

An Addendum to

Leading Change In Gifted Education

The Festschrift of Dr. Joyce VanTassel-Baska



Friday, March 13, 2009

**The College of William and Mary
Williamsburg, Virginia**

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The Nexus of Policy, Practice, and Leadership

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In the musical *Wicked*, Elphaba proclaims to her sister, Glinda, “I’m limited. Just look at me—I’m limited. And just look at you: you can do all I couldn’t do” (Schwartz, 2003). As former state director of gifted programs in South Carolina (1998-2006), I have to confess initially to sharing Elphaba’s feelings when I met Joyce VanTassel-Baska, “my Glinda.” It was my good fortune to know Joyce as a mentor and professional colleague, and especially as a friend who shaped my understanding and exploration of gifted education during those years. Moreover, gifted education in South Carolina benefited from Joyce’s hand, heart, and head in guiding and advising the development of policy, practice, and leadership strategies for its gifted and talented programs.

Joyce’s work reflects a dedication to making a difference; a difference that is not for self gain, but is in consideration of what will be left for others to use and build upon. Kouzes & Posner (2006) defined this act of leadership as legacy thinking. Joyce’s legacy thinking that nurtures my recent work in gifted education has been in the area of policy. This brief reflection will focus on my present thoughts concerning the nexus of policy, practice, and leadership in gifted education.

Knowing Joyce’s love of Latin, I must point out that *nexus* is derived from a Latin word *nectere* that means *to bind*. From my experiences in gifted education, it is clear that gifted education flourishes when there is a firm commitment to securely binding policy, practice, and leadership. The power of this synergy has become even more evident since retiring from the South Carolina State Department in 2006. Whether you are a classroom teacher, a school or district leader, a state coordinator, a state affiliate member, a parent, or a professor, your voice and actions are critical for responding to this challenge facing gifted education—can we bind policy, practice, and leadership together? The response to this question will significantly impact the future of gifted education, particularly in the public schools.

If you visit the policy page on the U.S. Department of Education’s website, you are greeted with the following message:

Please note that in the U.S., the federal role in education is limited. Because of the Tenth Amendment, most education policy is decided at the state and local levels. So, if you have a question about a policy or issue, you may want to check with the relevant organization in your state or school district (U.S. Department of Education, n.d.).

Limited? There’s that word again. The reality is that the limited federal role in education exercises significant influence on policymakers when deciding what is and is not addressed in state and local policy. In spite of all the good work by advocates for gifted education, they have made little progress toward a federal policy that addresses gifted education in a substantive manner. While a passing reference to gifted may have been provided occasionally in federal legislation, the impact has thus far been minimal. Therefore, the lack of federal policy pushes the action to the states, and in many states that action is passed on to the local school district. The states must do all that federal policy cannot do (or believes it cannot do).

This sad reality proves to be both a blessing and a curse for gifted education—an opportunity and a challenge. Passow & Rudnitski (1993) found that all states had formulated policies (legislation, regulations, rules, guidelines) that supported gifted education. This finding suggests that states sense the need for policy addressing gifted learners. However, state policies were described as uneven, and the call for rethinking present policies based on research, experience, and developments in education, psychology, organization was sounded. Recent studies painted a similar picture of the gifted policy in the states (Brown, E., Avery, L., VanTassel-Baska, J., Worley, B., & Stambaugh, T 2005; Zirkel, 2005; Clinkenbeard, P., Kolloff, P., & Lord, E., 2007).

The State of the States (SOS) in Gifted Education, a biannual report of the Council of State Directors of Programs for the Gifted and the National Association for Gifted Children (NAGC), provides further evidence regarding the mixed responses of states when developing policies for gifted education. Both the 1990 and the 1999 *SOS* report found 26 states mandating services for gifted, and the most recent data (2007) identified 24 states with similar service mandates. It could be assumed that where there is no mandate for service, there is no policy. However, other data from the *SOS* suggest that most states have policies or at least guidelines or rules addressing gifted education.

For example, in 1990, 46 states reported using general intellectual ability as the most common giftedness indicator. The fact that 46 states reported use of general intellectual ability to indicate giftedness suggests policy. In 1999, 30 states reported mandating identification of gifted. This suggests policy, although both examples exceed the number of states that reported requiring service for gifted learners. These examples highlight inconsistent responses of states in offering comprehensive policies for gifted education. States may be swimming in the gifted policy pool, but Michael Phelps does not have to worry, and here is why.

Is there consensus in the gifted education community regarding the purpose of policy? Is there consensus concerning who is in charge of developing and implementing the policies? Is there consensus as to the essential elements of gifted education policy? Based on reports and research, such as those cited previously, and my experiences listening to state directors and policymakers, the answer to those questions is a resounding NO. Furthermore, I would argue that until the field accepts the importance of addressing this lack of consensus, advocacy voices will remain dissonant and ineffective. The limited federal role and the varying state commitments to gifted policy will not change, and the possibility of a nexus among policy, practice, and leadership will not be realized.

Much good work in the field of gifted education has contributed to the identification of best practices: The National Research Center on the Gifted and Talented housed at the University of Connecticut, the research-based curricula developed through

funding from the Javits Act, the Center for Gifted Education at William and Mary, Belin-Blank, Northwestern, University of Arkansas at Little Rock, Western Kentucky University, University of Virginia,...—I think you get the picture. In fact, google “center for gifted education,” and you will receive about 761,000 hits. The field has been busy. And if you add to the work of centers the recent publications (e.g. Robinson, Shore, & Enerson, 2007; Pucker & Callahan, 2008; VanTassel-Baska & Stambaugh, 2008) and journals (e.g. *Gifted Child Quarterly*, *Journal for the Education of the Gifted*, *Roeper Review*) that highlight research-based best practices, one has to sense and believe that we know what we ought to be doing.

However, when considering the binding of policy and practice, the voice of Glickman (1991) continually comes back to haunt me: we know what we should be doing in education; we just enjoy pretending not to know. VanTassel-Baska (2006) echoed this sentiment when addressing the disconnect between practice and policy. Now, I want to be clear that I am not viewing the world through Theory X glasses, but efforts to bind policy and best practices in gifted education are inconsistent across the states. State policies must include language that describes the specific types of programs and support services that gifted learners need. Why bother to seek understanding of what approaches have a positive and significant impact on learners and then ignore addressing these practices when developing or amending policy? Confronting our professional knowledge must be an acknowledged value that consciously impacts policy words and actions.

In addition, the ability of states to use best practices to shape policy must be supported by those who conduct research. Longitudinal studies around best practices are needed to support the development and refinement of effective policy. Changes in policy would never be initiated on the basis of a single study; thus, there is a need to help policymakers through evidence-based research on key ideas in best practice over time. Research similar to that on acceleration and grouping would help bind policy and practice. In addition, this research could serve advocates as wave after wave of educational reform breaks on states and local districts.

Thoughts on best practices would be

incomplete without considering the practitioner—in our case, the teacher who plans, guides, instructs, and assesses the gifted learner. Policy must address opportunities for teachers to have access to research-based best practices in gifted education and support for their sustained professional learning. What processes and expectations are set for highly effective teaching with diverse gifted learners? How do teachers remain competent in content given the information age and the pace of discovery that is common place today? What kind of leadership is needed to bring policy and practice to a nexus?

Numerous leadership definitions, theories, and models exist, and although considerable research on leadership has been conducted, particularly from a business/organizational perspective, an answer to the above question remains elusive. Moreover, in education the role of leader is often confused with that of administrator or manager, which makes a response to the question even murkier. Bill Gates (as cited in McFarland, Senn, and Childress, 1994) may have provided insight into a response for this question: “leadership means bringing out the energy and capabilities that people have, and getting them to work together in a way they wouldn’t do otherwise” (p. 68). A leader who seeks to bind policy, practice, and leadership believes, understands the implication for leaders and followers, and commits to actions that will fulfill this ideal. This leadership goes beyond empowerment; it embraces the challenge of providing guidance and assurance when followers face fear, uncertainty, frustration, and hopelessness. In other words, the leader realizes the potential and is unwavering in the effort needed to release this energy.

Building bridges between diverse groups who contribute to shaping educational policy requires the humility and will to think and act in ways quite different from past attempts. This approach to leadership must be comfortable with change, while being visionary and responsive. The uniqueness of each state and the tension between local control and state responsibility interfere with the building of a shared vision for gifted policy and often ignite resistance to mandating policy and practice. Herein lies the challenge and the opportunity: what are the new ways of shaping and developing educational policy; what from the past should be kept and what should be discarded?

Can we bind policy, practice, and leadership? Joyce would reply in the affirmative, and her contribution to gifted education in South Carolina provides the evidence. In 1998 South Carolina approved policy that introduced the use of performance task assessments to identify academically gifted learners. This policy relied on practice and research that promoted the use of authentic assessments in order to be more responsive to the need for adaptations in screening minority students and students of low socioeconomic status. Joyce exhibited the leadership mentioned above in guiding collaboration among South Carolina teachers, coordinators of gifted programs, university professors, and state department staff. Her leadership and the support from the Center for Gifted Education at the College of William and Mary pushed down barriers, fostered new relationships within the state, and brought new vigor to gifted education.

This example only begins to confirm the power of binding policy, practice, and leadership. New understanding about gifted learners, the role of curricula, the need of gifted learners for social and emotional support, an infrastructure for affecting classroom practices and supporting changes in instructional practices, and the power of program evaluation could be cited as dramatic changes engendered by the nexus of policy, practice, and leadership. The handprint of Joyce VanTassel-Baska can be seen in all of these aspects.

To bind policy and practice, you must be a leader, and you must develop leaders. Policy must be monitored from the beginning to identify and respond to its impact, both intended and unintended. As policy is monitored and as research-based practices emerge, regular revisions to policy must be addressed. Thus, policy evolves through practice and leadership.

Joyce has given the field of gifted education a rich legacy to use and build upon. Perhaps the idea of addressing policy for gifted education is overwhelming given the present accountability environment, the fragmented approach to educational reform, and the economic conditions that threaten programs serving gifted learners. A quotation attributed to President Calvin Coolidge captures the commitment needed to bind policy, practice, and leadership.

Nothing in the World can take the place of

persistence. Talent, will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination are omnipotent. The slogan, “press on” has solved and always will solve the problems of the human race. (Platt, 1989, p. 255)

Do we have the courage, fortitude, and moral commitment of Joyce? I am confident she urges us to “press on.” And Elphaba can best express how I feel and probably how the field of gifted education feels when thinking of Joyce and her work: “so much of me is made of what I learned from you; you’ll be with me like a handprint on my heart...whatever way our stories end, I know you have rewritten mine...” (Schwartz, 2003).

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Fostering Diversity in Gifted Education

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Joyce VanTassel-Baska has been highly influential in several areas of my work, most notably identification of hard-to-find gifted learners, teacher education, and policy. This discussion focuses on those three strands: research centered on low income, minority, and other special needs gifted learners; teaching educators about diverse gifted learners and how to develop curriculum well-matched with those learners; and how policy supports or hinders quality program development for diverse gifted learners. In my thinking, these topics are bound together into a key issue facing our field—that of developing a more explicit body of knowledge about diverse gifted learners and curricular and instructional practices for those learners grounded in research. Joyce VanTassel-Baska's wide-ranging and extensive contributions in gifted education have enabled the field to develop more defensible approaches for academic talent development, and in this essay, I comment specifically on the ways in which her work has deepened my personal knowledge and guided my own work.

First, I provide the reader with a brief context for the discussion to enable understanding of my work in gifted education and the connections of that work to Joyce VanTassel-Baska. Descriptions of the strands of my work and the significance of Joyce VanTassel-Baska's influences comprise the central part of the story. The story's conclusion touches on future directions.

