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NRC/GT Looks at Self-Reflection of Classroom Practices

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The National Research Center on the Gifted and Talented (NRC/GT) conducts theory-based research in schools around the country. However, one of our professional and personal objectives is that our studies also lead to practitioner-friendly procedures and products that can be integrated into instructional practices and curriculum. In all of our studies, we incorporate multiple assessment techniques to ensure the quality of the intervention materials; to determine the status of students' prior knowledge, skills, and abilities; to establish baseline data on teachers' instructional and curricular practices; or to assess what has been learned and applied in classrooms. Essentially, all research studies involve multiple data collection tools. We choose some of the existing tools, adapt others, or create our own that are specific to the planned, research study. Depending on the purpose of the instrument, we determine the extent to which we conduct validity and reliability studies of a newly created instrument or use more informal procedures to check the appropriateness of items to document the application of an intervention.

Understanding and Analyzing Classroom Practices

If we were trying to study teachers' classroom practices in one of our current or future studies, we could use the Classroom Practices Survey (Archambault et al., 1993), which we designed for a national study of grades 3 or 4 teachers. We based the Classroom Practices Teacher Survey on a literature review and researchers' experiences. We found that teachers could make adjustments in their instructional and curricular practices in the following ways:

1. alternative arrangements for grouping students for instruction
2. advanced or accelerated work
3. instruction in higher level thinking skills
4. within-class enrichment activities of various kinds
5. modifications of the regular curriculum
6. challenges and choices in the curriculum (Archambault et al., 1993)

These adjustments required subtle or dramatic changes in how class assignments were designed; how the availability of different types of resources were used; how critical, creative, or research skills were infused in various content areas; how flexible grouping facilitated learning; or how the level of difficulty of objectives was adjusted to students' learning needs. Once the overall purpose of the potential instrument was well defined, we generated items to meet the specific needs of the study. Through formal content and construct validation procedures and reliability techniques, we reduced the initial item pool and developed a 39-item survey that asked teachers to respond to the frequency (i.e., never, once a month or less frequently, a few times a month, a few times a week, daily, and more than once a day) with which the classroom practices

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were used with average and gifted students. As part of the validation process, we subjected survey items to factor analysis, which led to a more parsimonious approach to understanding, discussing, and interpreting items. Through this construct validation phase of the instrument, we identified 6 factors underlying the entire item set:

1. Questioning & Thinking
2. Providing Challenges & Choices
3. Reading & Writing Assignments
4. Curriculum Modification
5. Enrichment Clusters
6. Seatwork

These factors allowed us to make statistical comparisons by student classification as gifted or average, region of the country, ethnicity, type of community (i.e., rural, urban, or suburban), and legislative mandates related to programming for students with high academic abilities, among other variables of interest. Such analyses provided many informative details about classroom practices in public and private schools throughout the country.

Other researchers in Canada, Australia, and the United States have used the instrument in their own studies because they noted the academic nature of the instrument and the ease of administration. Researchers also modified or added items to make the instrument appropriate for different age groups (Robinson, 1998**)**, and still others adopted the organizational and measurement techniques to develop items related to a specific subject area such as reading (Richards, 2003).

The original NRC/GT instrument to assess classroom practices could be used as an informal, self-report technique of your own classroom practices. Do you want to know if you include challenges and choices in your classroom? Do you want to know the extent to which you use thinking skills? Well, you can! The Classroom Practices Teacher Survey and all of the details related to instrument development are included in the research monograph entitled *Regular Classroom Practices With Gifted Students: Results of a National Survey of Classroom Teachers* (Archambault et al., 1993).

Self-Report and Analysis of Classroom Practices

Some of the Classroom Practices items reflect opportunities for students and teachers to ask questions, reflect on learning, or participate in a flexible learning environment. These items may serve as guidance for your own self-study of the frequency of use. Factor 1: Questioning & Thinking include items that reflect practices that provide high-end learning opportunities (Renzulli, 1994) for all students. However, the depth, breadth, abstractness, and complexity of these practices need to be varied to challenge gifted and talented students. The Questioning & Thinking factor includes the following items:

1. Teach thinking skills in regular curriculum
2. Provide questions to encourage reasoning & logical thinking
3. Ask open-ended questions
4. Encourage students to ask higher-level questions
5. Encourage student participation in discussions

You could use the same rating scale as the original instrument (see response format above) or adjust the format, such as: (1) Never, (2) Sometimes, (3) Frequently, (4) Always. Since you are adopting this instrument for personal purposes, rather than a research study, you should select a rating system that is informative for you. Then you can study the patterns of your ratings and decide if you want to consider some of the items as the basis for seeking more information about the practices. Think about what you already do well; think about items that you might add to your instructional repertoire;

and select items that you might want to know more about in the future. If you wanted to enhance the quality of questioning techniques based upon your ratings, try a few tactics to help you understand your current practices. Tape record a few 5 minute segments of your classroom interactions. Listen to the voices carefully.

