Talents and Type IIIs: *The Effects of the Talents Unlimited Model on Creative Productivity in Gifted Youngsters*

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This study examined a set of lessons that integrate the Talents Unlimited Model (TU; C. L. Schlichter, 1986) with the 10 steps of completing a Type III activity (J. S. Renzulli & S. M. Reis, 1985) to determine the effects of these lessons on the quality of students' creative products and on the number of students who completed their products. Treatment group students showed a statistically significant difference in finishing their independent or small-group projects, as opposed to students in the control group. In addition, treatment group students' products were of significantly higher quality as measured by the Student Product Assessment Form (SPAF; S. M. Reis, 1981) than products completed by students in the control group.

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Creative productivity as a definition of giftedness describes those aspects of human activity and involvement that result in development of original material or products (Type IIIs) that are purposefully designed to have an impact on one or more target audiences. This conception differs from "lesson learning" giftedness in that creative productive people put their abilities to work in areas of study and problems that are personally relevant (Renzulli, 1986).

The Problem

Although the Schoolwide Enrichment Model (SEM; Renzulli & Reis, 1985, 2002) provides a framework for guiding teachers in the design of activities aimed at nurturing productivity among students, less than half of the students involved in the model during their first year decide to participate in this phase of implementation (Gubbins, 1982; Reis, 1981, Renzulli & Reis, 1994, Renzulli & Reis, 1999). In addition, Olenchak's (1988) research found that of the 216 students involved in his study, more than 27% chose not to complete their products. Students listed low interest in independent or small-group study and problems associated with task commitment, time allocation, and human and material resources as primary deterrents to completion (Gubbins).

Teachers can design learning experiences to promote creative productivity through activities that emphasize the integration of information and various thinking processes (Renzulli & Reis, 1985; Schlichter, 1986; Tomlinson, 1994). Through investigative activities and the development of creative products, students learn to assume the roles of first-hand investigators, writers, artists, or other types of practicing professionals. By employing a process called *curriculum compacting* (Renzulli & Reis, 1998), the information that the student has mastered is substituted with work including challenging alternatives based on the student's interests. The student's role is transformed from *lesson learner* to *first-hand inquirer* where he/she thinks, feels, and acts like the real-world practicing professional who delivers products and services (Renzulli & Reis, 2003a). These experiences become vehicles through which students can apply their interests, knowledge, thinking skills, creative ideas, and task commitment to self-selected real problems or areas of studies. The teacher's role is changed from a didactic presenter of information to a mentor/guide who leads the students through the investigative process (Renzulli & Reis, 2003b).

Schoolwide Enrichment Model

The SEM (Renzulli, 1994) defines gifted behavior as consisting of three interactive clusters of human traits: above-average ability (though not necessarily superior), task commitment, and creativity. Creative productive accomplishment occurs when there is an interaction among these clusters as the student is focused on a specific performance area (Renzulli, 1978).

The Enrichment Triad Model (Renzulli, 1977), an early stage in the evolution of the SEM, provides a framework for three types of activities that are designed by enrichment teachers to give students the opportunity to learn how to do advanced research. Type III enrichment activities include opportunities for individual or small-group investigations of real problems (Renzulli, 1983). Students who display a sincere interest in a particular performance area and/or who demonstrate the desire to acquire in-depth knowledge of a topic area are taught to examine a real-world problem within an interest area (Hébert, 1993). Such interests are often stimulated by another form of enrichment activities called Type I's. These experiences offer students exposure to content areas not normally covered in the regular classroom through speakers, field trips, books, student teacher discussions, and interest-development centers (Renzulli, 1993). A third type of enrichment that is a focus of the Triad Model is called Type II training. Students learn skills in higher level thinking, as well as "how to" processes that real professionals employ in their respective fields.

Talents Unlimited Model.

An example of a Type II thinking skills model is the Talents Unlimited Model (TU), which improves students' critical and creative thinking skills within the context of classroom curriculum (Schlichter & Palmer, 2002). Based on the work of Calvin Taylor (1986), this program increases student metacognitive capacity and performance in specific work-related thought processes including: *Productive Thinking, Communication, Forecasting, Decision Making,* and *Planning* – with the *Academic* Talent based as a frame of reference for the other five Talents. Through consistent, precise practice of the subskills and metacognitive language of each Talent, students become aware of the thought patterns required to make meaning of the academic information. Simultaneously, students not only acquire the complex skills and processes of the Talents but also master the integrated content (see Figure 1).