A Context: The relationship begins

In the early 1990s, South Carolina (SC) commissioned Carolyn Callahan from University of Virginia, to conduct a comprehensive evaluation of the state's gifted program. Since SC was operating under a state mandate to provide gifted education for several years prior to the commissioned evaluation, the evaluation's purpose was to take a close look at how tax dollars were being utilized to provide gifted education. The statewide evaluation produced several

strong recommendations related to the curriculum and focus on enrichment in many of SC's gifted programs. As a result, SC looked outside for expertise to address the recommendations, which led to the development of a strong relationship with Joyce VanTassel-Baska and the Center for Gifted Education at William and Mary (CFGE). Joyce VanTassel-Baska had received a Javits grant to develop curriculum for high ability students in language arts and science. SC's cohesive group of gifted education leaders, including the SC Department of Education and the SC Consortium for Gifted Education partnered with CFGE to pilot the curriculum as it was being developed. This collaborative work allowed districts to see other approaches to teaching gifted students.

Under Joyce VanTassel-Baska's leadership, the CFGE developed training in the curriculum and a cadre of trainers available to work around the country. This systematic, clear training allowed effective curriculum and instruction for gifted students to take root in SC. As the state moved from pure enrichment-based gifted programs to gifted programs based on core academic areas, the CFGE offered resources to continue to build the capacity of educators to make that shift. This partnership, which began in the early 1990s, continues today and has had an enormous impact on improving the quality of programming for SC's gifted students.

Curriculum for Gifted Learners: Understanding Diversity

In the state partnership described above, Joyce VanTassel-Baska's influence was not directly tied to my work; rather her influence shifted my philosophy about what knowledge is of most worth when it came to the education of gifted youngsters. My first experience in working directly with Joyce VanTassel-Baska came after I received a Javits demonstration grant for three years of work with Title One elementary schools in SC. The demonstration project, called Project Breakthrough, had as its purpose to find

more low income, minority gifted students. The central premise of Project Breakthrough was to teach teachers how to use rich, interesting, rigorous curriculum with their high poverty students. The premise was based on the hypothesis that if teachers used high quality curriculum and instruction, the academic gifts and talents of their hard-to-recognize gifted students would “bubble up” and become evident. Federal grants were required to use “research-based approaches”, so once our Project Breakthrough school partners were identified, we studied achievement test data and identified two academic areas of focus: language arts and science. Based on previous research, we believed one antidote to students’ academic weaknesses was the language arts and science curriculum developed by the CFGE at The College of William and Mary. I called Joyce VanTassel-Baska, and she became involved in the work of the project.

The teachers in Project Breakthrough schools were trained in the models embedded within the CFGE curriculum units. They were able to try these models (e.g., Paul’s reasoning model, Taba’s model, the hamburger model, problem-based learning) in classroom instruction with their students. Part of the teacher development was specific training in the CFGE language arts and science curriculum. Amazingly, with what would be considered in most studies a minimal intervention, Project Breakthrough teachers began to see their students differently. Students became engaged in learning in ways they had not before. Students’ strengths in problem-finding, critical analysis, and conceptual thinking were revealed by the learning activities that were part of the CFGE’s curriculum. Student achievement went up in several areas, particularly with the lowest achieving groups! More gifted learners were identified. Teachers began to see what their students were able to do rather than what they could not do. And, these results grew directly from using CFGE’s high level, rigorous curriculum with a group of low income youngsters.

Teachers, Curriculum, and Understanding the Gifted Learner

If you fast forward to one of the gifted education graduate courses offered at the College of Charleston, *Introduction to Curriculum for Gifted*

Learners, it is clear that lessons learned from Project Breakthrough, i.e., enabling teachers to see what bright students are able to do through the curriculum and instruction they use with those youngsters, continue to guide me. When I first began teaching graduate courses in gifted education, some (but not all) teachers successfully mastered how to create differentiated units for their gifted students. Joyce VanTassel-Baska’s Integrated Curriculum Model (ICM) now serves as the primary model in this introductory course for building teachers’ conceptual understanding of the theoretical underpinnings of curriculum for gifted. This conceptual understanding is translated into practical understanding, e. g., what the ICM looks like in an elementary language arts classroom with gifted students, by utilizing CFGE’s published units in different content areas and at different levels to illustrate. The CFGE’s curriculum units provide exemplars that teachers analyze, test out with their students in their classrooms, and observe how students respond differently. Having a starting point (i.e., the CFGE units), something concrete to illustrate the theoretical ICM, is invaluable as teachers develop their understanding of how to adapt their standards-based curriculum for gifted learners. Now, *most* teachers in my introductory gifted education courses understand differential curriculum for gifted learners and are much more successful in creating their own units of study that effectively differentiate content, process, and product for bright students. The teachers’ knowledge and skill directly impacts the gifted students that they teach. Clearly, the reach of Joyce VanTassel-Baska’s work extends to those high ability students and assists them in the development of their academic talent.

Joyce VanTassel-Baska’s prolific record of publications, from monographs, gifted education texts, articles on gifted education research, to the National Association for Gifted Children publications she edited, authored, and co-authored, is amazing. Her leadership in the realm of high quality, published resources provides the field with more quality, accessible materials for educators. Her published work in its varied forms enables me as a professor of gifted education to have a pool of resources from which to draw for special topics courses in gifted education, for teacher development activities with school districts, and for leadership development.

Low income, minority, and other special needs gifted learners

The partnership of Joyce VanTassel-Baska with South Carolina gifted educators and me extends beyond curriculum to identification through development of a performance-based assessment of intelligence. In the 1990s, when a complaint was lodged with the Office of Civil Rights about exclusionary identification practices in SC's gifted programs, task force work finally led gifted education leaders in the state to a collaborative effort with Joyce VanTassel-Baska to develop alternative approaches to identify underrepresented gifted students, i.e., low income, minority and other underserved gifted students. Out of several years of collaborative work, Project STAR was born.

The statewide gifted identification process was changed to utilize this alternative measure as a different pathway to finding underrepresented gifted students. Two studies were conducted by Joyce VanTassel-Baska to find out 1) which students were being identified using STAR, and 2) how these "nontraditional" gifted students were performing. The research showed the STAR assessment enabled identification of more low income gifted students, more African American gifted students, and more female gifted students.

Joyce VanTassel-Baska then invited me to work as part of the research team on the second qualitative study, designed to find out how the "nontraditionally" identified gifted students (those identified through domain-specific performance assessments) were faring in their gifted education programs and how they compared in attitude, motivation, and self-efficacy with "traditionally" identified gifted students. The research team interviewed the students, their parents, their gifted teacher, and their science teacher to examine similar and different perspectives revealed about student performance. From the data, vignettes on 37 gifted students were written. The vignettes developed from these case studies provide more insight into the diversity of gifted students through descriptive snapshots of diverse gifted students. The vignettes have been used in development with teachers, counselors, and administrators to illustrate, with real examples, the diversity of gifted learners.

This case study research examined low

income gifted students, African American gifted students, twice exceptional students, and high nonverbal, low verbal gifted students. After we completed the case study producing the vignettes, Joyce asked those of us on the research team and a few others to work with her in applying and extending this research through publication of a book, *Profiles and Patterns of Underrepresented Populations in Gifted Programs*, the fourth in NAGC's Critical Issues Series on Equity and Excellence.

My work in applying and extending the research centered on low income Caucasian gifted learners, gifted learners with an unbalanced profile, i.e., high nonverbal aptitude and ability and low verbal aptitude, and teacher development to work effectively with diverse gifted learners. My experiences in this collaboration with Joyce underlined for me the importance of continued inquiry. As this Joyce VanTassel-Baska lesson is the most recent for me, I will comment on my inquiry into the high nonverbal, low verbal gifted student and what I learned from that work.

In the investigation to develop the chapter on high nonverbal, low verbal gifted students, I began with several questions based on my assumptions about the nature of these students. First, I wondered how nonverbal giftedness was defined in the literature. Next, I wanted to understand more about identification of high nonverbal ability as well as styles and preferences for this subpopulation of gifted students. The goal of the investigation was to offer recommendations for school-based persons to recognize and develop the talents of this particular group of students. What I found out in the research process challenged my preconceptions about how receptive and expressive language and nonverbal intelligence may not necessarily be mutually exclusive. I assumed because the students in the case studies had uneven profiles, with low verbal abilities indicated by their identification data, that many high nonverbal gifted students had this same uneven profile. In the process, I learned more about this topic and the distinction among nonverbal assessment, nonverbal intelligence assessment, and nonverbal intelligence, terms used interchangeably by many practitioners. I found disagreement among researchers about nonverbal ability, in particular when nonverbal assessments are used as part of an

identification protocol to find underserved gifted students. The process of delving deeper into the literature related to this subpopulation helped me to remember the critical importance of challenging my own assumptions, raising questions, and seeking understanding. Avoiding complacency when one has worked in a field for many years is critical. This example illustrates how working with Joyce reminded me of the importance of continuous inquiry to the development of the field.

Concluding comments

The model that Joyce VanTassel-Baska has provided us throughout her career in gifted education is that of continuous inquiry. Her questioning attitude about what we can learn from past and current research, how that knowledge connects to where we are currently in gifted education, and where we need to be headed in the future as a field has provided us with incredible guidance. Her leadership is one key to the progress in gifted education over the past twenty years Joyce VanTassel-Baska has shown us the courage to go against the grain, breaking new ground, doing high quality work, while working at an incredible pace! Her efforts to bring together interested parties to a national meeting on *Low Income Promising Learners* helped those in attendance engage in how we might collaborate more closely since our goals are similar and our resources limited. For me both personally and professionally, it strengthened my determination to continue the inquiry and work into this often neglected group of learners. The gathering demonstrated how we need to figure out how to work together more closely. Publication of the “Pearl Book” as a summary of what works with low income learners of promise is a “bible” I keep close at hand. We know misconceptions held by educators and parents affect the representation of diverse gifted learners in programs. Special attention to the individuality of gifted students and increased efforts in teacher development drawing on Joyce’s research and curriculum development must continue.

There can be no argument about the deep and wide-ranging influence of Joyce VanTassel-Baska’s work on the field of gifted education. This essay provides a glimpse into her influence on my work and on what I have learned from her. It is difficult to

imagine a future without her visionary leadership. But, the continued development of gifted education’s research base with special attention to diverse gifted learners will move forward as all of the seeds sown through Joyce VanTassel-Baska’s influence sprout and grow.

The Contribution to Teacher Education of Joyce VanTassel-Baska

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This is the story of Joyce VanTassel-Baska's influence on me, my program and the state of South Carolina. I am a teacher in the 45th year of my career having taught grades K-9 and for the last 20 years pre-and in-service teachers. One of my titles is Director of Gifted Education at Converse College, a small liberal arts college for women with a co-educational graduate school. The M. Ed. in Gifted Education was created in 1981-82, and the degree was and still remains the only one offered in our state. I was offered the position of director of the program and began in the fall of 1989 as an Assistant Professor.

To fully understand the status of gifted education in South Carolina, a brief history is in order. South Carolina, to the surprise of many educators, has been a leader in gifted education. Since 1984 when Governor Dick Riley passed the Education Improvement Act (EIA) that funded gifted education in every school district, the South Carolina Consortium for Gifted Education along with the State Department of Education has provided professional development using nationally recognized consultants to help teachers and coordinators responsible for educating gifted students in academics and the arts.