- How many students are asking questions?
- What types of questions are posed?
- What other types of questions would enhance the interactions?
- Are students challenging each other's responses?
- Are students searching for verification of details by analyzing specific sections of text?

Resources for Questioning & Thinking

There is a great quote by Frank Kingdom: "Questions are acts of intelligence" (source unknown). Questions are posed to clarify information, to seek details, to offer alternative perspectives, or to continue the quest for more knowledge and understanding. If you completed your personal ratings of Factor 1: Questioning & Thinking and found that your ratings were mainly "never" and "sometimes," you might want to experiment with resources such as the following:

1. Learn how to incorporate thinking skills into various content areas to encourage students to examine concepts and principles. Sternberg and Spear-Swerling (1996) provide examples of several assignments that encourage analytical intelligence, practical intelligence, and creative intelligence, based on Sternberg's Triarchic Theory of Intelligence (1985). In biology, they offer the following suggestions:

    - Evaluate the validity of the bacterial theory of ulcers.
    - Design an experiment to test the bacterial theory of ulcers.
    - How would the bacterial theory of ulcers change conventional treatment?

2. Fountain and Fusco (1991) support the viewpoint of teaching reading as thinking and recommend several strategies that emphasize metacognition before, during, and after reading, writing, thinking, and listening (Costa, 1991, Costa & Liebmann, 1997). Metacognition makes us aware of what, how, and why we are doing something. Essentially, it aids us in planning, monitoring, and evaluating our thinking. Loring (1987) adapted Fountain and Fusco's approach and provided the following suggestions applicable to any text, conversation, or reflection. The works of Fountain and Fusco and Loring have been modified for Table 1 of this article.

Try the techniques above and see how students respond. Ask students to select one question before, during, and after they read text of various challenge levels (i.e., on grade level and above grade level). Encourage them to start a "Questioning & Thinking Journal" to see how their understanding of text is supported or enhanced by carefully analyzing their reading, thinking, and reflections. Convene small groups of students and ask them to share their reactions to documenting this process in their Questioning & Thinking Journals. As you read their journals, think about how you can make changes in your classroom practices that would further support Factor 1: Questioning & Thinking. Completing a similar analysis of classroom practices by including Factor 2: Providing Challenges & Choices further enhances the focus on questioning and thinking and considers various elements of the learning environment.

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Opportunities for Challenges & Choices

Self-reflection of classroom practices will certainly be enhanced as you think about how students are responding to changes you are making based on your personal analysis of your classroom. The second factor from the Classroom Practices Survey may extend your analysis of daily events that affect the classroom climate as well as teaching and learning opportunities.

Table 1
Questions and Statements to Support Reading/Writing/Speaking/Listening

Questions	Reflections
Before Reading/Writing/Speaking/Listening	
What am I doing?	Ideas I already understand within this topic are. . . . The idea I need to identify as the point of this reading is. . . . The last time I did an assignment like this. . . .
Why am I doing this?	Some things I know that the teacher expects are. . . . What I know already fits with what is expected. . . . Some things I can do to help set a purpose are. . . .
Why is this important?	Therefore, as I read this, I plan to focus on____because. . . . Other options I could consider for determining the focus could be. . . .
During Reading/Writing/Speaking/Listening	
How/where does it fit in with what I already know?	This is like what I already know in some ways, but different in other ways. . . . The main ideas and supporting ideas are related in that. . . .
What questions do I have?	Checking his [her] position on that, I think. . . . Evidence I have to believe this is. . . . This word is unfamiliar to me, but I can say it. . . .
What plan would help me to understand or learn about this?	I can use____(cognitive map, graphic organizer, think aloud, etc.) to learn this information because I see how it organizes this information and I remember when I used it before.
After Reading/Writing/Speaking/Listening	
How can I use this information in other areas of my life?	I remember how this connected to my life before, so, I think it can be used in the future in the following ways. . . . The next time I have a problem like this I'll know how to. . . .
How effective have I been in this process?	On a scale of one to ten I would rate my use of strategies to learn this information____ since I . . . . Analogies that I can relate to my learning are. . . .
What more do I need?	When I think about the way my thinking was activated in this assignment I realize I was thinking in the following ways. . . .

