and strategies provided by technology should be considered from the initial stages of program and classroom planning. The pre-assessment for this project included assessment of the hardware and software available at each school and throughout a school district, and the responses indicated that teachers and administrators need to consider what equipment and applications are available as they plan for student learning. This planning should consider the teacher's technology skill level as well as students prior experiences with technology.

A third recommendation involves allowing for a wide variety of technology skill levels among the students. Questions such as, "What are the basic technology skills required for this instructional strategy?" should lead to various contingency activities to build or reinforce required skills. One way in which this could be accomplished is through basic pre-assessment activities that require students to demonstrate mastery of required skills. These required skills can then be taught to students through direct instruction, exploration, tutoring, peer coaching, or whichever model works best for the students.

Finally, an integration plan should include an evaluation component. Some guiding questions: What affordances and constraints does the integration of technology provide or produce? How is student learning advanced through the integration of technology? How does technology support differentiated learning experiences for students? What improvements might result from various modifications to our technology plan?

Technology is increasingly a part of our society, and technology literacy will be paramount to success in the Information Age. Many questions remain to be explored in the area of technology and its role in modifying curriculum and instruction for gifted learners, and as a tool to support gifted students effectively in developing the skills they will need. There is also a need to continue to explore ways in which higher education can support teachers as they implement technology to meet the needs of the diverse groups of students they meet in the classroom.

by Bess B. Worley II & Catherine Little, Ph.D.

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Advancing Creative Technologies. (n. d.). Retrieved September 15, 2003, from http://www.act2online.org

Annotated Bibliography: Technology and Gifted Education

While technology holds great promise for enhancing the education of gifted children, research on effective technology use with gifted learners is limited and not very current in the applications and software addressed. Therefore, studies from the general education literature that are relevant to gifted education are included in this bibliography. The first section focuses on teachers' understanding and conception of technology use in the classroom as well as how to provide teachers with appropriate and adequate training for technology integration. The second section provides a glimpse into the types of research currently related to technology and learning that can be found in the literature. The third section presents a list of relevant readings pertaining to technology use by teachers and students; several of these articles focus specifically on gifted students. Clearly, there are many avenues of inquiry that remain to be addressed in the study of technology use with gifted learners.

Professional Development

Angeli, C., & Valanides, N. (2004). The effect of electronic scaffolding for technology integration on perceived task effort and confidence of primary student teachers. *Journal of Research on Technology in Education, 37*(1), 29-43.

In this quasi-experimental study of student teachers in the primary grades and the integration of Information and Communication Technology (ICT), half of the teachers were taught scaffolding techniques while the other half were not given any scaffolding. Data were collected on the teachers' perceived task effort confidence in using ICT, and attitude toward ICT. The most salient finding in this study suggests that having student teachers work on designing and integrating activities with ICT in their methods courses will affect their future use of ICT for instructional purposes.

Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers & Education, 39* (4), 395-414.

A study of 94 classrooms in four different states investigated the impact of planning, leadership, curriculum alignment, professional development, technology use, teacher openness to change, and teacher non-school computer use on five dependent measures: teacher technology competency, teacher technology integration, teacher morale, teacher perceived impact on student content acquisition, and teacher perceived impact on student use of higher order thinking skills. This study suggests that technology integration is predicted by teachers' receptivity to change. The impact of technology on content acquisition was predicted by strength of leadership, teacher openness to change, and negatively influenced by teacher non-school computer use. And the impact of technology on higher-order thinking skills was predicted by teacher receptivity to change, the constructivist use of technology, and negatively influenced by percentage of technology use where students work alone. These findings indicate that teaching style and type of instructional activity may be related to how effectively technology is used to improve student learning.

Bebell, D., Russell, M., & O'Dwyer, L. (2004). Measuring teachers' technology uses: Why multiple-measures are more revealing. *Journal of Research on Technology in Education, 37*(1), 45-64.