My work in gifted education in South Carolina began in 1977-78 as the coordinator of a small program funded through the grant system and subsequently expanded with EIA funds. Because teaching gifted in those days was a lonely business with little support or professional development, I contacted two district coordinators nearby, and we established the Piedmont Consortium for Gifted Education which became the South Carolina Consortium Education as more districts added programs and needed professional development for their teachers of gifted.

The foregoing is a prelude to what I as a professor, teachers of the gifted, and our state owe to Joyce Van Tassel-Baska. We have had many nationally recognized consultants in our state, but Joyce has been the one constant. I am not sure just

exactly how many years she has had a direct relationship, coming to present at our conferences or work with a small group of us, but it has been more than 20 years.

Joyce conceptualizes at the highest levels; her abstractions are elegant. These are obvious in her presentations, her writing and in the curriculum units she developed in language arts, science and social studies. Many of our districts use Joyce's units in one or more subject areas. Much of the curriculum developed in gifted programs in South Carolina is based on Joyce's Integrated Curriculum Model (ICM). I have used her curriculum textbooks in my courses since I began teaching at Converse College. Her other texts and publications are valuable resources for developing courses and presentations.

Although Joyce is considered the "guru" of curriculum for gifted students, she has an unmatched depth of knowledge in special populations, identification, instructional strategies, assessment and program evaluation. I go to one or more of her presentations at national and state conferences and always learn something new.

She worked with our state in developing the performance tasks that are administered as a third step of our identification system for students who qualify on ability or achievement but not both. These tasks have increased the number of minority students and students from poverty identified as gifted. Her research on the students identified using the performance tasks has been published and proves the efficacy of using this type of assessment for minority and low SES students.

For the past few years, Joyce in her capacity as President of the National Association for Gifted Children (NAGC) has left her permanent mark on the field in two very important ways. First she has emphasized the need for state and national policies as a way to ensure the survival of gifted education and the protection of rights of gifted students. Secondly, she provided the leadership to work with the Council

for Exceptional Children (CEC) to develop national standards appropriate for gifted education. It was a lengthy, comprehensive process that has culminated in The CEC-NAGC standards being approved by the National Collegiate Association for Teacher Education (NCATE), the premiere accrediting body for higher education institutions. This has legitimized the field of gifted education in the eyes of people who have never viewed it as a stand-alone field.

Joyce, your professional life is inextricably linked to our state. You have mentored us and inspired us to be better than we thought ourselves capable of. Although you are retiring from William and Mary, you are not retiring from gifted education. We and the field need your presence to continue the journey toward excellence. “The purpose of our lives is to give birth to the best which is within us,” (Marianne Williamson). This quote describes you and with your guidance can perhaps describe some of us.

The Use of the ICM in Mapping Best Practice in Curriculum and Instruction for the Gifted

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Much has been written about gifted best practice and a thorough literature review has been completed (Drain, 2008) to identify those practices that have research support for use with gifted students. This paper begins with an overview of curriculum studies of science, social studies, and language arts curriculum based on the Integrated curriculum Model (Van Tassel-Baska, 1986). Second, a summary is presented of gifted best practice derived from the literature. This summary delineates the strength of the support found for each practice. Next, the dimensions of the ICM are explicated and linked to supported practices from the literature. Finally, the author concludes with a discussion of the implications of these connections and practices for a project currently underway in the St. Louis Public Schools.

Integrated Curriculum Model: Curriculum Studies

Findings from the following studies suggest that curriculum units designed on the ICM framework have had success in engaging and educating gifted students on a number of targeted outcomes including scientific experimental design, literary interpretation, persuasive writing, content growth in language arts and science, reading comprehension, and critical thinking. The curriculum implementation has been coupled with teacher training on the curriculum using in-session practice, repeated instructional sessions, and a coaching model.

The VanTassel-Baska, Bass, Ries, Poland, and Avery (1998) study investigated the efficacy of the science unit *Acid, Acid Everywhere*, based on the Integrated Curriculum Model. The unit was used in 45 classrooms in 15 school districts in 7 states. It was used in a variety of class configurations including self-contained gifted, pull out gifted, heterogeneous with cluster grouping, and heterogeneous. The purpose of the study was to assess student growth on integrated science process skills. The researchers also were interested in assessing implementation issues. Data

gathered from this study was to be used to improve and/or justify other units of study. The unit, *Acid, Acid Everywhere*, served as a prototype for other units which followed. Student pre- and post-test was the Diet Cola Test (in two forms) developed by Fowler (1990). Although the units also contained science content objectives and macro-concept objectives, this study only reported on the process skills objectives. Teachers received summer training or week-end training on the curriculum and volunteered to participate. Trainings lasted from 2 to 5 days.

Researchers reported a significant difference between the posttest data from the experimental group and the comparison group on designing a science experiment, with an effect size of 1.30, which is considered a large effect. Teachers perceived the strengths of the unit to be the hands-on, problem-based, and student-centered aspects of the curriculum. Teachers in heterogeneous classes observed that all students benefited from the curriculum, not just the gifted students.

VanTassel-Baska, Zuo, Avery, & Little (2002) investigated the efficacy of a language arts curriculum based on the ICM (Integrated Curriculum Model) for students in grades 2-8 from 10 states and 46 schools over a period of five years. The study was limited by non-random selection; however, participating schools did provide both experimental and comparison groups. All students were identified as gifted using the local identification procedures of the individual schools. Teachers were given from one to four days of training on the curriculum materials by trained staff members or trained teachers/administrators. Trainings supported teachers in the use of differentiated learning practices within the units. These practices included a focus on higher level thinking, concept development, use of advanced readings, use of research, use of inquiry, and various forms of independent learning.

Study results showed a statistically significant difference between experimental and comparison

groups favoring the experimental group for literary interpretation ($ES = .070$ —considered a moderate effect) and for persuasive writing ($ES = .242$ —considered a very strong effect). The treatment was deemed effective for students regardless of gender, SES level, or grouping strategy.

Feng, VanTassel-Baska, Quek, Bai, & O'Neill (2005) examined the longitudinal effects of using the William and Mary language arts and science curricula at grades 3 through 5 in a suburban school district over a six-year period. The purpose of this study was to assess the effects of the differentiated curriculum over time. Students were exposed to the language arts units *Journeys and Destinations*, *Literary Reflections*, and *Autobiographies* in grades 3, 4, and 5, respectively. They used science units *What a Find*, *Electricity City*, and *Acid, Acid Everywhere* over the same time period.

A total of 973 students participated during the six-year period from 1996 to 2002. The study used mixed-methods design, incorporating both quantitative and qualitative data. Survey instruments and focus groups for students, teachers, administrators, and parents allowed for deeper understanding of the benefits received from the curricula. District performance data were also used to determine student academic growth.

Researchers found that students' academic growth was statistically significant with a magnitude of moderate to large. They also found that overall growth steadily increased from lower to higher grade levels in all domains assessed. Results suggested that in both language arts and science, there appears to be a positive effect related to repeated exposure, with the highest gains seen after the third year of implementation.

Project Athena, (VanTassel-Baska, Bracken, Feng, & Brown, 2007) a Javits Grant supported scale-up project, used the William and Mary language arts curriculum units at grades 3-5, along with supplemental materials for scaffolding, as a reading comprehension and integrated language arts program for inclusive general education classrooms in a number of Title One schools across three states. The experimental design included 2,113 students across three years of implementation along with 39 experimental and 38 control teachers. The experimental students were of all ability levels,

multiple ethnicities, both genders and all socio-economic levels. The schools, labeled as Title One Schools, had a higher than average number of children in poverty.

Experimental teachers were given the William and Mary curriculum units along with supplemental materials such as the *Jacob's Ladder* curriculum as well as the readings and novels to support the units. Teachers received training following the format of 1) introducing the model for teaching, 2) providing practice using the model, and 3) debriefing the model. Experimental teachers participated in a three-day workshop during the summer, followed by a one-day workshop mid-year. The second year, continuing teachers received advanced training during the summer while teachers new to the project received the initial training. This was again followed by mid-winter training and debriefing. Teachers were also able to communicate with the project coordinators for additional assistance during the course of the implementation. Teachers were observed using the COS-R (Classroom Observation Scale-Revised) and given coaching and feedback on their teaching performance during the course of the project as well.

Findings from the VanTassel-Baska, Bracken, Feng, and Brown (2007) study demonstrated a number of positive outcomes. First, experimental students scored significantly higher in both critical thinking and comprehension. All ability groups and all ethnic groups registered significant growth gains from using the curriculum. Not only did experimental teachers score significantly higher than control teachers on frequency of use of differentiated strategies, but they also scored significantly higher on effective use of differentiated strategies. Finally, experimental teachers in their second year of implementation demonstrated significantly more effective use of differentiated strategies over first-year experimental teachers. The authors concluded that the use of high-powered curriculum coupled with powerful teaching and learning models and multiple modes of assessment all supported by appropriate teacher training can result in high levels of student challenge and excitement in learning.

Gifted Best Practice

In an in-depth review of gifted best practice literature, Drain (2008) found a number of strategies

and practices to be supported for use with gifted students. These strategies are outlined on Table 1 with an assessment of the support found for each. Each strategy is judged to have strong support, reasonable support, limited support, or no support, depending on the number of studies found to recommend them for use with gifted students. Practices with a minimum of four studies or a meta-analysis to recommend them for gifted students are judged to have strong support.

Practices with gifted students supported by three studies are judged to be reasonably well supported. Practices supported by fewer than three studies with gifted students are judged to have limited support. Where no studies have been found to support the practice with gifted students, the practice is judged to be unsupported. Unsupported practices may or may not be effective with gifted students, there is simply no body of research to recommend them.

Table 1.
Research Support for Educational Practices with Gifted

Practice	Strong Support (supported by 4 or more studies)	Reasonable Support (supported by 3 studies)	Limited Support (supported by 1 or 2 studies)	No Support (no studies found to support)
Acceleration	X			
Active learning experiences	X			
Advanced level content and projects	X			
Authentic assessment		X		
Concept teaching	X			
Creative thinking skills	X			
Critical thinking skills	X			
Curriculum compacting/Diagnostic - Prescriptive Instruction/ Compression of Content	X			
Curriculum extensions			X	
Curriculum modifications/ Depth vs Breadth	X			
Enrichment/learning centers				X
Flexible grouping strategies	X			
Higher-order questioning strategies		X		
Imagery training				X
Independent self-selected study			X	
Inquiry learning and teaching			X	
Integrated language arts		X		
Metacognition	X			
Multi-modal learning				X
Problem finding			X	
Problem solving	X			
School-wide theme-based enrichment	X			
Socratic discussion			X	
Student choice				X
Students as practitioners in a field (authentic practice)	X			
Synectics			X	
Using primary sources	X			

The ICM and Gifted Best Practice

With the exception of flexible grouping, all of the supported practices which were revealed in the literature are delineated in the ICM. Figure 1 locates the recommended practices as viewed through the lens of the Integrated Curriculum Model. The Concepts, Issues, and Themes dimension includes strategies such as clustering information into meaningful units, using concept models, teaching integrated language arts, using curricula that lead to conceptual understanding, organizing knowledge around important ideas or concepts, and using school-wide theme-based projects.

The dimension of advanced content includes acceleration and rapid pacing, advanced level content, curriculum compacting, curriculum extensions, curriculum modifications (including teaching depth as

opposed to breadth), understanding versus memorizing, using primary sources, and completing advanced level projects.

The product and process dimension includes activities such as acting as a practitioner in the field, which includes real problems, open-ended assignments, problem finding, problem solving, and authentic assessments. It also includes active learning, independent study, inquiry learning and teaching, using higher order questioning strategies, teaching higher order thinking skills including critical thinking, creative thinking, and metacognition. It includes teaching and encouraging creativity as well.