Factor 2: Providing Challenges & Choices consists of a much larger group of items that clustered together during the factor analysis of the Classroom Practices Survey. As you review the items, you will recognize the inclusion of items related to thinking skills, flexibility of instructional choices, and varying the level of difficulty of the content. Once again, consider these items as an opportunity to conduct a self-reflection of your classroom practices. Select a response format (e.g., (1) Strongly Disagree, (2) Disagree, (3) Agree, (4) Strongly Agree) that will be informative and then conduct your rating of each item below for Factor 2: Providing Challenges & Choices:

1. Allow students to work in location other than class
2. Teach unit on thinking skills
3. Competitive thinking skills/problem solving program
4. Contracts or management plans for independent study
5. Time for independent study projects
6. Work from higher grade textbook in class
7. More advanced curriculum unit
8. Group by ability across classrooms
9. Send to higher grade for specific subject area instruction
10. Establish interest groups
11. Consider student's opinion in allocating time for subjects
12. Programmed or self-instructional materials
13. Encourage students to organize long-range projects

As you review your responses to the items above, determine whether you want to learn more about some of the practices that you are not currently emphasizing in your classroom. Ask yourself questions such as the following:

- Have I varied the learning environment for students who like to learn in small or large groups or independently?
- Do I really want to promote opportunities for students to use advanced curricula?
- Do I recognize my students' academic needs by approaching new content in various ways?

Resources for Challenges & Choices

There are myriad ways to approach teaching and learning. It is a matter of making choices that will yield the most positive outcomes for you and your students. Take a moment and think about how you would respond to the following question: How do I optimize student learning? As you think about your answer, consider various instructional options for students:

1. Renzulli, Rizza, and Smith (2002) suggest the use of the Learning Styles Inventory to determine student preferences for one or more approaches to learning, understanding, and applying their skills and abilities. The styles include: direct instruction, instruction through technology, simulation, independent study, projects, peer teaching, drill & recitation, discussion, and teaching games. As you plan lessons and think about ways students will demonstrate their mastery of the curriculum, experiment with different approaches that will invigorate the learning environment.
2. Rogers (2002) investigated the research evidence related to instructional management provisions and their impact on gifted students. In her book entitled *Re-forming Gifted Education: Matching the Program to the Child*, she provides research-based guidelines that will promote decision-making. Perhaps you would like to consider accelerating a gifted student in one subject either within the current grade level or advancing to a higher grade level. Rogers outlines questions to consider in developing an

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appropriately challenging educational plan and lists the behavioral characteristics that are important considerations for the student to experience success (see Table 2).

Designing challenges and choices for your classroom is a worthy journey to consider. The changes will not be immediate nor automatic; therefore, think about what you would really like to accomplish, familiarize yourself with appropriate practices, and then monitor the results by asking two questions: (1) How has this change made a difference in my classroom? (2) What are the students' responses to the focus on challenges and choices?

Mastering the Process Self-Reflection of Classroom Practices

Only two of the six factors of the Classroom Practices Survey have been highlighted as opportunities to engage in an analysis of what happens in your classroom. The remaining factors include:

- Factor 3: Reading & Writing Assignments
- Factor 4: Curriculum Modification
- Factor 5: Enrichment Clusters
- Factor 6: Seatwork

The research teams associated with The National Research Center on the Gifted and Talented will continue to create instruments that are of value to our planned program of research and will, at times, describe how such instruments can be of

Table 2
Candidate for Single-Subject Acceleration

Cognitive Functioning	Personal Characteristics	Learning Experiences	Interests
Is processing and achieving well beyond others at same grade level in a specific subject area	*Is self-directed, independent, and motivated to learn*	*Enjoys individual learning and challenge in learning experiences*	*Strong interest in specific academic area with little time to supplement learning outside of school time*
• Has above average ability • Is achieving 2+ grade levels beyond current grade in specific area • Possesses strong achievement • Shows learning strengths in planning, learning, and communication precision	• Is independent in thought and action • Is persistent in own interests, assigned tasks • Enjoys school and learning • Makes connections and associations • Is a fast processor and retains information easily • Is socially mature, emotionally stable, perceptive, confident, and shows a willingness to take risks	• Has strong preference for independent study, self-instructional materials • Demonstrates preference for challenge and fast pacing of instruction • Likes being in competitive situations	• Has intense interest in specific academic area • Has extensive involvement in a variety of out-of-school interests