Taylor (1986), Renzulli and Reis (1986), Schlichter (1986), Burns (1987), and Hébert (1992, 1993) have proposed a synthesis of content, process, and learning-how-to-learn skills for students much like that which has caused adults to be

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The Talents Unlimited Model

Talent Area: Productive Thinking

Definition: To generate many, varied, and unusual ideas or solutions and to add detail to make the ideas more interesting.

Sample Activity: Students learning how energy can change from one form to another draw/label many, varied, unusual examples of energy chains.

Talent Area: Decision Making

Definition: To outline, weigh, make final judgments, and defend a decision on the many alternatives to a problem.

Sample Activity: Students decide which famous African American included in a reading unit will be the subject of dioramas they make by weighing the choices with such criteria as information available, interest to audience, and so forth.

Talent Area: Planning

Definition: To design a means for implementing an idea by describing what is to be done, identifying the resources needed, outlining a sequence of steps to take, pinpointing possible problems, and showing improvements in the plan.

Sample Activity: Following a study of myths and misconceptions about bats, first graders develop a plan for conducting a survey about other children's attitudes about bats.

Talent Area: Forecasting

Definition: To make a variety of predictions about the possible causes and/or effects of various phenomena.

Sample Activity: As students first learn about the 14th Amendment during a study of their state's history, they are asked to predict many, varied possible effects of the ratification of the amendment.

Talent Area: Communication

Definition: To use and interpret verbal communication to express ideas, feelings, and needs to others.

Sample Activity: Following a field experience to measure the circumference of trees in their schoolyard, students compose math word problems that make comparisons between the sizes of those trees and the sequoia tree they just read about.

Talent Area: Academic

Definition: To develop a base of knowledge or skill about a topic or issue through acquisition of information and concepts.

Sample Activity: Students read from a variety of sources about political candidates in a local election, making notes of the main ideas.

Figure 1

recognized as gifted contributors to the knowledge and culture of mankind. The SEM provides a model for guiding students through the 10 steps of creative productivity. The TU integrated with the SEM (*Talents and Type IIIs;* Newman, in press) can elaborate the Type II process strategies designed to help students learn to focus, plan, complete, present, and evaluate their products as professional problem solvers and producers of knowledge.

Several research studies have investigated the influence of personal variables such as locus of control, self-concept, self-efficacy, grade, gender, learning styles preferences, achievement, and Type II orientation lessons on students' decisions to initiate a creative product (Burns, 1987; Delisle, 1982; Gubbins, 1982; Schack, 1986; Starko, 1986). Burns (1987) reported that the predictor variables, including learning style preferences, achievement test scores, grade, gender, self-efficacy, and participation in Type II orientation lessons (later published as *Pathways to Investigative Skills;* Burns, 1990) were all significant in determining which students would begin Type III projects. None of the studies mentioned above, however, examined the effects of training lessons on the *completion rate* of products or on the *quality* of student creative productivity (Type III) as defined by the SEM.

Research Questions

The purpose of this study was to investigate the effects of the TU thinking skills on the completion rate and quality of students' creative productivity. More specific questions included the following:

1. Will application of the TU to the process of investigating real problems (Type III) affect the completion rate of student products?
2. Will application of the TU affect the quality of student productivity in the investigation of real problems (Type III), as measured by the Student Product Assessment Form (SPAF) of the SEM?

Methods and Procedures

Subjects

The subjects for this study included 147 third- through sixth-grade students participating in enrichment programs from 9 schools in 3 suburban school systems in Birmingham, Alabama. These sites were selected because of similarities in socioeconomic levels, curriculum, and staff educational levels. Students were selected for the enrichment program through the SEM (Renzulli & Reis, 1985). Of the initial pool, numerous students were eliminated from the study because their projects did not meet Type III criteria or because their Type III projects were not completed by the end of the study. The treatment group consisted of 59 students who completed 27 products (individually or in small groups) and the control group was made up of 45 students who completed 27 products. All 10 enrichment teachers involved in the study had received previous training in both the TU and the SEM. Each enrichment teacher and her students were randomly assigned by schools to either a treatment group or to a control group through cluster sampling. The five teachers randomly assigned to utilize the TU materials were provided a manual of treatment instruction, *Talents and Type IIIs* (Newman, 1991/in press), which included a series of 10 sets of lessons that apply the TU processes to those related to the investigation of real-world processes and the development of real-world products.