The practice of flexible grouping has support as best practice, but is not defined by the ICM; rather, it is delivery model which may be used in implementing the curriculum.

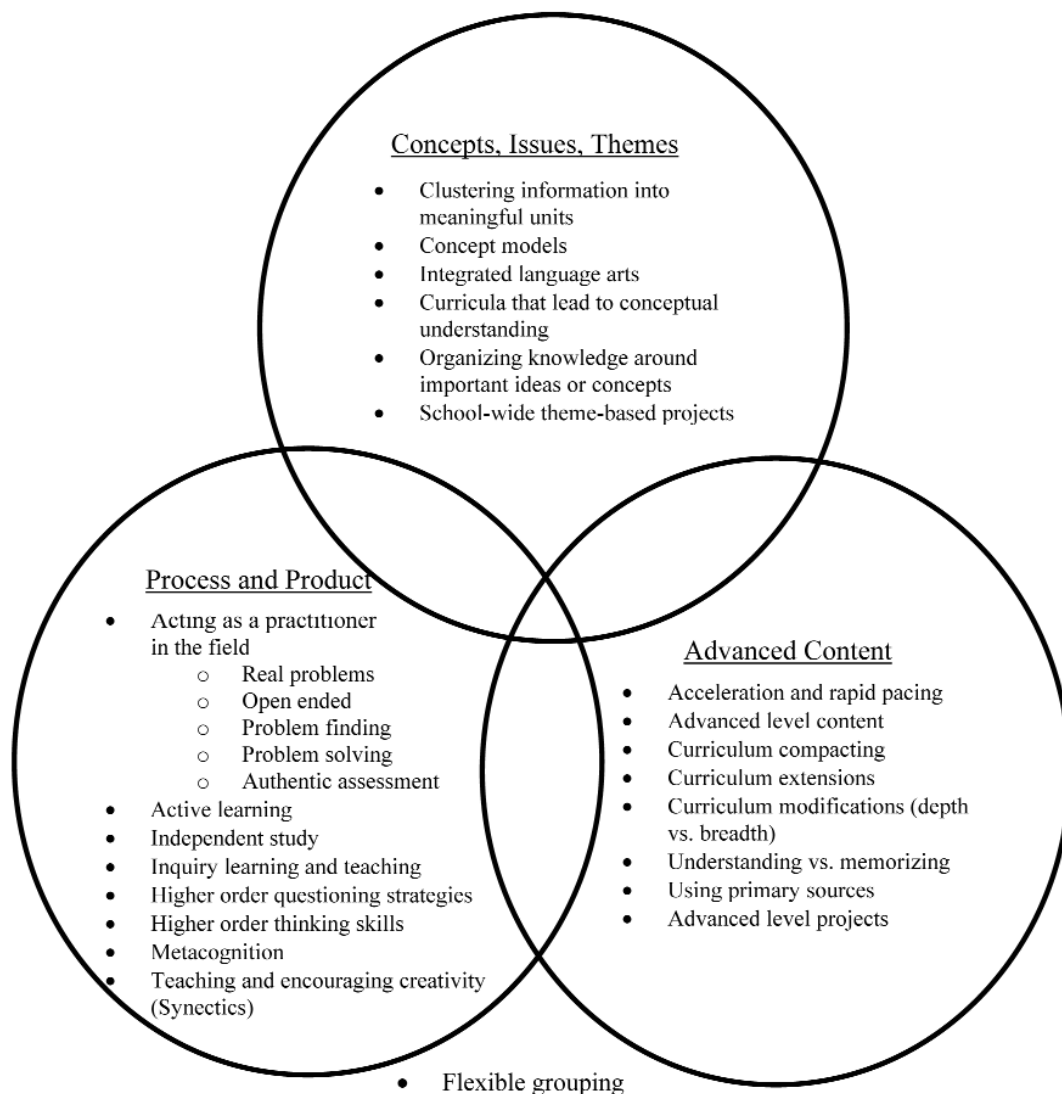


Figure 1. Best practices in gifted education and the ICM

Implications for Curriculum Development and Curriculum Remodeling at the School Level

The curriculum work undertaken at the Center for Gifted Education at The College of William and Mary, under the direction and supervision of Dr. Joyce VanTassel-Baska, has resulted in a curriculum framework that guides the creation of effective curriculum for gifted students. The curriculum units developed under the auspices of the CFGE have undergone scientific scrutiny and have gone through numerous revisions before reaching the stage of publication and general dissemination. The units have been aligned with national educational standards as well as selected state standards. Schools and districts from across the United States use these units of study regularly and systematically across grade levels. One of the most often heard comments from teachers has been “When will *William and Mary* have a curriculum for...?”

A project is currently underway in St. Louis Public Schools, St. Louis, Missouri, to remodel the district-mandated curriculum to meet the needs of gifted students in a middle/high school and in an elementary school where all of the students have been identified gifted. The school personnel began by creating a statement of their philosophy of curriculum. Next, they explored gifted best practice through the lens of the Integrated Curriculum Model. They identified the grade level and subject objectives required by the local school district and, using backward design, created units of study which include advanced content and advanced products/processes organized around a macro concept such as change, progress, evolution, patterns, or cause and effect. Each grade level team from PK through grade 10 have been assigned a macro concept and are working toward integration of all of their content into the specified concept. The project is in its infancy and moving forward in stages. During the 2008-2009 school year, the middle/high school began implementation of curriculum units in language arts and social studies. At this time, the units are being evaluated by outside experts in order to ascertain content validity. At the end of the first year of implementation, staff will evaluate the end of course data as well as the expert’s comments and revise the units as needed. The elementary school is currently developing their initial curriculum units and are expected to begin implementation during the last quarter of 2008-2009. Pre- and post-test data, critical thinking skills assessment data, and achievement test data will be collected after the implementation of the units to help determine the effectiveness of the units.

The St. Louis project is just one example where the ICM has been a useful tool for curriculum development for

the gifted at all levels of instruction. There are many more that could be mentioned. Needless to say, the work in curriculum of Joyce and her colleagues at William and Mary has advanced the field of gifted education in important ways and will continue to do so.

A Tribute to Joyce

Dr. Joyce L. VanTassel-Baska, a woman among women. George Eliot (English Novelist Mary Ann Evans, 1819-1880) once said, “It is never too late to become what you might have been.” As with many women from my generation, my career trajectory has taken a non-traditional path. After raising two wonderful daughters and teaching elementary and middle school for many years, I was blessed with the opportunity to realize a long-time dream of returning to school to study with some of the country’s most distinguished academics and earn an advanced degree in education. Joyce Vantassel-Baska welcomed me into the program at the College of William and Mary and into the Center for Gifted Education with open arms. She mentored me, sustained me, guided me, and challenged me. When I lacked direction, she challenged me to reach higher and go farther than I believed I could. She believed in me and dared me to believe in myself. She still encourages me to go one more step, try one more thing, make life better for one more child.

Joyce is a world-changer and a paradigm-shifter. She asks the right questions at the right time and allows each of us to grow and become our best selves. Without her guidance and persistent faith in me, I would not have completed the William and Mary program and would not be in the challenging, rewarding career that I am. My gratitude will never be enough to repay her for giving me the opportunity to become “what I might have been.” No one will ever replace her at the College of William and Mary, in the field of gifted education, or in my heart. Thank you, Joyce.

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Evaluating Psychological Factors that Relate to Academic Success among High-Achieving African American Males

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Introduction

In public school systems around the country, educators – teachers, counselors, and administrators – have made significant progress in identifying and recruiting diverse populations in gifted and enrichment programs (Moore, Ford, & Milner, 2005). Yet, a recurring theme in education is the underrepresentation of minority students in gifted education programs. Recruiting diverse students in gifted programs has been the primary focus for addressing their underrepresentation (Bernal, 2002). Bernal (2002) suggested that recruitment efforts – screening, assessment, and placement – have focused on: (a) finding appropriate instruments, namely culturally sensitive tests of intelligence and achievement, to assist with screening, referral, and placement decisions; (b) increasing teacher referrals of diverse students; and (c) creating or improving nomination forms and checklists that capture the strengths of diverse groups. However, another issue is retaining students once they enter gifted or rigorous academic programs (Ford, 1994; Johnsen, Feuerbacher, & Witte, 2007). The retention of minority students in gifted programs has become a serious issue in gifted education and suggests that few studies have focused on factors that affect the retention of students of color in gifted programs.

Over the years, many schools in impoverished areas have been receiving negative criticism as failing schools and not meeting the needs of students with special talents. As a result, retention of gifted students has become a great concern. The underrepresentation of economically disadvantaged children and adolescents – especially those from racial and ethnic minority groups – in programs for gifted students is one of the most recalcitrant and troubling issues confronting educators of gifted students (Borland, Schnur, & Wright, 2000). Ford, Grantham, and

Whiting (2008) report that “two issues have been heavily debated in education relative to African American students...the first is their lower academic performance compared to White students, referred to as the ‘achievement gap’, and the second relates to their underrepresentation in gifted education” (p. 216). According to Heck and Mahoe (2005), our high schools continue to provide inequitable educational experiences and outcomes for children of different racial-ethnic and social class backgrounds. Moreover, Heck and Mahoe (2005) state that “the high school preparation and educational attainment of African American and Hispanic students, however, continue to lag behind those of Asian American and white students” (p. 418). Ford et al. (2008) reported that “Black students are underrepresented by as much as 55% nationally in gifted education; although Black students compose 17.2% of school districts, they represent 8.4% of those identified as gifted” (p. 217). Furthermore, VanTassel-Baska, Johnson, and Avery (2002) reported that reorientation in teacher strategies, with a large influx of diverse gifted learners, will mandate changes in instructional practices to promote student success. Such strategies carry with them a promise for higher achievement at all levels of the educational continuum.

The many contrasting theories concerning the educational success or failure of students of different social class and racial-ethnic backgrounds suggest that there is no simple explanation (Heck & Mahoe, 2006; Nieto, 2005). Students who are not academically and socially integrated into their high schools politically resist their educational marginalization, or those who are disappointed in the promise of education, are more likely to leave before graduating (Fine, 1991; Mehan, 1992; Heck & Mahoe, 2006). This notion resonates across all aspects of education, but most importantly in gifted education.

Review of the Literature

The literature review presented in this paper will attempt to evaluate relevant literature that relates to academic success among high achieving African American students, but in particularly male students. An in-depth analysis of literature on underrepresented populations in gifted programs, the talent development process, resiliency, self-efficacy, and leadership provides a foundation for relevancy to academic success.

Underrepresented Populations in Gifted Education

One of the most persistent, troubling, and controversial issues in education is the disproportionate representation of minority students in special education, including gifted education (Ford, 1998). The underrepresentation of minority students in gifted education programs is a national problem receiving too little attention, especially as it involves African American learners (Daniels, 1998). One of the major concerns in gifted education is not only identifying more gifted students from lower income backgrounds but also retaining them in special programs (Johnsen et al., 2007).

Challenges in serving promising children of poverty include voluntary under-participation in programs for the gifted following identification, resources for educational and non-educational needs, special needs of persistent English learners, and policy-related structural issues (Kitano, 2007). According to Van Tassel-Baska, Patton, and Prillaman (1991), two of the most neglected populations in gifted education are individuals whose talents may not be recognized or actualized because they are (1) culturally different from the mainstream culture, and/or (2) economically disadvantaged. Gallagher (2003) agreed that an increasing concern is the particular needs of racial, ethnic, and cultural subgroups of gifted children.