From Rogers, K. B. (2002). *Re-forming gifted education: Matching the program to the child.* Scottsdale, AZ: Great Potential Press, p. 124.

value in classrooms around the country. Adapting research instruments for individual use may prove to be another way to engage in your own professional development experience. Self-reflection and assessment are certainly pragmatic ways to consider classroom changes. Enjoy the process!

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Future Problem Solving Program

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Imagine yourself observing an enrichment classroom. In the middle of the room, a team of four, 5th graders is arguing about the effects *Virtua Tech*, a virtual corporation in the year 2056, has on the mind and body of its employees. In the back corner of the room you notice a fourth grader in deep thought. It almost looks as if his head is steaming. As you get closer, he jumps up and says: "Yes! I'll use the roaches as an endless energy supply." While you are listening to his ideas six, 11th graders enter the classroom and present with pride business cards created for their cyberphobia group of adults. Amazed by the students' creativity, problem solving skills, and excitement for learning, you decide to investigate the problem solving model they are using.

The Future Problem Solving Program (FPSP), started in 1974 by E. Paul Torrance, today reaches approximately 250,000 students in 43 Affiliate Programs (coordinated by the international office in Lexington, Kentucky) throughout the United States, Australia, New Zealand, Korea, and Canada. Full time staff members prepare all materials and topics: practice problems, qualifying problem, affiliate bowl, and International Conference. Teams and individuals successful in the qualifying problem advance to the affiliate bowl and bowl winners in each division (i.e., junior, grades 4 to 6; middle, grades 7 to 9; and senior, grades 10 to 12) are invited to participate at the International Conference. Trained evaluators review and compare student work of the same age division on all topics (Future Problem Solving Program Coach's Handbook, 2001).

Topics and Student Interests

To best meet student interests, the selection of FPSP topics is guided by the results of a poll of the students participating in grades 4 to 12 (Torrance & Safter, 1999). Student votes overwhelmingly center around the newest cutting-edge frontiers of humankind. The topic areas of these frontiers seem to change with age. Younger students' (grades 4 to 6, junior division) preferences center around innovative instrumentation and processes such as solar energy, computer education, pedestrian conveyor-belt travel, intelligent machines, and mass use of electric cars. These topics may be categorized as human control over the physical environment. Students in grades 10 to 12 (senior division) show more interest in psychological frontiers, such as genetics, human engineering, hypnosis, and mind-altering drugs, than younger students. Middle division students (grades 7 to 9) seem to be in transition between interests of junior and senior division students. Their interests are similar to the younger age group. They do not seem to share the introspection of the seniors (Torrance & Safter, 1999).

The wide variety of extra-curricular topics chosen every year provides students with opportunities to find their area of passion. Torrance (1981, as cited in Torrance & Sisk, 1999), found in his longitudinal studies of creative achievement, that adult creative achievement was influenced by students' experiences of falling in love with something during their elementary school year. Most adults however, including teachers and parents, do not have much information about these frontier topics to teach the background knowledge necessary for solving problems related to these topics. The FPSP coach's role includes facilitation of learning and the modeling of processes whereby new knowledge is acquired. Students have to be prepared for self-directed learning (Torrance & Safter, 1999). FPSP goals, therefore, center around the acquisition of problem solving skills.

Goals of the Future Problem Solving Program

Although the FPSP provides students with opportunities to enhance their awareness of everyday issues and increase their knowledge base, the main goal of the FPSP is to teach students *how* to think. The development of higher order thinking skills will help students use their knowledge to solve problems. The program focuses on the creative problem solving process and futuristic issues to develop the skills necessary to adapt to a changing world and shape the future (Future Problem Solving Program Coach's Handbook, 2001). Specifically, the creative problem solving process:

- helps students to improve their analytical thinking skills
- aids students in increasing their creative thinking abilities
- stimulates students' knowledge and interest in the future
- extends students' written and verbal communication skills
- encourages students to develop and improve research skills
- provides students with a problem-solving model to integrate into their lives
- guides students to become more self-directed and responsible
- promotes responsible group membership (for team Future Problem Solving and Community Problem Solving)

The Future Problem Solving Program:

- provides students with unique opportunities to enhance their awareness of everyday issues
- models effective processes that can be used throughout their lives
- incorporates the basic skills taught in the classroom by extending students' perceptions of the real world
- promotes responsible group membership
- encourages real-life problem solving experiences
- promotes continuous improvement through the evaluation process
- offers authentic assessment in the product produced (p. 11)

The FPSP also extends students' perceptions of the real world and helps them apply the skills learned to real life issues. The experience of implementing a proposed solution is provided through the Community Problem Solving (CmPS) component. Students learn to continuously improve their problem solving skills from the feedback provided in the evaluation process.

Students are expected to apply a 6-step creative problem solving model when solving a problem in each of the three FPSP components: Team Problem Solving, Scenario Writing, and Community Problem Solving. The mastery of these 6 steps is therefore at the heart of the FPSP.

The Six-Step Problem Solving Model

Guided instruction of the 6 steps seems to be easiest within the team problem solving component. The international office of the FPSP releases the curricular topic for all problems before the related Future Scene is given to the participating students. This allows students to conduct in-depth research to acquire a strong knowledge base on the general topic related to the Future Scene. Once the future problem solvers receive the Future Scene, they work through it using a 6-step model, based on the Creative Problem Solving (CPS) process (see Figure 1). Students complete a booklet that guides them in a linear, sequential way through the creative problem solving process.

During step 1, students are asked to carefully analyze a specific situation given—the Future Scene—related to the general topic. They learn how to use macro and micro analyses to gain a

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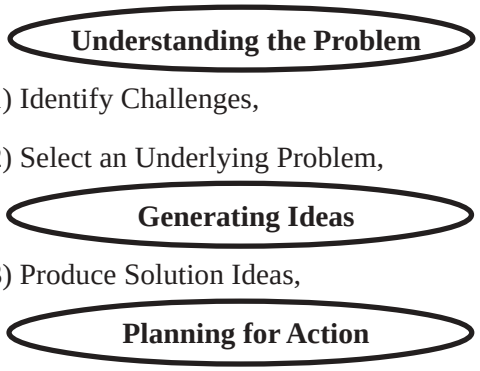

Figure 1. The 6-step model.

Source: Future Problem Solving Program. (2001). *Future Problem Solving Program coach's handbook.* Lexington, KY: Author, p. 15.

good understanding of the complex and ill-defined situation. Thereafter, they identify the 16 most promising challenges, issues, concerns, or problems imbedded in the situation that needs consideration. The Future Scene describes a fuzzy situation projected 20 to 30 years into the future, a time when the students might obtain leadership roles. Students are required to use the knowledge gained and project it far into the future. In step 2, the students go through the list of challenges, consider possible underlying problems, and formulate a key underlying problem that is neither too broad nor too narrow. Students are required to follow a standard format in formulating the underlying problem they intend to solve throughout the remaining steps. The standard format helps students to focus on one challenge only and proceed with further analysis of the problem as well as a uniform structure that helps evaluators make comparisons across student booklets. In step 3, students are asked to generate 16 varied and unusual solution ideas that have potential for solving the underlying problem. Students, in step 4, generate the five most appropriate criteria for judging the solutions, which they apply in a evaluation matrix to select the solution with the highest total rank (step 5). Finally, in step 6, students write an action plan based on their highest scoring solution idea. The students have to complete the whole booklet within 2 hours.

The Coach's Handbook suggests and explains tools for generating options—using divergent thinking—such as Brainstorming, SCAMPER, and Morphological matrix. The acronym SCAMPER stands for: Substitute? Combine? Adapt/Add/Alter? Minify/Magnify/Modify? Put to Other Uses? Eliminate or Elaborate? Reverse/Rearrange/Reduce? The Morphological matrix consists of 4 columns and 10 rows. Team members identify four major aspects (people, place, obstacle, and goal) of the topic and/or future scene (one per column) and list (in the rows) 10 elements of each aspect. Then they explore random combinations and make new and interesting possibilities.