Teachers assigned to groups not utilizing the TU materials guided student investigations of real problems using materials and guidelines described in the SEM (Renzulli & Reis, 1985). Training in how to plan, organize, and manage a creative investigation is one of the 14 skills in Renzulli and Reis' taxonomy of Type II process skills (1985). Teachers of both groups encouraged their students to develop quality products, and teachers involved with the TU lessons were asked to adhere to the objectives, materials, and activities of the lessons.

Research Design

A posttest-only control group research design was used in this quasi-experimental study to address the above research questions, which focused on students' products. Students in the treatment group participated in a series of 10 sets of structured lessons, *Talents and Type IIIs* (Newman,1991/in press) that apply the TU thinking skills to processes related to the investigation of real-world products (Type III). Teachers in the control group guided students through the Type III processes by utilizing the *Schoolwide Enrichment Model: A Comprehensive Plan for Educational Excellence* (Renzulli & Reis, 1985).

The Experimental Lessons

The manual *Talents and Type IIIs* (Newman, 1991/in press), presented to students in the treatment group, provided step-by-step training in planning, managing, and completing a real-world product. The 38 activities applied the TU processes to the steps of completing a Type III investigation and were developed to take the guesswork, hit-or-miss approach out of independent projects and investigations of problems. The guide, created for students in grades three through six, included activities and processes that adults employ in the world of work in their efforts to be creative producers. The 10 sets of lessons integrated the TU processes with the 10 steps of completing a Type III project (Renzulli & Reis, 1985) and included the following major processes: (a) interest finding, (b) focusing the interest area, (c) record keeping, (d) identifying a problem, (e) learning about the topic, (f) deciding on the product and audience, (g) getting Type II training, (h) developing the product, (i) presenting the product to an audience, and (j) evaluating the work.

Sample Activity Form: Decision Making

FOCUSING THE INTEREST AREA
DECISION MAKING
ACTIVITY 4

Use the Decision Making Talent to decide which subtopic is most appropriate for further study.

1. List the subtopics that you are considering.

Cahaba Lily

Pollution

Animals

Recreation

2. Think more carefully about each subtopic by fenerating some criteria questions. (Ask your teacher for help if you have problems.)

a. *Do I have enough information?*

b. *Am I interested?*

c. *Will other people be interested?*

d. *Is this one of the most important subtopics?*

(Activity 4 - continued)

3. Use your answers to the criteria questions to help you make a decision.

4. Choose the subtopic that you think is best suited for your study and write it on the line below:.

Pollution

5. Think more carefully about your choice by listing the reasons that you chose the subtopic.

I chose *Pollution* **because:**

a. *I do have information.*

b. *I am interested in this topic.*

c. *Other people will be interested in this topic.*

d. *This is an important subtopics.*

Remember: Focusing for a subtopic is important so that you can manage your project.

Figure 2

Gubbins (1982) documented that students who fail to complete Type III products indicated that low interest level in the investigation was the main problem that prevented completion. Lesson Set 1 addressed this problem by suggesting several approaches to help students uncover their interest areas. Productive Thinking processes were employed to assist students in thinking of many, varied, and unusual topics that could become Type III investigations, and Decision Making was used to help students narrow their alternatives to one final choice, using a set of criteria important to the student.

This process worked well for third-grader Sarah, whose class had been studying the Middle Ages. Sarah used Productive Thinking to generate related topics of interest that she might like to pursue for in-depth study. However, Sarah had also become interested in the Cahaba River through her father, who was an active member of the Cahaba River Society. Therefore, Sarah also included pollution and extinction of the Cahaba River as another topic on her list.