In a cross-case study analysis conducted by Johnsen et al. (2007), the researchers investigated the issue of retention of at-risk learners in a university-based program, known as the University for Young People Program (UYP). The researchers were interested in learning more about factors that might be influencing the students who did not choose to remain in the program. Their findings indicate that social factors seem to strongly influence the retention of

gifted and talented students from lower income backgrounds in this academic enrichment program.

Another aspect of at-risk that tends to have many implications in gifted education is the nature of underachievement. Underachievement syndrome continues in epidemic proportions in our country (Rimm, 2003). According to Rimm (2003), being intellectually or creatively gifted does not assure educational or creative success or productivity; concurrently, there are risks and pressures that accompany high intelligence that detour potentially high-achieving children toward defensive and avoidance patterns. Rimm (2003) identifies three major pressures that are affecting gifted children: 1.) the need to be extraordinarily intelligent, perfect, or smartest; 2.) the wish to be extremely creative and unique, which they may translate as nonconformity; and 3.) the concern with being admired by peers for appearance and popularity (p. 424). In addressing the nature of underachievers as a component of at-risk students, Van Tassel-Baska (1998) indicated that in planning intervention, it seems appropriate to abandon the medical model and introduce alternative schools to provide such an opportunity in many locales, but they should start earlier than the high-school, preferably at the middle-school level.

The Talent Development Process

Talent development is a complex process involving the individual, the home, the school, and the community (Robinson, Shore, & Enerson, 2007). Understanding such individuals takes special skills and should encompass in-depth analysis of their traits. Expression of talents involves opportunities for individuals to showcase their special skills. According to Robinson et al. (2007), "talent development is fostered when the child or adolescent encounters the right teacher at the right time, has the opportunity to connect powerfully with the talent area, and has an outlet to express accomplishments" (p. 45). Gagne (1995) alludes to the success level of a student in any subject matter as a display of talent in that particular domain. Furthermore, Gagne (1995) indicates that a given natural ability can express itself in many different ways, depending on the field of activity adopted by the individual.

Gagne (1995) defines talent, within his model, as "the superior mastery of systematically developed

abilities (or skills) and knowledge in at least one field of human activity to a degree that places a child's or adult's achievements within at least the upper 15% of age peers who are active in that field or fields" (p. 103). Moreover, in his model, Gagne (1993 & 1995) emphasizes that "talents progressively emerge from the transformation of aptitudes into well-trained and systematically developed skills characteristic of a particular field of human activity of performance" (p.107). Furthermore, when talent is developed over a period of time, both psychological and environmental aspects play significant roles.

African American students are affected by factors that generate from school. Kennedy (1995) indicates that White students' educational experiences were generally influenced by socioeconomic factors, while African American students' performance and outcomes were related to school factors. Johnsen et al. (2007) concluded that relationships with peers, mentors, and parents appeared to have a significant impact in retaining students in rigorous programs.

Resiliency in African American Students

Wolin and Wolin (1993) suggest that individuals who demonstrate a high level of resilience are hardy, invulnerable, and invincible. Neihart (2001) notes that gifted children share similar characteristics with resilient children: intelligence and curiosity, self-efficacy, sense of humor, and problem-solving skills. Ford (1994) argues that resilient Black youth possess an internal locus of control, strong, yet positive sense of self, and feelings of empowerment. McMillan and Reed (1994) identified the need to evaluate how resilience promotes success in students. Resilient at-risk students have a set of personality characteristics, dispositions, and beliefs that promote their academic success, regardless of their backgrounds or current circumstances (McMillan & Reed, 1994). Resilient students have a strong sense of self-efficacy and believe they are successful because they choose to be (Reis, Colbert, & Hébert 2005).

Self-Efficacy toward Academic Success

Students with a strong sense of efficacy are enhanced in human accomplishments and well-being. Students with a high self-efficacy approach difficult tasks or accept difficult tasks and typically do not

avoid them. They typically set high goals and maintain them until tasks are completed. Set-backs are only minor reminders of road blocks that can be removed in order to be successful in future tasks. Self-efficacious individuals approach challenging situations with assurance that they have complete control over the outcome. Such an efficacious outlook produces personal accomplishments, reduces stress and lowers vulnerability to depression (Bandura, 1995).

Self-efficacy research in academic settings has focused primarily on two major areas: the relationships among efficacy beliefs, related to psychological constructs, and academic motivation and achievement (Pajares & Miller, 1995). According to Hsieh, Sullivan, and Guerra (2007), an extensive body of research has examined the relationship between self-efficacy and achievement in the domains of math and reading, suggesting that students with higher self-efficacy perform better in these areas than students who have lower self-efficacy. The researchers concluded that students with more confidence generally are more willing to persist in the face of adversity, and students with goals of "mastering a task" tend to invest in focused effort.

Leadership and Achievement

American schools are under constant pressure to ensure that all students succeed, despite their socioeconomic background, race, creed, or color. According to Karnes and Bean (1990), the mere fact that academic achievement is not as highly correlated with future leadership as extracurricular experience brings forth valued suggestions for promoting the skill of leadership among today's youth. Whether the focus is on achievement in the academic arena or in the extracurricular aspect, concerns for student success in leadership have surfaced as a major priority. According to Bonner, Jennings, Marbley, and Brown (2008), "one of the primary ability areas used to define giftedness that shows great promise in increasing the numbers of African American males identified is leadership" (p. 97).

The accommodations that many American schools must make are quite vital in establishing the leadership qualities in students early and often. For high achieving students, it is imperative that best practices are demonstrated and utilized for the

advancement of skills, knowledge, and capabilities to venture out into the world, but in particular, helping students realize their leadership potential. For example, when thinking of some of the nation's leaders, many of them were accelerated in their learning. According to Colangelo, Assouline, and Gross (2004), many of America's prominent leaders benefited from acceleration, which in turn delineated the myth that students who skip grades rarely fit into society. Eminent individuals such as Rev. Dr. Martin Luther King, Jr., T.S. Elliot, Joshua Lederberg, Sandra Day O'Connor, and W.E.B. DuBois were great leaders who reached society early, and as a result, everyone benefited (Colangelo, Assouline, & Gross, 2004).

Tribute to Dr. Joyce VanTassel-Baska

From August 2003 to August 2008, I have been afforded one of the greatest opportunities in my life; to have one of the world's most brilliant, talented, intelligent, and caring individuals in my life. Dr. Joyce VanTassel-Baska has been an inspiration in my life and truly a monarch in the field of gifted education. When I first met Dr. VanTassel-Baska, I immediately gravitated towards her warm and inviting spirit. After my meeting with her for advisement, I called my wife and told her that I have met the smartest person in the world.

Dr. VanTassel-Baska challenged me to my highest potential. I was fortunate to have her for three courses and each course provided a superlative academic challenge, high-level of rigor, and an opportunity to learn from one of the world's most renowned scholars in the field of gifted education. Moreover, I feel honored to have been a student, advisee, and to have her as my co-chair on my dissertation committee. Dr. VanTassel-Baska, I will truly miss you, the conversations we had, the scholarly advice that you have provided me over the years, and the conversations about life. You will always hold a special place in my heart and I appreciate all that you have done for me. Dr. VanTassel-Baska, enjoy your retirement and please remain available, because I really enjoy talking with you, not just about school, but about life.

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Challenging the Neglected Spatially Gifted Student with FIRST Lego League

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*You mean you taught yourself?"
"I don't quite know," Matilda said truthfully.
"It's just that I don't find it very difficult to
multiply one number by another."
Miss Honey took a deep breath and let it out
slowly. She looked again at the small girl
with bright eyes standing beside her desk so
sensible and solemn. (Dahl, R., 1988, p. 73)*

Appropriate challenge is needed for gifted children to thrive (VanTassel-Baska, 1998), and academic competitions are an excellent way to fulfill this need (Omdal & Richards, 2008). Students with spatial aptitude are less likely to receive challenge in school (Silverman, 2005; Webb, Lubinski, & Benbow, 2007), and thus academic competitions that challenge children spatially are apropos. Participation in the FIRST Lego League competition provides many types of challenge, particularly spatial challenge.

The need for challenge

Challenge in curriculum and instruction, at levels appropriate for gifted learners, has academic and affective benefits for them when provided and dire repercussions—such as underachievement—when denied. Challenging gifted students can be very difficult as they have often already mastered 40-50% of their grade level content before the year begins (Clarenbach, 2007) and have the ability to gain about three years of growth in one year (Rogers, 2007), but the benefits of providing challenge are numerous. Rogers (2007), in her meta-analysis of 40 studies on the subject, found consistent evidence showing that when gifted students are provided challenging curriculum, they have significantly higher test performance. There are many affective benefits to appropriate challenge as well. For examples, Benbow and Lubinski (1997) have shown that when gifted students are given challenging experiences, they are more likely to set higher educational goals, and

Hoekman, McCormick, and Gross (1999) found that stress levels of gifted adolescents were reduced considerably when challenge was increased to levels appropriate to their abilities. The consequences of failure to challenge are severe: Value-added assessment analyses have shown that the top 20% of students show the most decline when their needs are not met (VanTassel-Baska, 2007); gifted students left to languish with ineffective teachers may never be able to make up the lost learning (Hansen & Feldhusen, 1994); and high achieving teenagers experience rises in depression, stress, and boredom when they cannot move forward in an area of talent (Rogers, 2007). Underachievement is another major problem associated with a lack of academic challenge. Reis (2007) highlights the problem:

High-ability students spend hundreds of hours each month in classrooms where they rarely encounter new or challenging curriculum. They are bored by the assignments of routine tasks they mastered long ago, by low levels of discussion, and by a constant mismatch between content and their ability. These events lead to frustration for many of our brightest students (p. 125).

Estimates of gifted students underachieving range from 10-50% (McCoach and Siegle, 2008) and form 25-30% of high school dropouts (Kim, 2008). Underachievers finish four years of college less than half the time (McCoach and Siegle, 2008). Unfortunately, most classrooms focus on minimum-competency where gifted students have few, if any, opportunities to face academic challenges (Ozturk & Debelak, 2008b). As concerned educators of the gifted, providing consistent academic challenge must be our mission. Failure to provide gifted students with an appropriate level of academic challenge is indefensible.

Academic competitions as a means for providing challenge

Academic competitions are an excellent way

to meet the challenge needs of gifted students, having both academic and affective benefits. Ozturk and Debelak (2008a) identified several ways in which academic competitions help meet the needs of gifted learners including using higher order thinking, working on challenging tasks, creating products with unrestricted levels of excellence, and working in groups of ability-peers. Omdal and Richards (2008) found that mentorships, open-ended problems, and all work done by students were other factors in many academic competitions that were advantageous for gifted children. Beneficial outcomes for gifted learners, depending on the competition, are many-fold and include increased creativity, improved self-concept, aid in talent development, and higher goal-setting (Omdal and Richards, 2008). Ozturk and Debelak (2008b) also identify several affective benefits for gifted learners in academic competitions including increased motivation, nurturance of a healthy self-concept, coping with subjectivity, and opportunities to meet scholarly role models. There are competitions in almost every conceivable field and for all grade levels. Omdal and Richards (2008) list National History Day, National Geography Bee, Destination ImagiNation, and Odyssey of the Mind. The Yahoo! Directory (2009) has a section dedicated to K-12 academic competitions where the 60 listings include ThinkQuest Internet Contest, Kids Philosophy Slam, Academic Decathlon, Let's Get Real (a business-focused competition), Science Olympiad, National Science and Engineering Fair, and several others including region-specific competitions. Hoagies Gifted Education Page (2009) maintains an extensive list of about 100 competitions including Math Olympiad, National Peace Essay Contest, Rubber Band Contest for Young Inventors, and TOY Challenge. The book *Academic competitions for gifted students* (Tallent-Runnels & Candler-Lotven, 2008) lists 165 academic competitions including Doors to Diplomacy, EngineerGirl Essay Contest, Fire Fighting Robot Contest, Physics Bowl, Vegetarian Resource Group Essay, and Young Naturalist Awards. Likely, there is an academic competition available in virtually every domain in which giftedness exists.