For convergent thinking, the handbook includes tools such as: Hot Spot and Paired Comparison Analysis. A Hot Spot is the common element that clusters of promising ideas share. Paired Comparison Analysis is used in comparing one possibility or idea against another idea, one pair at the time, until all possible pairs have been examined. A number is assigned to each pair as the option is chosen and rated for importance, 1, 2, or 3. The ratings for each possibility can be totaled to provide a rank ordering or prioritizing of the options.

Components of the FPSP

The FPSP includes different components: Future Problem Solving (FPS), Community Problem Solving (CmPS), and Scenario Writing (SW). The primary emphasis of the academic year program (October to June) is on instruction with feedback offered to the teams. FPS asks students to solve complex scientific and social problems of the future.

An example of a future scene focusing on a virtual corporation, an approach to solving a

local community problem related to the use of technology, and a response to a scenario involving the increasing need for energy are provided on the insets that follow.

Training in problem solving skills facilitates situational creativity (i.e., students can be creative within prescribed activities related to a specific topic), whereas CmPS fosters real product creativity. Students in the CmPS identify a problem they would like to solve in their school, community, or state. Then, they use the 6-step Future Problem Solving process to solve the problem, (i.e., to develop an action plan and implement the plan).

Future Problem Solving Virtual Corporations
Future Scene for International Conference, 2002*
(Future Problem Solving Program, 2002a, adapted)

One scene, for example, pertains to a virtual corporation *Virtua Tech* in the year 2056. The scene is based on facts and projections about virtual corporations and their organizational structure with a focus on the dynamics of a corporation existing in virtual space. The scene opens with Aluui, a programmer, who shares her excitement about her prospective work place with her mother via her Holographic Mailbox and explains that her work partners will be from all over the world. "Virtua Tech is run by an impressive executive team, a group of individuals from leading universities, governmental bodies and traditional corporations around the world," Aluui explains. During this conversation with her mother, Aluui receives a message from Virtua Tech saying that her software program was accepted and 25,000 Digital Monetary Units have been deposited into her account. However, the scene goes on to raise concerns about the operation of this virtual corporation, including effects on the mind and body of employees that are not fully understood. Therefore, concerned nations, industry groups, and Virtua Tech representatives have created an advisory group. This group is asking the International FPS Alliance to direct its very best problem solving teams across the globe to help them examine important issues involved with the operation of this unique corporation. The FPS teams' task is to identify possible challenges relating to Virtua Tech, formulate an underlying problem, generate solution ideas, and develop an appropriate action plan.

Community Problem Solving (CmPS)
Helping Achieve New Demands in Society
Whitharral High School in Whitharral, TX (Coaches: Karol Albus & Gayle Mullen)
Community Problem Solving: 1999 International Conference Champions
(Future Problem Solving Program, 1999, adapted)

The goal of the project was to educate adults in the computer field and also to eliminate cyberphobia. The team did so by offering complimentary computer classes to the adults in their community because it felt that the amount of computer knowledge obtained by adults was not sufficient for the technological demands of today's society. The team was very successful in their efforts and was asked to teach office computer skills to the clerks at the Hockley County Clerk's office. The project brought multiple benefits to the small rural community of Whitharral, TX. Besides decreasing "cyberphobia" among the adult population, it helped to bridge the gap between generations. The CmPSers learned how to research, plan, and adjust a curriculum to fit the needs of their students—from farmers and secretaries to local business owners and senior citizens. The adults created business, cards, mailing labels, and greeting cards. They learned how to use various software applications, save hundreds of hours in documenting expenses, and safely navigate the Internet. With the aid of grant money awarded by Learn and Serve America, the CmPSers plan to expand the class offerings as well as recruit and train new teachers.

* All excerpts are reprinted with permission from the Future Problem Solving Program, Inc.

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Scenario Writing Educational Options (Junior Division)
The Wheels of Energy
Barrett Robertson, Gardendale, AL
2002 International Scenario Writing Champions
(Future Problem Solving Program, 2002b, adapted)

Josh sat at his desk thinking and pondering in the darkness. The only thing moving during the blackouts were the roaches. Josh knew he had to find an alternative energy fast. Why were humans so dependent on electricity? Almost everything ran on solar power or rechargeable batteries now (year 2051). Unfortunately, the ozone layer is being depleted more and more each year, which affects solar power. Rechargeable batteries became every hospital's savior and every asthmatic person's life improved.