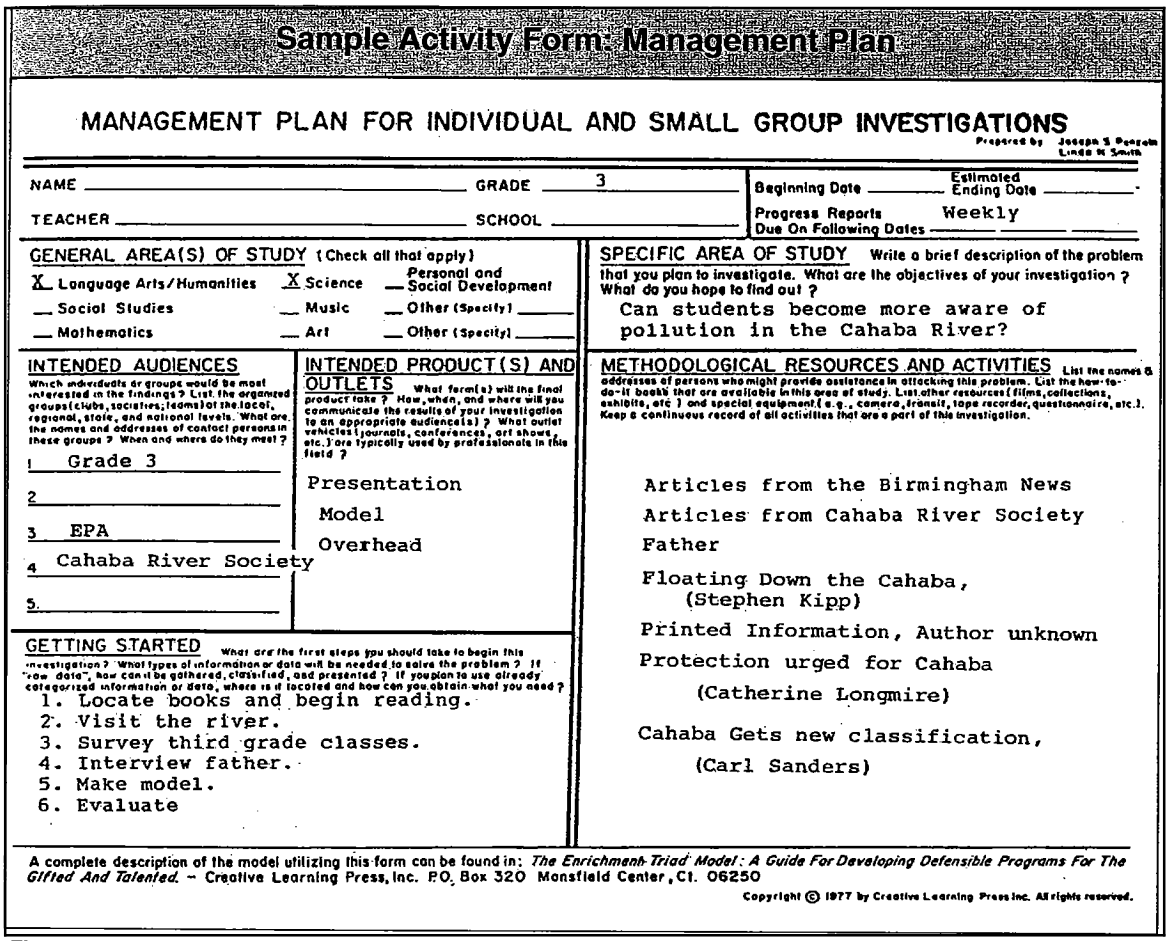
Sarah narrowed her alternatives to five topics and used Decision Making to think more carefully about each one, asking the questions: (a) Am I really interested in this topic? (b) Is there a lot of research information about this topic? (c) Am I likely to maintain interest in this topic over a long period of time? Weighing her alternatives with these questions, Sarah decided the Cahaba River interested her most.

The second set of lessons provided the students with an extended opportunity to focus their broad general interest area into a subtopic appropriate for investigation. A technique called *webbing* was used with Productive Thinking to assist students in visualizing the many, varied, unusual subtopics associated with their general interest areas. Again, Decision Making was instrumental in helping the students decide on the best subtopic for investigation. Sarah, for example, after webbing many, varied, unusual topics associated with the Cahaba River, narrowed her subtopics to include the Cahaba lily, pollution, animals, and recreation. After proceeding through the steps of Decision Making, Sarah determined that pollution of the Cahaba River was the best subtopic for her study (see Figure 2).