This survey of approximately 3,000 K-12 teachers and subsequent analysis provides ideas for improving the ways in which teacher technology use is conceived and measured. The authors suggest the use of viewing technology for teaching and learning in multiple categories instead of as a broad, uni-dimensional concept. They also suggest focusing on how technology is being used, and identifying the purposes for technology use in the classroom.

Kozma, R. B. (2003). Technology and classroom practices: An international study. *Journal of Research on Technology in Education, 36,* 1-14.

An examination of 174 case studies from 28 participating countries provides insight as to the use of technology worldwide. This study specifically identified innovative pedagogical practices that were used to change teaching and learning practices. Findings indicate many similarities and differences in how teachers use technology in the classroom worldwide. Primarily, technology use supports the search for information, product design, and student publication of research and project results. While this study did not specifically address the needs of gifted learners, this description of international best practices suggests that managing information with technology is an important skill for tomorrow's leaders.

Grove, K., Strudler, N., & Odell, S. (2004). Mentoring toward technology use: Cooperating teacher practice in supporting student teachers. *Journal of Research on Technology in Education, 37*(1), 85-107.

This is a study of 16 pairs of mentor teachers and student teachers in the integration of technology into teaching and learning activities. The authors recommend school districts and universities provide mentor teachers with professional development sessions related to integrating technology with curriculum-based, student centered activities in order to assist the novice teachers in the same instructional strategies.

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Annotated Bibliography

(cont'd from page 17)

Technology in the Classroom

Muir-Herzig, & Rozalind G. (2004). Technology and its impact in the classroom. *Computers and Education, 42*(2), 111-131.

This causal comparative study focuses on determining if the level (low/high) of classroom technology affects at-risk students' attendance and/or classroom grades. While results suggest that technology use has no significant positive effect on grades and attendance for at-risk students, the overall use of technology was low among the teachers in the sample. These findings also suggest that schools need to plan for technology use in the classroom as part of an overall school improvement plan, including professional development, time for communication, and time for collaboration, in order for technology to be an effective instructional tool.

Roberts, A. (2004). Analyzing patterns and relationships around a bond of common text: Purposes, dilemmas, and possibilities of a virtual community. *Journal of Research on Technology in Education, 37*(1), 1-27.

This is a two-year interpretive case study investigating telecollaborative problem-based learning. The study focused on an examination of global issues by fourth through sixth grade students. The use of technology enabled participants to exchange information and ideas in a timely manner, and facilitated student learning in terms of composition, language usage, and communication. This is an example of how technology can be used to facilitate learning of concepts, themes, and real-world issues while improving communication and technology skills.

Other Suggested Readings

Gardner, H. (2000). Can technology exploit our many ways of knowing? In Gordon, D. T. (Ed.) *The digital classroom: How technology is changing the way we teach and learn* (pp. 32-35). Cambridge: Harvard Education Letter.

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by Heather French & Bess B. Worley II

The Center Announces New Javits Grant

The Center for Gifted Education (CFGE) at The College of William and Mary is pleased to announce the receipt of a new $3 million research grant from the U. S. Department of Education. The grant is part of the Jacob K. Javits Gifted and Talented Students Education Act, which was reauthorized as part of the No Child Left Behind Act of 2001, and will be implemented over a five year period.

The Center's new grant, *Project Clarion*, under the leadership of co-principal investigators, Dr. Bruce Bracken, Professor in the School of Education, and Dr. Joyce VanTassel-Baska, Executive Director of the CFGE and the Jody and Layton Smith Professor of Education, will focus on concept development in the sciences at the primary grades within an overall goal to study the "scaling up" effects of sound principles of teaching and learning. Dr. VanTassel-Baska shares, "The Center for Gifted Education is delighted to continue our important work in science curriculum development and research on low income potentially gifted learners through Project Clarion. It provides us five more years of collaborative work with school districts in three states, including five here in Virginia. Moreover, it will contribute enormously to our understanding of concept development in young children from impoverished backgrounds, an important breakthrough in education in general."