Spatial giftedness

Giftedness in the spatial domain is

increasingly recognized as an area worthy of service in schools and summer programs, but students with spatial gifts are still neglected in school curricula and instruction and thus are rarely challenged in their talent area (Silverman, 2005; Webb, Lubinski, & Benbow, 2007). Traditional gifted programs and talent searches do not even look for students with high spatial ability, relying instead on math and verbal domains or general intelligence only (Webb, Lubinski, & Benbow, 2007). This lack of service and challenge has consequences for spatially gifted students. According to Mann (2006), students with spatial gifts tend to be undereducated and underemployed as adults compared to students with similar gifts in mathematical and verbal areas. Likely due to high math foci in schools (Silverman, 1998), spatially gifted students tend to have lower educational aspirations and less motivation to perform than gifted math students (Webb, Lubinski, & Benbow, 2007).

This is particularly alarming since people with spatial strengths are highly suited for careers in engineering, architecture, medicine, dentistry, and other STEM fields (Snow, 1999) as well as the arts. Complicating matters further, Silverman (2005) has found that many spatially gifted students do poorly on auditory and sequential IQ test items leading to low overall scores despite excellence on visual-spatial items. The author notes that spatially gifted students may struggle with reading, writing, timeliness, and organization, leading to academic failure. Spatially gifted students may also have other exceptionalities such as learning disabilities (Mann, 2006). Since children tend to perform better—even in areas of relative weakness—when teaching is focused on their area of strength (Sternberg, et al., 2000), the need to provide spatially gifted students with spatial challenges is glaring.

Academic competitions and spatial giftedness

Academic competitions involving spatial challenges can help meet the needs of students with high spatial abilities. In particular, given the designing, building, and programming aspects of FIRST Lego League (FLL), it is an ideal competition for the spatially gifted. FIRST is the foundation For Inspiration and Recognition in Science and Technology. The not-for-profit organization “designs

accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and math, while building self-confidence, knowledge, and life skills” (US FIRST, 2008). The foundation sponsors the FLL for ages 9 to 14 years discussed in this article as well as the new Junior FLL for ages 6 to 9 years and two high school level robotics programs. Teams of 3 to 10 kids, ages 9-14 (as of January 1st of the competition year) can participate. Anyone can form a team—a school, an organization (such as Scouts or 4-H), or a neighborhood group. FLL is an international competition taking place in more than 40 countries and involving more than 13,500 teams with an approximate total of 135,000 children participating in the 2008/09 competition year (US FIRST, 2008). Each year, a new real-world science topic is chosen. Recent topics have included nanotechnology, Mars exploration, energy production, and global climate change. Teams register over the summer or in the early fall. Qualifying Tournaments (often called “regionals”) are usually held in November with Championship Tournaments generally scheduled in early December. There were more than 450 regional qualifying events scheduled in 2008 and continued growth is expected (US FIRST, 2008).

There is strong evidence—both from classroom use of robotics (Lego and otherwise) and from participation in FLL competition—that gifted students, particularly those with high spatial ability, can benefit from the high challenge level. Waks and Merdler (2003) found that designing, building, and programming a Lego robot pushes students’ spatial reasoning and creative problem solving abilities. Petre and Price (2004) gathered data from numerous robotics competitions, including FLL competitions, and determined that robotics works effectively as a vehicle to guide children toward an effective understanding of programming and engineering principles. Notably, the authors found that this learning was generalizable to other programming and engineering situations. Geeter, Golder, and Nordin (2002) found that middle school students competing in FLL gained a better understanding of engineering; improved creative thinking, critical thinking, and problem-solving skills; and increased self-confidence levels, interest, and involvement in science and math. Importantly for the purposes of this

paper, robotics has been used specifically for spatial instruction. Verner (2004) has used pre- and post-measures of middle and high school students participating in a robotics curriculum using kinematics, point-to-point motion, rotation of objects, and robotic assembly of spatial puzzles and found significant student progress in the tasks related to spatial ability. In a similar vein, physics content knowledge was improved in a study of robotics in a middle school summer program (Williams, Ma, Prejean, Ford, & Lai, 2007).

Robotics has been successfully utilized at many levels. For example, robotics may have similar benefits for average and lower performing students as well. In research conducted in a remedial class of eleven and twelve-year-olds, students showed gains in understanding their learning style as well as in problem-solving skills (Swartz, 2007). Lego robotics’ use is not limited to school-aged children; it has also been used at the college level for training engineers. Wang, LaCombe, and Rogers (2004) used Lego robotics to cover sophomore and junior-level coursework including such concepts as data acquisition, numerical methods, dynamics, statics, motor performance, fluid dynamics, feedback control, and strength of materials. Michigan Tech has a program for its engineering students to mentor FLL teams, helping to enhance their own students’ engineering education while working to increase the future pool of engineering students (Oppliger, 2002). Furthermore, it is likely that, as children participating in FLL are actively engaged in science, technology, engineering, and math (STEM) fields, they may become more interested in such careers and begin to pursue advanced classes in those subjects earlier (Webb, Lubinski, & Benbow, 2007). As robotics can be beneficial to lower achieving students and still provide challenge at the university level, it is likely that robotics curriculum and competition would be beneficial for spatially gifted underachievers and spatially gifted students with other exceptionalities such as learning disabilities.

Benefits

Spatially gifted children, including those underachieving and those with other exceptionalities, need to be challenged in their talent area. This need is not fulfilled by most math curricula, but robotics

curricula and competitions, such as FLL, hold promise for providing for this challenge need. Based on the literature review presented here, the academic benefits of providing appropriate challenge for spatially gifted children will likely include higher achievement; improved skill in spatial reasoning, higher order thinking, creative problem solving, and critical thinking; increased content knowledge in spatial fields such as physics; improved process understanding in programming and engineering; and earlier pursuit of advanced coursework in science and math. Affective benefits should be equally numerous, including higher goal setting; improved motivation and self-concept; increased self-confidence levels, interest, and involvement in science and math; decreased depression, stress, and boredom; and opportunity for mentorship with scholarly role models. The benefits extend to society as well. By recognizing spatially gifted children and providing them with appropriate challenge in their talent area, the future pool of students pursuing STEM fields such as architecture, medicine, dentistry, and engineering as well as the arts will likely increase.

Conclusion

The need to challenge spatial learners is great, and the existing research suggests that FLL competition may be a means of addressing this need. Much further research is needed, however. Although several studies on the use of robotics, including FLL competitions, have been done, only one included measures of spatial aptitude, and it did not involve FLL competition. A study focused on the relationship between spatial ability, participation in FLL competition, and any achievement gains found could have important implications for providing a more appropriately challenging education for the spatially gifted.

Tribute to Dr. Joyce VanTassel-Baska

I have not known Professor Joyce VanTassel-Baska for long, but have made use of her work as a practitioner for several years prior to entering the Ph.D. program in Educational Policy, Planning, and Leadership with an emphasis in gifted education at William and Mary. In particular, after seeing Joyce speak at the National Curriculum Networking Conference several years ago, my focus in educating

my gifted students moved from enrichment-only to include rigor and challenge. Due to the challenge inherent in FLL, I came to understand it as an excellent way to address the needs of gifted students and first noticed that some students who excelled at engineering robots did not similarly excel in math—leading to my interest in the spatial domain. Now that I have daily interactions with her, both as her student and her research assistant, I have been able to greatly expand my understanding of gifted children and the field of gifted education, particularly from her knowledge of domain-specific giftedness which suits my interest in spatial intelligence. Joyce has both affirmed my intent to pursue connections between spatial ability and Lego robotics while challenging me to broaden my horizons. She is incredibly active and productive as a writer, a speaker, a researcher, and a teacher, and yet she is also able to make time to be a mentor, a role that has been fortunate for me.

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Differentiated Instructional Strategies: Practical Ways to Meet the Gifted Needs of Gifted Learners in the Regular Education Classroom

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Introduction

“Equality in education does not require that all students have exactly the same experiences. Rather, education in a democracy promises that everyone will have an equal opportunity to actualize their potential, to learn as much as they can” (Fielder, Lange & Winebrenner, 2002, p. 109).

Across the nation, gifted education programs need to be evaluated and revised, which, The United States Department of Education brought to the forefront of the gifted education debates in their report *National Excellence: A Case for Developing America's Talent* (1993). The report found that many gifted students are failing to achieve to their fullest capability. While educational reform proponents have focused on raising the bar for the lowest students, they must also raise the standards for America's brightest students. In 2001, the *No Child Left Behind Act (NCLB)* was created to close the achievement gap by raising standards and accountability. The increased pressure on states and districts to bring together all levels of ability has played a large role in the reduction of the gifted education services offered. This unfortunate side effect is a result of the negative perception that gifted learners are already achieving, and therefore do not need additional support. When so many students are failing, providing support for a group of children who are already above standard is overlooked (VanTassel-Baska, 2006). The *National Excellence* report, created years before NCLB, clearly shows that these needs are not being met.

In order for gifted education programming to be accepted in the public school system it must be linked to the standards in a meaningful way (Gallagher, 2000; Kaplan, 2008). Differentiating the instruction provides the link to the state standards while meeting the needs of the gifted students in the regular education classroom. It is paramount for

gifted learners who have unique learning needs to receive differentiated instruction; this is achievable through a variety of instructional strategies.

The term differential education was first used by Virgil Ward in 1961. His research found that if instruction was going to best meet the needs of all learners, it would have to be differentiated based on the student's needs (Ward, 1980). He argued that the gifted were not receiving an education that enhanced their intelligence because of the nature of general education. Ward believed several principles should guide instruction and curriculum for gifted learners. One principle was that the gifted education program should be unique and meet the needs of the individual learner (Ward). Individualizing the educational experience for the gifted learner provides a challenging learning environment. He believed this could be accomplished by posing higher level questions, more in-depth explorations of the content as well as acceleration through the content. Differentiated instruction therefore lies at the heart of gifted programming and is a nonnegotiable of educating gifted students (VanTassel-Baska, 2005).

Review of Literature

Effective instruction is critical to student achievement and growth in mixed-ability classrooms. Sanders and Rivers (1996) researched the direct impact of the teacher's instructional abilities on student achievement. They reported that student achievement is inhibited up to 54% when the student has an ineffective teacher for three years in a row. Sanders and Rivers (1996) found this to be true of students of all ability levels, not just high ability learners. Differentiating instruction to meet the needs of the learner has been proven effective for students at both ends of the bell curve (Brulles, 2008; Guskey, 2007; Tleson, 2004).

All students differ in their abilities, interests, and readiness levels. Effective teachers modify their instruction to meet the needs of all of their students (Tomlinson, 1999; VanTassel-Baska, 2003). Gifted learners learn best when they are actively involved in their learning. Building a knowledge framework allows gifted students to build new schemas, make connections, and process new information (Feldhusen, 1985; Reis & Small, 2001). Gifted learners are characteristically more motivated to learn, as well as are more curious, imaginative, creative, and have advanced abilities, interests, problem solving abilities, and senses of humor (Reis & Small). These unique characteristics need to be accommodated for during instructional time. Inquiry-based instruction, tiered activities, and curriculum compacting are three instructional strategies, grounded in research, which are effective in meeting the needs of the gifted learner in the regular education classroom. All three of these strategies are implemented after pre-assessing the students' abilities, interests, and readiness levels. This critical step in the process of differentiating provides the data that enables the teacher to prepare the curriculum and instruction (Rodgers, 2002). Rodgers found that when gifted programs were matched with the gifted child's interests and abilities that on average a third to a half of a year's additional achievement (effect size of .35 to .49) was possible.