The next step in the series of lessons included record keeping. Gubbins (1982) reported that 90.2% of the students who failed to pursue Type III investigations had received minimal or no training in how to focus, plan, and manage the projects. In addition, it was beneficial for students to complete records that documented and communicated information to persons responsible for guiding the investigation. In the third set of lessons, students learned to complete forms that assisted in organization and time management (see Figure 3). TU activities that addressed these areas included Communication, Decision Making, and Planning.

Lesson Set 4 focused on identifying a problem for investigation. This step was crucial to the development of a Type III product, and it was important for teachers to provide proper guidance through this stage, or students could get off track and lose interest in the project. The lesson was used to ask the "who, what, which, when, where, why, how, how much, and under what circumstances" questions that could be used as research questions. For example, Sarah generated the following questions for research on the Cahaba: How does pollution affect the Cahaba? How does pollution affect the things that live in the water? How is pollution put into the water? What is being done about the pollution? Can students become more aware of pollution in the Cahaba River? Decision Making was employed to have students consider their best questions and then to decide on one for their research investigation. Sarah decided to address as her main focal point the task of helping students to become more aware of the pollution in the Cahaba River.

After students had formulated the research question, they learned how to organize their searches through use of a variety



Sample Activity Form: Management Plan

MANAGEMENT PLAN FOR INDIVIDUAL AND SMALL GROUP INVESTIGATIONS

Prepared by Joseph S. Renzulli, Linda H. Smith

NAME _____ GRADE 3

TEACHER _____ SCHOOL _____

Beginning Date _____ Estimated Ending Date _____

Progress Reports Due On Following Dates Weekly _____

GENERAL AREA(S) OF STUDY (Check all that apply)

- X Language Arts/Humanities
- X Science
- __ Personal and Social Development
- __ Social Studies
- __ Music
- __ Other (Specify) _____
- __ Mathematics
- __ Art
- __ Other (Specify) _____

SPECIFIC AREA OF STUDY Write a brief description of the problem that you plan to investigate. What are the objectives of your investigation? What do you hope to find out?

Can students become more aware of pollution in the Cahaba River?

INTENDED AUDIENCES Which individuals or groups would be most interested in the findings? List the organized groups (clubs, societies, teams) at the local, regional, state, and national levels. What are the names and addresses of contact persons in these groups? When and where do they meet?

1. Grade 3
2. _____
3. EPA
4. Cahaba River Society
5. _____

INTENDED PRODUCT(S) AND OUTLETS What form(s) will the final product take? How, when, and where will you communicate the results of your investigation to an appropriate audience(s)? What outlet vehicles (journals, conferences, art shows, etc.) are typically used by professionals in this field?

Presentation
Model
Overhead

METHODOLOGICAL RESOURCES AND ACTIVITIES List the names & addresses of persons who might provide assistance in attacking this problem. List the how-to-do-it books that are available in this area of study. List other resources (films, collections, exhibits, etc.) and special equipment (e.g., camera, transit, tape recorder, questionnaire, etc.). Keep a continuous record of all activities that are a part of this investigation.

Articles from the Birmingham News
Articles from Cahaba River Society
Father
Floating Down the Cahaba, (Stephen Kipp)
Printed Information, Author unknown
Protection urged for Cahaba (Catherine Longmire)
Cahaba Gets new classification, (Carl Sanders)

GETTING STARTED What are the first steps you should take to begin this investigation? What types of information or data will be needed to solve the problem? If "raw data", how can it be gathered, classified, and presented? If you plan to use already categorized information or data, where is it located and how can you obtain what you need?

1. Locate books and begin reading.
2. Visit the river.
3. Survey third grade classes.
4. Interview father.
5. Make model.
6. Evaluate

A complete description of the model utilizing this form can be found in: *The Enrichment Triad Model: A Guide For Developing Defensible Programs For The Gifted And Talented.* – Creative Learning Press, Inc. P.O. Box 320 Mansfield Center, Ct. 06250

Figure 3

of both primary and secondary sources. In the fifth set of lessons, students received instruction in locating, collecting, organizing, and analyzing data through TU processes of Productive Thinking, Academic Skills, and Decision Making.