Project Clarion seeks to enhance scientific concept development among K-3

Continued on page 19, New Javits Grant

Project STAR: The Second Follow-up Study

Following two collaborative research contracts in 1996 and in 2002, the South Carolina State Department of Education continued a third grant with the Center for Gifted Education at the College of William and Mary. The purpose of this grant is to conduct a second follow-up study of the performance tasks used to identify gifted students across the state, and to track how these students pereform in the classroom.

The purpose of this new two-year research grant is to conduct a continuing trend analysis of identification profiles and performances of students who qualified for the gifted program based on their scores on the Performance Tasks (Project STAR). This study will also attempt to ascertain the differential performance of students identified through Project STAR instrumentation and those not meeting the cutoff as well as traditionally identified gifted learners. Also of great interest are the particular issues in working with the population of interest (i.e., African American and low income) as well as Hispanic and Asian students.

There are several major research objectives: a) To examine longitudinally the demographic patterns and performance trends of Project STAR students over the years (2000 -2005); b) to compare the profiles and patterns of Project STAR-identified gifted students with those of gifted students identified through traditional methods as well as Project STAR-nominated but unidentified students; c) to identify the individual student prototypes of giftedness exist within the Project STAR data set as well as unique characteristics and educational needs that typify them; d) to examine the patterns of identification and performance of low-income African-American students identified through Project STAR and those who were nominated but not qualified; e) to examine the similarities and differences for Hispanic and Asian minority groups in respect to identification and performance; and f) to identify special issues, if any, in nurturing Hispanic students identified through the Spanish version of the Project STAR performance tasks.

Through Project STAR, the Center also conducted trend analysis on the profiles and performances of the targeted gifted and nominated but unidentified population using the state-wide GIFT data set. At the same time, a heavy emphasis of the first year design focused on a qualitative in-depth examination of the cognitive, academic, and social-emotional development of the Project STAR identified gifted students. Five school districts in the state were selected for on-site case studies. The cohort of gifted students who were identified in 2000 comprised the major source for the sampling (current 7th or 8th graders). A

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New Javits Grant

(cont'd from page 18)

students in seven school districts across three states: Virginia, South Carolina, and Maryland. The research study will incorporate: randomized studies of student learning based on the curriculum intervention, classroom observations to gain insight into the mechanisms of concept learning, curriculum development in science and math, and professional development sessions and assessments for teachers and principals. The Bracken Basic Concept Scale, one of three pre-test instruments, will be used to assess students' incoming levels of concept development and the William and Mary Problem Based Learning science curriculum will be part of the curriculum intervention. Dr. Bracken explains, "The Bracken Basic Concept Scale has been used for more than 20 years to assess and monitor children's conceptual development, and has been employed in such recent large-scale early childhood research studies as the Millennium Project in the United Kingdom and the Harlem Children's Zone in New York. Project Clarion will combine basic concept assessment with the instruction of early science concepts using two scaled up curricula, the Bracken Concept Development Program, and William and Mary's Center for Gifted Education's science curriculum. We believe combining the assessment and instruction of foundational science concepts will result in enhanced cognitive and academic development in our sample of ethnically diverse young children."

Also working on the grant will be Dr. Ellen Fithian as project manager and Dr. Bev Sher as curriculum coordinator. For more information on the Jacob K. Javits Gifted and Talented Students Education Act, visit http://www.ed.gov/programs/javits/index.html. For more information on Project Clarion, visit http://cfge.wm.edu/clarion/index.php or call (757) 221-2362. 🕮 🕮 🕮 🕮 🕮

Project Athena: It Works

During the 2003-3004 academic year, Project Athena was implemented in randomized 3rd-5th grade classrooms in seven school divisions across three states. Project Athena is a Javits funded demonstration grant targeting low-income high ability students, and is designed to gauge how the implementation of research-based language arts curriculum can raise the threshold of critical thinking and overall academic performance in these students. In the fall of 2003, each participating school division implemented several pre-assessment measures to determine a baseline of student performance. Following several measures of pre-assessments, the districts in the experimental classrooms, implemented the William and Mary language arts units and the comparison classrooms implemented the designated school division's language arts curriculum. During the implementation cycle which lasted from October, 2003 until February, 2004, Project Athena staff and graduate students along with several trained school district personnel, conducted classroom observations twice - once earlier in the implementation cycle and once toward the end of the units. At the conclusion of the curriculum unit implementation, post-assessments were administered.