Curriculum compacting is an instructional strategy shown to be effective with gifted learners. It is one way to effectively meet the needs of the gifted learner in the regular classroom (Tomlinson, 1999; Reis, Westberg, et al., 1993). Often gifted learners are able to pass standardized tests at the beginning of the year because of their advanced skills, knowledge, and interests. These students need the opportunity to explore more challenging curriculum in order to enrich their educational experience (Reis & Renzulli, 1992). Compacting provides opportunities to modify the curriculum by eliminating the already mastered content, and replacing it with academic challenges in the area of interests (Tomlinson; Winebrenner, 2003). In order to compact, the teacher must first identify the objectives for the unit, then pretest the entire class on the specific objectives, and finally, the teacher and student replace the curriculum with enrichment or acceleration activities (Renzulli & Reis, 1998). The

benefits of curriculum compacting have been consistently found to be positive in respect to student learning (Reis, Westberg, et al., 1993; Stamps, 2004).

The second differentiated instructional strategy that is effective at providing appropriate levels of instructions for gifted students is tiered activities. Tiered Activities provide students lessons focused on standards, essential understandings, and skills but at the appropriate levels and abilities (Tomlinson, 1999). Tiering provides differentiated instruction based on complexity, challenge, and depth. Project GATE, a Tiered Curriculum Project, was a federally funded partnership between Ball State University and Indianapolis Public Schools (Pierce & Adams, 2004). Project GATE researched and created differentiated lessons through the use of the instructional strategy of tiered activities. There are six basic steps in developing a tiered lesson. First, the teacher selects the concept, skill, or generalization for the assignment. Then the teacher considers the interest, readiness, and learning profile of the students. Next, the teacher creates an activity that is interesting and high level. By charting the complexity of the activity the educator is able to evaluate for whom the activity is appropriate for. Finally, the teacher adjusts the activity for the various student levels by adjusting the materials needed to complete the assignment and then matching appropriate versions of the activity to the student groups (Tomlinson).

Inquiry-based instruction is another instructional strategy shown to improve the achievement levels for all learners (VanTassel-Baska & Brown, 2007). Inquiry-based instruction is especially important for gifted because it helps them become competent thinkers and problem-solvers (Feldhusen, 1998). Inquiry-base instruction capitalizes on several of the characteristics of gifted learners. Gifted learners are naturally more independent and typically are bored with mundane tasks (Rosselli, 1993). When the teacher is a facilitator, rather than a lecturer the gifted are able to use their skills to create new understandings and build new schemas. The creation of new schemas is a result of thinking creatively and critically. Another characteristic of giftedness is the unique ability to understand information and use it productively. Gifted learners therefore excel when the higher-levels of

Bloom's Taxonomy are used to facilitate inquiry-based instruction because they are engaged in evaluating, synthesizing, and analyzing the content (Bloom, 1977). Inquiry presents students with a question to be solved and then students brainstorm solutions, gather data, synthesize the information, assess their conclusions, share the conclusion, and evaluate the conclusion (Sisk, 1993).

Application to School-Based Practice

Curriculum compacting, tiered activities, and inquiry-based instruction are three instructional strategies that can easily be implemented in the regular education classroom. Teachers, administrators, and school systems are provided with cost-effective solutions to providing a high-quality education to gifted learners when they use differentiated instructional strategies. These strategies are easy to learn how to use during a professional development session and with a subsequent follow-up sessions classroom teachers are well on their way to meeting the needs of their gifted learners. Furthermore, these instructional strategies may be used in any combination, or independently which provides the classroom teacher with a toolbox of strategies to reach gifted learners. The classroom teacher selects which strategy to use based on the interest levels, readiness levels, and learning profile of the student.

In mixed-ability classrooms, where students must demonstrate mastery of common objectives, curriculum compacting offers gifted learners an opportunity to accelerate through previously mastered material. Curriculum compacting buys time for gifted students to explore areas of interest and flourish under the discovery of new knowledge and creation of new schemas. At the same time, it enables the classroom teacher to focus attention on lower students while providing a quality educational experience for the gifted. Curriculum compacting opens doors for gifted learners to explore in greater depths and levels of complexity; opportunities that would otherwise not present themselves. Because curriculum compacting is based on pre-assessments the gifted learner always receives appropriate levels of instruction.

Tiered activities, likewise, provide classroom teachers with a practical solution to meeting the needs of all learners on a daily basis. Tiering opens doors to gifted learners by giving students the opportunity to

be challenged and build new knowledge in a classroom setting that would otherwise be repetitive; while at the same time covering the essential questions and knowledge required by the curriculum. Tiered activities differentiate the instruction based on levels of complexity, open-endedness, and abstraction. Teachers can easily integrate tiered activities into the daily schedule as work stations, or independent learning centers. Gifted students excel when their interests, talents, and readiness levels are challenged. Tiered activities are a realistic way for the classroom teacher to provide these opportunities to gifted students.

A final differentiated instructional strategy that can be practically implemented in a mixed-ability classroom is inquiry-based instruction. Gifted students characteristically are more independent learners who enjoy being challenged. Inquiry-based instruction allows gifted students to explore, build new schemas, and become independent learners. This differentiated instructional strategy enables the classroom teacher to become the facilitator, or guide rather than the sole source of knowledge. This is another realistic way that the classroom teacher can meet the needs of gifted students. Instead of having to carve out periods of time to impart knowledge on gifted students, the teacher only needs to point the students in the right direction and they are able to explore the topic in greater depth, levels of complexity and challenge.

Curriculum compacting, tiered activities and inquiry-based instruction are solutions to the dilemma of how to meet the needs of gifted students in the regular classroom. These differentiated instructional strategies are researched-based and proven to be effective with gifted learners. Each strategy is flexible enough that the classroom teacher can use them with all subject areas, as well as being straightforward enough that the teacher does not need a lot of professional development or added resources to implement them on a daily basis.

Implications for Research

Differentiated instructional strategies have been proven effective in the literature at meeting the needs of the gifted learner. There are still many questions, however, in regards to how often, and how effectively these strategies are being implemented in

the classroom setting. These questions coupled with the need to reform the American educational system have set the stage for future research studies. Future research studies should evaluate gifted program models to determine the degree to which these strategies are being used in classroom. Additionally, it would be interesting to research if certain combinations of differentiated instructional strategies are more effective than others. Research studies examining the frequency of which the different strategies are used by the teachers would provide insight into which methods are used more often by the classroom teachers. Research studying teacher choice and student choice would provide data that may be helpful in the revision of gifted program models.

In the Age of Accountability, it is important to be able to link instruction to data. Therefore, research studies measuring the effects of the use of differentiated instructional strategies with gifted students on their standardized test scores are needed. There is also a need for longitudinal studies focused on the long-term benefits to gifted learners who are taught through the use of differentiated instructional strategies.

Tribute to Dr. Joyce VanTassel-Baska

I was first introduced to Dr. Joyce VanTassel-Baska when I was officially accepted into the doctoral program at The College of William & Mary. Having recently completed my endorsement in gifted education, I recognized the name as the researcher cited in all of my papers and was awed by the prospect that THE Dr. Joyce VanTassel-Baska was my advisor. During our first meeting, I realized that my educational experience at W&M was going to be much more than just a degree when Dr. VanTassel-Baska invited me to call her Joyce. Joyce was not only my advisor, but she was my mentor, my professor, and my cheerleader. Joyce challenges everyone to reach for more and not to be satisfied with just being good, but rather to strive for excellence. This unwavering expectation of excellence drives Joyce forward in her research, teaching, work at the Center, and sponsorship of graduate students.

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Problem-Based Learning: A Review of Literature

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Overview

Problem-Based Learning (PBL) originated in Canada in the 1950's and 1960's, acknowledging and addressing student and instructor dissatisfaction with commonly

held practices in medical education (Barrows, 1996). In discussing the origins of PBL, Boud and Feletti (1997) said:

PBL, as it is generally known today, evolved from innovative health sciences curricula introduced in North American over 30 years ago. Medical education, with its intensive pattern of basic science lectures followed by an equally exhaustive clinical teaching program, was rapidly becoming an ineffective and inhumane way to prepare students, given the explosion in medical information and new technology and the rapidly changing demands of future practice. Medical faculty at McMaster University in Canada introduced the tutorial process, not only as a specific instructional method (Barrows & Tamblyn, 1980) but also as central to their philosophy for structuring an entire curriculum promoting student-centered, multidisciplinary education, and lifelong learning in professional practice (p. 2).

This medical training tool has now been applied globally in disciplines not necessarily related to the medical arts (Gijselaers, 1995). PBL presents real world problems to students who are asked to apply reasoning, questioning, researching, and critical thinking to find one of many potentially correct solutions to problems posed. PBL is an educational construct that is centered on discussion and learning that emanates from a substantive, sound, concrete problem that gives students practice in tackling puzzling, frustrating, demanding dilemmas and predicaments that require that students define their own gaps in understanding in the context of the initial information offered. Additionally, PBL is a learning

model that incorporates many of the key principles of constructivist learning (Savery & Duffy, 2001), and those found in project-based science that engenders and promotes student's science learning (Schneider, Krajcik, Marx, & Soloway, 2002).

While there are many versions and translations of what constitutes PBL (Boud & Fellitti, 1991), PBL is widely viewed as a method of problem solving in which students are presented with an opportunity to solve problems similar to those one might encounter in real life situations (Boud & Fellitti 1991, Gallager, Stepien, & Rosenthal, 1992, O'Neil, 1992, Perkins & Blythe, 1994, Wiggins & McTighe, 1998). These problems are presented, as ill-structured and ill-structured problems are those that have the following characteristics; a) more information than is initially available is needed to understand the problem, b) the problem definition changes as new information is added to the situation, c) many perspectives can be used to interpret information, and d) no absolute right answer exists (Barrows 1990), cited in (Gallagher, Stepien, & Rosenthal, 1992). In addition to these characteristics, three criteria are essential for PBL; beginning the learning process with a problem; exclusive use of ill-structured problems, and the use of the teacher as a metacognitive coach (Gallagher, Sher, Stepien, & Workman 1995, O'Neil, 1992). Bridges (1992) states that PBL problems should be created with the following components: a) introduction, b) content, c) learning objectives, d) resources, e) expected outcomes, f) guiding questions, g) assessment exercises, h) and a time frame.

Dooley (1997) offers five stages for students who are reacting to the prescribed scenario past, present and future. These include reacting to the PBL scenario, which is an opportunity for students to take ownership, make a commitment to the investigation, while formulating questions that speak to the many variables posed by the original problem. Brainstorming, webbing (Hyerle, 1996), cause and effects, visualization, guided imagery, and role

playing that develop the present perspective, exploring the past perspective, predicting the future perspective solving problems, and synthesizing to develop a product. Finally, working in small groups, looking to sub-problems, questions, issues and trends related to the scenario students find opportunities to construct in-depth knowledge, critical and creative thinking skills that develop goals for self-directed learning.