Lesson Set 6, *Deciding on the Product and Audience,* presented students with a wide array of possible products through the consideration of visual, verbal, written, and kinesthetic modalities. Students explored learning styles in general, as well as how the creative producer has to consider his or her own learning style and the varying learning styles of the audience. Students were encouraged to rely on suggestions from mentors and methodological books as they considered exciting and engaging ways to share their knowledge through "bona fide" products and real audiences. Through Productive Thinking, Sarah generated the following examples of products for consideration: model, presentation, debate, cartoon display, display, overhead transparences. Using Decision Making processes, Sarah decided on a combination of presentation ideas to increase public awareness about pollution of the Cahaba. The TU processes of Communication, Decision Making, and Productive Thinking were especially helpful in the design of this set of lessons.

It is imperative that the teachers help students identify and gain advanced-level investigation and creative production of products. Advanced research involves learning certain behaviors and processes, and teachers often expect students to acquire skills without adequate direction. Activities in Lesson Set 7 guided students in thinking about the methodological processes and skills that adult professionals employ as creative producers in their respective fields. Through Productive Thinking, teachers assisted students in finding and acquiring necessary skills that adult professionals employ as creative producers in their respective fields. For example, Sarah learned to design a survey to collect raw data regarding the level of student awareness about the problems of the Cahaba River.

Activities in Lesson Set 8, *Developing the Product,* guided students in analyzing diverse, complex, and professional adult projects. Students also learned to record formative self-evaluative information as their products evolved. The applications of Communication, Forecasting, Academic, and Planning Talents were especially crucial when teachers encouraged task commitment and provided constructive feedback as students modified parts of their products that did not represent quality work.

Although creative productive people receive personal satisfaction from their efforts, many rewards also come from finding ways to contribute to knowledge in the field to enrich the lives of others. Teachers play a major role in helping students to develop this "sense of audience" by encouraging them to believe that they really do have something valuable to contribute. Productive Thinking, Communication, and Forecasting were utilized in Lesson Set 9 to assist students in this stage of the Type III process. For example, Sarah used the Forecasting Talent to predict the many, varied effects that sharing her project might have on others.

It is important that students learn to evaluate their own work and to make judgments about the quality of their work. In Lesson Set 10, students were encouraged to think of specific examples of strengths and weaknesses related to their Type III processes and products. Students self-evaluated their work using the rubric for the Student Product Assessment Form (SPAF) (Reis, 1981). In addition, as students reflected on the experience, they conferred with their mentors and teacher using the Communication Talents to produce a written evaluation of the Type III experience. Sarah used Communication Talent to rate her work, comparing the process to the simile: Completing my Type III was as *fun as:* (see Figure 4). Finally, students applied the Productive Thinking Talent as a real-world process to think of many, varied, and unusual ideas and/or strategies that would be helpful to incorporate into future Type III investigations to make them even more professional and high quality projects.

Sample Activity Form: Evaluation

EVALUATING YOUR WORK
COMMUNICATION 3
ACTIVITY 35

Use Communication 3 Talent to help you rate your work as you make comparisons using words from Activity 31 and set up a comparison statement.

Sample: *fun* **Completing my Type III was as**

as *riding on a rollercoaster*.
as *getting my allowance*.
as *dancing of draging*.
as *going to the beach*.
as *watching a baseball game*.
as *watching a foorball game*.
as *eating candy*.
as *playing keep away*.

Remember: Think of many, varied comparisons in the form of a simile.

Figure 4

Instrumentation

Reis' (1981) SPAF was used to assess the quality of student creative productivity (completed Type III products). This instrument was selected because it was the only one available that considered the differing aspects appropriate to the nature of the original creative products, as specified by the SEM. The SPAF (see Figure 5), which has a possible score of 75 points, uses a Likert-type scale for scoring operationally defined product quality by analyzing the degree of presence/absence of such factors as early statement of purpose, problem focusing, and level of resources.