Project Athena's 2003-2004 focus was on curriculum implementation, classroom observations, the use and analysis of pre- and post-assessment measures, development of corollary supporting resources for the language arts teachers, and the development and piloting of a Professional Development Questionnaire (PDQ).

Beginning in September, the participating school divisions (Fairfax County, VA., Gloucester County, VA., Greene County, VA., Greenville, SC., Montgomery County, MD., Newport News, VA., and Westmoreland County, VA) administered several pre-assessment measures. These measures included portions of the Iowa Test of Basic Skills (ITBS), the Cognitive Abilities Test (CogAT), the Universal NonVerbal Intelligence Test (UNIT), the Test of Critical Thinking (TCT) and the performance-based pre-assessment measures of literary analysis and persuasive writing embedded in each curriculum unit. Following the pre-assessments in all classrooms, teachers in the experimental classrooms began to implement the relevant William and Mary Language Arts Unit. The targeted unit in the 3rd grade is *Journeys & Destinations*, 4th grade is *Literary Reflections*, and the 5th grade unit is *Autobiographies*. Each unit has 24 lessons and requires specialized training for fidelity of implementation. During the months that teachers were either implementing the William and Mary units or their school district's curriculum, classroom observations were conducted utilizing the William and Mary Classroom Observation Scale-Revised (COS-R) to determine the effectiveness of teacher and student behaviors. Each observation lasted approximately 45 minutes followed by a de-briefing with each teacher. Additionally, informal on-site technical assistance was provided for teachers and administrators to ensure communication, and understanding related to the grant's objectives. Following the implementation cycle, post-assessment measures were given - portions of the ITBS, the TCT, and the performance measures in the curriculum units.

During the conduction of unit implementation, project staff and graduate students worked assiduously on development of a professional development questionnaire (PDQ) led by Dr. Bruce Bracken, Co-Principal Investigator. The PDQ's purpose is to determine educator attitude toward professional development opportunities. The instrument has an internal validity of .98. There are two scales; one scale focuses on the ideal professional development experience and the other focuses on the actual experiences as compared to recent past experiences. Another team led by Dr. Joyce VanTassel-Baska created a reading comprehension program targeted to support the 3rd grade language arts units but that can be

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Project STAR

(cont'd from page 19)

total of 15 gifted students under five special prototypes were sampled from each selected school district for interviews; their teachers from both the elementary and middle schools, and their parents are also selected for interviews

The research team is composed of Dr. Joyce VanTassel-Baska, Dr. Annie Feng, Dr. Kim Chandler from the CFGE at the College of William and Mary, and Dr. Julie Swanson from Charleston University. Dr. Fran O'Tuel from the Carolina Consortium for Gifted Education served as the project evaluator. During late Spring and the Summer of 2004, the research team visited three school districts for on-site data collection; ongoing data collection efforts are underway in other school districts this Fall. An interim report will be written to share the first year findings at the South Carolina Javits Research Grant Committee Meeting this November.

by Annie Feng, Ed.D.

Project Athena

(cont'd from page 20)

used in all three grade levels, called *Jacob's Ladder*. The purpose of *Jacob's Ladder* is to enhance reading comprehension through the application of tasks that have been organized by skill ladders with questions and activities within each. Ladder rungs are organized to increase complexity in intellectual demand. Ladders can be used by individual students, in learning centers, with small groups, or as a whole class activity.

Both *Jacob's Ladder* and the PDQ were unveiled to the teachers and administrators participating in the study during a mid-winter training institute held in March, 2004. The overwhelming response by the educators attending the March meeting was positive. One teacher commented, "We are so impressed that the Project Athena staff not only listened to our needs but your *Jacob's Ladder* program gave us just what we needed. My colleague and I have decided that this program provides us with some really useful materials that utilize everything we've been striving for this entire year! Thank you, William & Mary."