Reaching for his keys, Josh went to the hovercraft. On the ride home, he swerved to miss the tow craft explosion right in front of him. Swooping to street level, he knew he had seen his share of crashes. There are no rules of the road in the air. He thought of how many times he had been here before. Falling fast and low, he wished his craft could run off the glides alone.

"Why not?" thought Josh. "Why can't we somehow harness the power of movement? Kinetic watches have been around for over five decades. Surely there could be enough power in everyday movements to power a battery. Is it possible to reconfigure kinetic power into a battery as a source of energy? How about using a pendulum-like movement to harness the power into a battery? That way it will let us have less power plants."

Josh went into the assembly room and found an old rechargeable unit. "I wonder if it will work?" he thought. For the next week, Josh continued to look at his belt attachment. At first, it was every few minutes, later every few hours. He was determined this would work. By the ninth day the rechargeable unit registered enough power. Over the course of the next few weeks, Josh recharged a dozen batteries. His ideas formulated like fireworks, thinking of what he could attach this device to, and how much more power he could generate.

Then the idea struck him like a rocket. YES! I'll use the roaches. Josh constructed a large circular platform with a rotating basis. It was kind of like a hamster wheel turned on its side. Finding the roaches was not a problem. It was catching them that was difficult.

Josh placed the platform in a large, clear, round tube and added the roaches. Immediately, the roaches crawled and moved to the platform. This turned the platform, creating a way to transform movement, kinetic energy, into a stored source. The roaches ate little, and the old ones were eaten by the others. It took Josh a few more months to perfect his assignment. In the next few years, he was awarded a Nobel Prize for his efforts in creating a new and virtually endless energy supply that renews itself.

The *scenario writing* component encourages students to use their imagination in creating a futuristic short story based on an FPSP topic. The scenarios must be placed at least 20 years into the future and are limited to a length of 1,500 words.

FPSP Competitions

Selected teams and individuals participate at regional, state, and international competitions. During the 2-hour competition of the FPS component, teams of four students or individuals analyze a Future Scene and complete a problem booklet that guides the students through the 6 steps as described above. The Future Scene relates to the topic the students were encouraged to research prior to the competition. No research materials or notes may be used during the actual competition session. Students have to be very time conscious and pace themselves at each step to complete all steps within the very limited time frame. Following this session, students are asked to persuade others of the merit of their

idea. Having a good idea is not enough, one must be able to "sell" it. During a 5-minute skit presentation, students can demonstrate their creative, persuasive, and oral communication skills (Steinbach, 1991).

Scenario writers may also compete against one another. They select a topic for their story from the pool of five FPS topics for the respective academic year, research the topic, and write a short story of a maximum of 1,500 words (Shewach, 1991). Students individually write drafts of a futuristic scenario. Editing and revising occurs under the guidance of a coach, who decides whether to submit the scenario to the contest or not. Winning scenarios are awarded at the FPSP competitions and published thereafter.

Any number of students from one to a whole classroom can become a team of community problem solvers. Students identify real problem situations in their school, neighborhood, or community and use the 6-step model to develop and implement the solution idea over an extended period of time (i.e., 6 months to 3 years). The students' report describes the full process including the area of concern, action plan, the efforts to solve the problem, and reflections. The evaluators examine the report and display at the competition and interview the students to secure their ownership of the product.

Conclusions

The FPSP provides educators with enrichment activities that can take place in a pullout program, after school program, resource center, or with students in a regular classroom. The high level challenge of the activities is especially appropriate for intellectually and creatively gifted students. Future Problem Solving takes students into new worlds. They gain new knowledge about cutting-edge research and use it in combination with higher order thinking to create original solutions for futuristic problems. Most gifted students love this kind of intellectual challenge. Seeing Community Problem Solvers grapple with real life problems and grow in their awareness of their capability to have a positive impact on the world around them is also gratifying to educators. The most obvious effect of Scenario Writing is improved writing skills. However, all FPSP components help students develop their written and oral communication skills. Improved communication skills and a thorough understanding of the 6-step problem solving model can greatly benefit the students far beyond the program (e.g., in other curricular activities and in their future careers).