The SPAF was the result of Reis' (1981) comprehensive research project directed toward developing the instrument and determining its reliability and validity. Interrater agreement on individual items ranged from 86.4% to 100%. The test-retest (r = .96) reliability was determined by having a group of independent raters assess the same set of student products on two separate occasions with an intervening time period between the two assessments. To obtain interrater reliability (r =.96), a technique described by Ebel (1951) was used to intercorrelate the ratings obtained from different raters (Reis & Renzulli, 1991).

Student Product Assessment Form

STUDENT PRODUCT ASSESSMENT FORM
SUMMARY SHEET

Name(s) _____ Date _____
District _____ School _____
Teacher _____ Grade ____ Sex _____
Product (Title and/or Brief Description) _____
_____
Number of Weeks Student(s) worked on Product _____

FACTORS	RATING*	NOT APPLICABLE
1. Early Statement of Purpose		
2. Problems Focusing		
3. Level of Resources		
4. Diversity of Resources		
5. Appropriateness of Resources		
6. Logic, Sequence, and Transition		
7. Action Orientation		
8. Audience		
9. Overall Assessment		
A. Originality of the Idea		
B. Achieved Objectives Stated in Plan		
C. Advanced Familiarity with Subject		
D. Quality Beyond Age/Grade Level		
E. Care, Attention to Detail, etc		
F. Time, Effort, Energy		
G. Original Contribution		

Comments:
Person Completing This Form _____

*Rating Scales.
Factors 1-8
5 - To a great extent
3 - Somewhat
1 - To a limited extent

Factors 9A-9G
5 = Outstanding
4 = Above Average
3 = Average
2 = Below Average
1 = Poor

Figure 5

Although no quantitative validity evidence was reported, content validity was established by submitting the instrument for evaluation to several recognized authorities in the field of gifted education, as well as in the area of educational research (Reis, 1981). The form was also submitted to 20 experienced teachers of the gifted in Connecticut. These authorities were asked to examine the form carefully and to assess the content for omissions, clarity and duplications.

Two independent, objective raters were selected from teachers in the area who were not part of the study but who had received instruction in TU and SEM and were implementing the models in their respective schools. A 3-hour practice session on use of the SPAF was conducted to clarify the procedures and to answer any questions related to the study. The raters were required to maintain interrater agreement of at least .75 for each product. In the case of less than .75 agreement, the raters discussed their rationales for each sub-score on the SPAF in order to come to agreement on a total score for the respective product.

Data Analysis

A 2 X 2 chi-square analysis with a .05 level of significance was used to analyze the data related to the completion rate of products. Analysis of Variance (ANOVA) was used to determine the between-group variance, as well as the variance within groups, to test the quality of the products. In addition, qualitative research techniques were combined with quantitative techniques to assess teacher and student perceptions, attitudes, and reactions to the experimental lessons.

Open-ended questionnaires were administered to the students and teachers in the treatment group. Student questions regarding the Type III process gave youngsters the opportunity to elaborate on the main points featured on the SPAF evaluation instrument. The student questionnaire also asked students to evaluate their understanding and competency in applying the Talents processes to the Type III process. Teacher questionnaires solicited information regarding the teachers' management of the project as well as their perceptions of the students' understanding and competency in using Talent processes with the Type III process. Documentation from questionnaires was analyzed through tallying the frequency of responses for questions that could be answered by a choice of several predetermined responses. Responses to the more open-ended questions, in addition to information from logs and interviews, were analyzed through developing coding categories (Bogdan & Biklen, 1982). This research required numerous site visits by the researcher to collect data, as well as to ensure that teachers were conducting the treatment lessons as intended by the researcher.

Results

Number of Noncompleters

The results from the analysis of data, significant at the .001 level, showed that the TU lessons had a positive effect in reducing the number of students who did not complete their products. None of the students who participated in the *Talents and Type IIIs* lessons dropped out of the study; however, approximately 21% of the students in the control group who did not receive training from the TU lessons chose not to finish their Type III products. The noncompletion rate for the control group was similar to the results of Olenchak's (1988) research that reported that approximately 27% of the students in his nontreatment study failed to finish their Type III investigations.