Between March and the end of the school year, Athena staff and graduate students analyzed the pre- and post-assessment measures from Year 1 implementation, planned for the Athena Summer Institute II training session, and continued to work closely with each school division.

Evaluation Highlights

Overall Year 1 summary of findings are as follows:

- Project Athena students showed moderate learning gains in critical thinking as did the comparison groups, suggesting that both project intervention and regular curriculum may be impacting such growth.
- Sub-analyses suggest that student growth in critical thinking may be bounded by the characteristics of the learner, teacher skills in critical thinking, and fidelity of curriculum implementation.
- Project Athena identification measures discover more gifted students at ability levels above IQ 120 than the measures already employed by the school districts.
- All subgroups benefited from the treatment. Promising learner of all subgroups in the sample appeared to benefit the most from the project.
- Gender, ethnic, and ability differences were evident.
- The intervention positively affected growth on both the reading and language portion of the ITBS.
- Teacher observation data suggest the need for greater treatment fidelity in respect to the use of higher level thinking strategies.

Future Plans

Future plans include analysis of each state's assessment data, another summer institute in August for new experimental teachers, returning experimental teachers and administrators for the purposes of sharing Year 2 data and scaling up specific areas of the language arts curriculum, such as reasoning, and analysis of the supporting reading comprehension structures such as *Jacob's Ladder* and *Navigator* usage.

by Elissa Brown, Ph.D.

Summer Enrichment Program Completes Its Sixteenth Year

July, 2004 marked the CFGE's Summer Enrichment Program's (SEP) sixteenth consecutive year. SEP provided enrichment classes for 673 students, ranging from preschool to ninth grade students, 412 in the one-week session and 261 students in the two-week session. Twenty-seven courses were offered each session, among which were several curricula written at the Center for Gifted Education and adapted for Summer Enrichment courses. Also, many teacher-developed perennial favorites were available, including *Lego Robotics*, *Bubble Fun*, *Ups and Downs: Physics of Roller Coasters*, and *All the World's a Stage*.

In addition to returning courses, there were new courses in a variety of disciplines and from a number of sources. Some, such as *What's On Your Mind?*, *Tell Me a Story*, and *Prove It Mathematically* were developed and taught by graduate students in gifted education, while others, such as *Civil War Battlefields* and *Detective "U" Crime Solvers*, were developed by local teachers. *Civil War Battlefields* explored the Civil War through study of its underlying causes and major battles. To bring the topic to life, each student worked with a team to construct a three-dimensional model of a particular battle and to analyze the strategies of the winning and losing generals. Another new course, *Detective "U" Crime Solvers*, engaged students as forensic scientists involved in solving fictional crime scenarios, some of which have appeared in publications authored by the course teacher, Mary Ann Carr.

A final source of new courses was College of William and Mary

Continued on page 22, Summer Enrichment

CFGE Summer Curriculum Conference and AP Institute

This summer, the Center for Gifted Education hosted two professional development experiences. Both the Summer Institute on Curriculum and Programs for High Ability Learners and the Advanced Placement Institute are held annually on the campus of William and Mary and attract over 540 educators.

Summer Institute on Curriculum and Programs for High Ability Learners

The first conference, held June 21-23, was the Summer Institute on Curriculum and Programs for High Ability Learners. One hundred and forty five teachers from across the country spent an intensive two and a half days in the workshop of their choice for one of seven strands. In addition to the in-depth training on the Center's different curriculum areas, as well as a strand that explored various ways to deepen the mathematics challenge for highly able students, participants could choose to immerse themselves in critical thinking strategies, gifted student and program evaluation, and creativity and research strategies. Center staff as well as practicing teachers from Virginia and Maryland led the strands.