PBL offers students ill-structured, realistic problems that integrate many disciplines and relate to the real world, focusing around relevant and important science content. Additionally, the given situation does not clearly define the problem and therefore students must determine the parameters of the problem as the initial problem lacks important information to develop a viable solution. The fact that this process does not address a single correct answer and allows for the latitude to explore a number of paths to finally develop a solution, speaks to a real world science that requires a non-linear process that is repeatedly followed to test a hypothesis, evaluate, and redefine the often elusive possibilities to resolution(s). Finally, not unlike the real world, students will never be absolutely certain they have the correct solution because of missing information and ethical constraints. However, a sound decision, best educated guess, must follow, (Gallagher et al., 1995).

A body of empirical evidence suggests that PBL is being used by teachers/facilitators in the field of gifted education, to include science, and less definitive evidence of its' holistic translation, and effectiveness with students. These questionable translations, which are labeled PBL, often failed to achieve the envisioned learning outcomes for a variety of reasons. Boud and Feletti (1997) delineate a number of possible sources for potential confusion; a) confusing PBL as an approach to curriculum design with the teaching of problem solving, b) adoption of a PBL proposal without sufficient commitment of staff at all levels, c) lack of research and development on the nature and type of problems to be used, d) insufficient investment in the design, preparation and ongoing renewal of the learning resources, e) inappropriate assessment methods, which do not match the learning outcomes sought in problem-based learning, and f) evaluation strategies which do not focus on the key learning issues and which are

implemented and acted upon far too late.

Fenwick and Parsons (1997) question the pedagogy and procedure of PBL and point to Casey and Howson's (1993) concern for preparing teachers to "harness their creativity through organization and planning" (p. 361). Novice PBL teachers are taught to perceive and respond in rational, logical, orderly ways, which Fenwick and Parsons see as well-intentioned and logical. However, the larger question posed is, "Whose gaze has divined these problems and produced the cases?" (p. 10). Additionally, the authors would offer that student professionals need to learn how to "Sort among divergent perspectives and conflicting priorities...thinking and acting in ways that allow a flexible view of a situation will accommodate emerging details" (p. 12).

An empirical perspective, gleaned from gifted curriculum design and its application, VanTassel-Baska & Brown (2007) would offer that:

The substance of gifted education, as a field, rest on the faithful application of curriculum and program models that are designed to serve gifted student in school and other contexts. Consequently, the influence of these models cannot be overestimated because systematic differentiation in the field is nested in teacher understanding of how to translate curriculum and instruction in appropriate ways and with diverse gifted populations (p. 342).

Gallagher, Sher, Stepien & Workman (1995) sees the teacher/facilitator in PBL as a metacognitive coach and not an expert or discussion leader. However, the facilitator/teacher does assist students in understanding the questions during the problem definition phase. He or she can also facilitate information location and sort through potential interpretations. Additionally, the teachers coach students on how to handle data, to include note-taking and storing of raw data. Finally, PBL facilitators modeling the behaviors of a scientist allow such skills to be transferred and applied in successful ways.

Clearly, an expectation of education is to enable students to become effective problem solvers, developing skills that enhance their critical thinking and refining these skills as effective problem solvers in real time (AAAS, 1993, Brooks & Brooks, 1993, Chin & Chia, 2004, Gallagher, 1997, Tobin, 1993).

Learning how to learn includes problem solving and the aim of teaching and learning is embedded in the learning by the doing and experiencing principle (Dewey, 1938). Eisner (2005) would concur, as his vision of education and the learning process is an occasion for discovery and, more importantly, an opportunity to obtain experience that is meaningful. Meaningful in the sense that one makes connections and perceives relationships that enhance and illuminate the meaningfulness of the work at hand and the connections it has to one's own passion and humanity. Eisner's vision places a higher premium on exploration than on discovery, and regards the quality of the journey as more educationally significant than the speed at which the destination is reached. PBL may also offer another educational catalyst to what Csikzentmihalyi (1990) discerns as critical for students to see themselves as the initiators of the action, enhancing feelings of self-determination and thus presenting an occasion to build one's intrinsic motivation and personal competence within the realm of the problem.

Problems with Problem-Based Learning

Fenwick and Parsons (1997) in their treatise: *A Critical Investigation of the Problems with Problem-Based Learning* offer a thought provoking perspective that revisits the very roots of PBL from a professional view, and that of training medical student. The authors acknowledge PBL's use in schools of graduate business to teacher preparation programs, Hughes and Sears, (1994); Casey and Howson (1993). However, Fenwick and Parsons (1997) see PBL as "ontologically narrow and epistemologically inconsistent,"(p. 4) and also cite that "Critics seem to accept the philosophical premise of PBL, and quibble only about particular practices within its application (p. 4). "A problem-based perspective attempts to reduce mystery, situation ambiguity, messy dynamics of human interaction, and life's essential difficulty to a pipeline of knowable and resolvable problems" (p. 8).

Vernon (1995) sees the disadvantages generally perceived are "knowledge gaps, wrong information," and what he terms the "inefficient use of valuable time"(p. 4). Hinman (1994), in (Fenwick and Parson 1997) views the PBL curriculum as presupposing that by way of intellectual problem-

analysis, students will acquire a litany of structures to relegate to the framing and solution of problems in real the world (p. 14). What is unclear about this criticism, according to Fenwick and Parsons, is the context for such assessment and they posed the question; what educational criteria is being compared to PBL and finally what constitutes improvement in student achievement and attitude?

There appear to be a number of versions of PBL and a number of claims made about the achievements of PBL, but they are based in anecdotal evidence or limited evaluative studies of narrow generalizability (Newman, 2004). Additionally, there is expressed concern in the literature regarding problem-based learning's application (O'Neill, 1992) and PBL's academic content; in that some critics question whether as much content is covered as with more traditional methods (Gallagher, 1993, O'Neill, 1992, Margetson, 1991, Stepien, Gallagher, 1993).

Additionally, other researchers have noted that teachers may not be trained to be "cognitive coaches" or willing to allow students to take ownership of the problem(s) (O'Neill, 1992, Margetson, 1991, Stepien & Gallagher, 1993). In regard to staff development, there does appear to be a definitive need for teacher training in the application of PBL, due to the restructuring of the learning environment resolute in No Child Left Behind, and the very nature of ill-structured problems, (O'Neill, 1992, Stepien & Gallagher, 1993). Waters & McCracken (1997) also emphasize what they term the "equity principle," in selecting a pedagogic methodology, as diverse learning styles is a principle factor in the current interest in PBL by the educational community (p. 1).

Assessment

Nowak & Plucker (1999) expressed concern for the assessment piece of the PBL model and offer that there is a "misalignment" in the instruction-assessment in what they consider otherwise exemplary units of Problem-Based Learning. Reis & Renzulli (1991) also concurred that assessment was often haphazard or non-existent. Specifically, authentic assessment that speaks to professionals in a given field in which the ill-structured problem exists is the most desirable method of assessment and should be ongoing, not just at the end. Formative assessment should be integral to the PBL unit and the

authors make a number of suggestions to insure proper assessment: a) stress that students are professionals in the field in which the ill structured problem exists and assess them as if you (teacher) are their supervisor, b) if instruction is problem-based, assessment should be similarly structured, c) teacher/facilitator should provide reasonable guidelines regarding your expectations for the students, d) don't hold off on assessment until the end of the activity or unit; model real-world behavior, in which ongoing assessment occurs (p 3-5) .

Evaluation

Literature evaluating PBL in differing venues include (Gallagher, Stepien, and Rosenthal 1992), study of 78 students using a problem-based course that meshed social science, physics and mathematics found that the experimental group manifested remarkably increased capacity for fact finding, problem finding and resolution finding. In another study by (Gallagher, Stepien, and Rosenthal 1992) found that PBL students became better at problem solving than the comparison group. Additionally, (Hmelo, Holton and Kolodner 2000) conducted a preliminary study of middle school students learning life science. It was concluded that students exposed to the PBL intervention learned more than a comparison class.

Utilizing the *Acid, Acid Everywhere unit*, 1461 students, grades 4-6, in 17 comparison classrooms were evaluated for science learning (science process skills) by (Van Tassel-Baska, Bass, Ries, Poland & Avery, 1998) using the Diet Cola Test (Adams,& Callahan, 1995; Fowler, 1990). The authors found statistically significant differences between pre and post tests of the experimental and comparison groups using an analysis of covariance ($F=32.86$; $p<.001$) with an effect size of 1.30 for those students in the experimental group (science process skills) compared with the control group not using the unit.

VanTassel-Baska & MacFarland (2008) in Critical Issues in Gifted Education, Science Secondary, observed similar problems at secondary ages and grade levels, while science reform efforts continue to emphasize, “Hands-on, minds-on approach to learning scientific processes, inquiry, and content”(p. 579). The authors point out that serious science study is too inflexible at this juncture to

accommodate the kinds and quality of world-class levels of science inquiry. However, powerful curricular solutions that speak to high-level thinking, problem solving, critical thinking are addressed via an instructional approach such as problem-based learning.

Reflections on Joyce Van Tassel-Baska

“The best thing for being sad,” replied Merlyn...”is to learn something. That is the only thing that never fails. You may grow old and trembling in your anatomies, you may lie awake at night listening to the disorder in your veins...you may see the world around you devastated by evil lunatics, or know your honor trampled in the sewers of baser minds. There is only one thing for it then – to learn. Learn why the world wags and what wags it. That is the only thing which the mind can never exhaust, never alienate, never be tortured by, never fear or distrust, and never dream of regretting. Learning is the thing for you.”

T.H. White, *The Once and Future King*.

My graduate experience at William and Mary came late in life and like so many other fortunate students is inextricable linked to Joyce Van Tassel-Baska. I was drawn to a body of knowledge that is infused with Joyce's lifetime passion for gifted education and which resonated, framed a purpose for and shed light on my own identity. Joyce often knew what I needed academically, professionally before I was completely aware and I have been truly fortunate to have a mentor that awakened a truth within me and assisted in allowing me to come to the realization that I was indeed a teacher at heart.

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Additional Tributes to Dr. Joyce VanTassel-Baska

Several years ago when I was feeling very down and frustrated with my future as an educator in gifted education, I took a chance and called Dr. Van Tassel-Baska. I wanted to know about the masters in gifted education program at The College of William and Mary. She actually took the time from her very hectic schedule to call me from an airport in Ohio to let me know of the fellowship program for the masters program. I suggested that maybe I was a little old for the program, and she still encouraged me to apply. I did, and I was accepted. I graduated with an MA Ed. in Gifted Curriculum three years later.

I have had the distinct pleasure of knowing Joyce, now, for a little over eight years--first meeting her as a parent picking up our daughters from Latin Academy and later finding myself attending her classes as I pursued that masters degree in gifted education. I have never known any one with the volumes of knowledge that she shares with her students. I have learned so much and have benefited greatly from all that Joyce has taught me as I continue to teach bright young children, meet with their parents and consult with their regular classroom teachers.

Through touching the lives of her students with her brilliance, she is touching the lives of thousands of students at every level throughout the world. Her many books will reach out to educators that she might not be able to teach personally. Dr. Joyce Van Tassel-Baska is an amazing woman and educator. I will always consider it a great privilege to know her.

Wilma Sharp
Doctoral Student
The College of William and Mary

Over the course of my three years in the doctoral program at The College of William and Mary, Joyce VanTassel-Baska became more than a frequently cited name in papers; she became a teacher and a mentor. Joyce has graciously served as a Professor in several classes, an advisor, and later Chair of my Comprehensive Examination and Doctoral Dissertation Committees. Words cannot express the impact Joyce has had on my life, my education, and my future career. I am grateful for her guidance and support, and wish her the best of luck in relaxing and enjoying retirement!

Angela Lycan
Doctoral Student
The College of William and Mary