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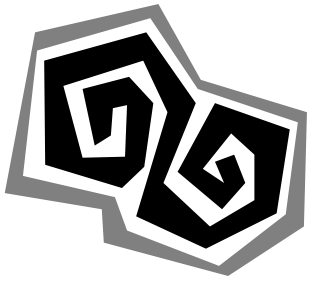

Recent Research From the NRC/GT

Giftedness and High School Dropouts: Personal, Family, and School-related Factors

Joseph S. Renzulli & Sunghee Park
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Storrs, CT

ABSTRACT

While the issue of high school dropouts has received much attention, the subject of dropouts among gifted and talented students has not been adequately addressed in research studies. Moreover, some research studies focusing on gifted dropouts used only IQ to identify gifted students. Using such a restricted definition of giftedness may cause a misunderstanding of gifted dropouts. This study was conducted to obtain more comprehensive information about gifted high school dropouts and to examine factors related to gifted students' dropout behavior using a more flexible definition of the gifted.

For this study, the National Education Longitudinal Study of 1988 (NELS:88) data base, which was a longitudinal study conducted by the National Center for Education Statistics (NCES), was used to address research questions. The NELS:88 began in 1988 by collecting data on approximately 25,000 eighth grade students, including data from their parents, teachers, and school administrators, and then followed up at 2-year intervals. Two computerized database studies were conducted using different samples. In Study 1, the Second Follow-up Dropout Questionnaire was directly analyzed to obtain specific information about gifted dropouts regarding their reasons for leaving school, parents' reactions, use of time, future career plans, relationships with parents and peers, and self-concepts. In Study 2, student questionnaires were analyzed mainly to examine personal/ educational factors related to the gifted students' dropout behavior.

The results from Study 1 indicated that (a) many gifted students left school because they were failing school, didn't like school, got a job, or were pregnant, although there are many other related reasons, (b) most parents whose gifted child dropped out of school were not actively involved in their child's decision to drop out of school, (c) many gifted students who dropped out of school participated less in extracurricular activities, (d) few gifted students who dropped out of school had plans to return to school, and (e) gifted students who dropped out of school had higher self-concepts than non-gifted students who dropped out of school. The results from Study 2 indicated that (a) many gifted students who dropped out of school were from low SES families and racial minority groups, (b) gifted students who dropped out of school had parents with low levels of education, (c) gifted students who dropped out of school had used marijuana more than gifted students who completed school, and (d) dropout behavior for gifted students was significantly related to students' educational aspirations, pregnancy or child-rearing, gender, father's highest level of education, and mother's highest level of education.

Reference

Renzulli, J. S., & , S. (2002). *Giftedness and high school dropouts: Personal, family, and school-related factors* (RM02168). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

Society's Role in Educating Gifted Students: The Role of Public Policy

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University of North Carolina
Chapel Hill, NC

ABSTRACT

This monograph reviews the role played by public policy in the education of gifted students. It describes the special rule making in identification, placement, program, and accountability. These rules emerge from legislation, court decisions, administrative rule making, and professional standards. Special problems involving racial discrimination, acceleration, teacher supports, and parental options are discussed. The monograph ends with five new policies the author believes are needed to fulfill our commitment to educating gifted students.

Reference

Gallagher, J. J. (2002). *Society's role in educating gifted students: The role of public policy* (RM02162). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

New Directions for Providing Challenging Opportunities for Gifted and Talented Students

The Neag Center for Gifted Education and Talent Development invites you to a 1-day workshop to learn more about options for working with high-ability students.

Using the Schoolwide Enrichment Model-Reading (SEM-R) Framework to Increase Achievement and Enjoyment in Reading With Talented Readers
Keynote Presenter: Sally M. Reis

Enrichment Clusters and Middle School Academies of Inquiry and Talent Development
Presenters: Joseph S. Renzulli & Susannah Richards

Math Enrichment for Talented Students
Presenter: M. Katherine Gavin

Modifying, Differentiating, and Enriching the General Education Curriculum
Presenter: E. Jean Gubbins

Developing Collaboration With Parents in Gifted Education
Presenter: Robin Schader

Reversing Underachievement: Strategies for Teachers and Counselors
Presenters: Del Siegle & D. Betsy McCoach

How to Implement the SEM-R in Your Classroom or School
Presenters: Sally M. Reis, Joan Jacobs, Rebecca Eckert, & Fredric Schreiber

Using Technology to Challenge talented Learners
Presenter: Del Siegle

May 22, 2003
8:00 am - 3:00 pm
University of Connecticut
at Storrs Campus

Registration Information

Visit our website at
www.gifted.uconn.edu
Registration Fee: $25.00 per person
(Includes breakfast, lunch, parking, & all workshop materials)

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