Advanced Placement Institute

The other event was the week-long Advanced Placement (AP) Institute for new and beginning teachers during the week of August 2-6. This was the Center's fifth, and largest to date, AP Institute. Almost 400 participants attended 17 different courses. Once again, interest in US History was such that a second section was created to accommodate the demand, and almost all subjects were filled to their capacity.

Participants were treated to a presentation and reception co-sponsored by the Admissions Office. The speaker shared information about the William and Mary admissions process, how AP courses are viewed during the process, as well as underscoring the importance of the AP curriculum in preparing students for the more challenging coursework at the college level. This event is always a success and provides teachers who might not otherwise have knowledge of the College with information to share with their students.

The AP Institute is the Center's most complex annual professional development conference, spanning five days, six buildings, consultants from multiple states, and involving members of at least three academic departments, as well as the College Board. Participants in science courses are able to utilize the College's laboratory spaces, and all participants take advantage of the computer labs. One attendant from the Summer Institute in 2004 said, "This was a great learning experience. Our instructor was enthusiastic and abundantly knowledgeable of the subject matter and very engaging. Everything I learned this week I plan to incorporate into my curriculum this school year."

by Dawn Benson

Summer Enrichment

(cont'd from page 21)

faculty. Dr. Beverly Sher, an adjunct professor of biology, wrote two new middle school biology courses for the Summer Enrichment Program through the use of funds from the Howard Hughes Medical Institute Biological Sciences Education Program Grant. The first course, *So You Want to Be a Doctor*, introduced students to the educational pathway leading to a medical career, and exposing them to information on the life of a doctor and on selected topics in human anatomy and physiology. The second course, *The Wonders of Genetics*, included a strand that instructed students in the basic principles of Mendelian genetics. The course helped them to understand the practical and ethical implications of genetics by placing them in the role of a genetics counselor to a family with a history of a genetic disease. Both courses were piloted by two talented new teachers and were met with an enthusiastic reception from parents and students. It is anticipated that these will be regular offerings in future sessions.

The Summer Enrichment Program continues to serve large numbers of gifted students in the local area and across the state, and generates exciting new course offerings to keep students coming back year after year. Information about SEP classes for 2005 will be available soon on our website, http://cfge.wm.edu.

by Ellen Fithian, M.D., Ph.D.

S E P

Saturday Enrichment Program

Spring Program

February 12, 2005 - March 26, 2005

Lego Robotics
Blast Off
Mathplications
X+Y=WHAT?!
Web Page Design
Hands-On-Math

Bubble Fun
All the World's A Stage
The Power of Persuasion
Chess
Latina Vivit

What's On Your Mind: Intro to Psychology & Cognitive Science
And many more!

For more information, please call the Center at (757) 221-2362 or visit our website at http://cfge.wm.edu (click on Saturday Enrichment Program)

Upcoming Center For Gifted Education Events

Focusing on the Future Career Conference
January 29, 2005

Saturday Enrichment Program
February 12 - March 26, 2005

National Curriculum Network Conference (NCNC)
March 7 - 9, 2005
The NCNC call for proposal is available online at cfge.wm.edu.

Summer Institute on Curriculum and Programs for High ability Learners
June 27, 2005 - June 29, 2005

Summer Enrichment Program
July 11-15, 2005 (Session I)
July 18-29, 2005 (Session II)

Advanced Placement Institute
August 1 - 5, 2005

Coming Soon

Focusing on the Future

A Career and Academic Planning Experience
For High-Ability Students in Grades 6-12 and Their Parents.

Saturday, January 29, 2005 9 a.m. - 3 p.m.
College of William and Mary, Williamsburg, VA

Student Workshops

Concurrent sessions are offered for middle and high school students. Students will be exposed to: (a) information about work habits and "habits of mind" that lead to successful careers in various fields; (b) an interactive discussion about a variety of career opportunities in a particular field; and (c) steps to take to prepare for specific careers.

Parent Workshops

Parents will have the opportunity to attend four workshops which will assist them in guiding their children with academic and career planning.

Visit http://cfge.wm.edu/focusing.php

Systems Newsletter

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