These findings are consistent with research related to task commitment (Barron, 1963; Bloom, 1985; Bloom & Sosniak, 1981; MacKinnon, 1965; Nicholls, 1972; Renzulli, 1978; Roe, 1952; Terman & Oden, 1959). Individuals who demonstrate high levels of task commitment also show great amounts of interest and involvement in their chosen areas of study (Barron). In addition, many have a better sense for identifying and focusing significant problems (Zuckerman, 1979). Students in the treatment group showed statistically significant differences on the SPAF in key concept areas of problem focusing and advanced familiarity with the subject. Thus, it seems logical that these two factors may have contributed to the zero dropout rate for treatment group students.

Descriptive data also supported the statistical results. Information from the student questionnaire indicated that 90% of the treatment students reported that they were "definitely better" or "maybe better" at identifying an interest for study. In addition, 93% of the students reported that they had improved in focusing topics, and 90% indicated that they were better at identifying problems related to their research topics.

Quality of Student Products

The results of ANOVA procedures showed that there were also significant differences between the two groups in the *quality* of products as measured by the SPAF. As shown in Table 1, the total mean score for the TU group was 62.98 as compared to 52.98 for the group not using TU. Mean scores for the total treatment group were statistically higher than those for the control group in 15 out of 15 key concepts, subtotal key concepts, and total key concepts on the SPAF (see Table 1). These findings are consistent with Olenchak's research, which reported a mean score of 53.21 for the quality of nontreatment student products as measured by the SPAF (Renzulli & Reis, 1985). Olenchak's (1988) explanation for this high score, given that the mean scores of previous studies were in the 40s range, was that the schools in his study had implemented the SEM for 1 year.

The statistical results for the TU group also were supported by qualitative data from both students and teachers. Results from a student questionnaire indicated that 87% of the students reported that they "definitely improved" or "maybe improved" in all of the skills areas listed on the questionnaire: Identifying an interest, focusing a topic, identifying problems, finding resources, deciding on products and audiences, and evaluating self. Additionally, 93% of the students reported that they had improved in executing the TU processes or Productive Thinking, Decision Making, Planning, Forecasting, and Communication as a result of the treatment experience.

Teachers commented through interviews and questionnaires that the TU lessons were "really far better than isolated, 'made up' hypothetical, TU thinking activities," and that "the lessons encouraged students to use the Talents for 'real life' situations and problems." Descriptive data from teacher questionnaires and interviews supported student data, which indicated that students became more skillful at executing the TU processes as a result of the treatment.

Teachers mentioned Decision Making most often as the Talent for which students showed the most improvement, noting that students learned quickly to generate criteria questions and state reasons for their decisions, processes that had been more difficult for them in the past. These findings are consistent with Beyer's (1987) suggestions that students are better motivated to learn a thinking skill if it is provided at a time when they feel a need to know how to use the process.

The Planning and Productive Thinking Talents were the processes that the students reported, along with Decision Making, as being most helpful in executing the Type III process. Specific activities employing these Talents mentioned most often by students included interest finding (Productive Thinking), focusing the interest area (Productive Thinking And Decision Making),

Group Differences on the Quality of Products Completed by Third- Through Sixth-Grade Talent Pool

	Treatment group *n*=27		Control group *n*=27			
Key concept	*M*	*SD*	*M*	*SD*	*F*	*p*
1. Early statement of purpose	4.759	0.641	4.056	1.643	4.30	.0431*
2. Problem focusing	4.611	0.641	3.722	1.625	6.99	.0108*
3. Level of resources	3.370	0.957	2.796	1.162	3.93	.0528
4. Diversity of resources	3.130	1.088	2.685	1.170	2.09	.1543
5. Appropriateness of resources	4.148	0.677	3.630	1.245	3.62	.0628
6. Logic, sequence, transition	4.185	0.709	3.556	1.340	4.66	.0355*
7. Action orientation	3.907	1.301	3.519	1.362	1.15	.2883
8. Audience	4.685	0.638	4.222	0.764	5.85	.0192*
Subtotal	**32.796**	**4.390**	**28.185**	**7.871**	**7.07**	**.0104***
9. Overall assessment						
A. Originality of the idea	4.204	0.711	3.574	1.016	6.96	.0110*
B. Achieved objectives stated in plan	4.333	1.279	3.519	1.919	3.37	.0721
C. Advanced familiarity with subject	4.333	0.855	3.333	1.065	14.47	.0004**
D. Quality beyond age/grade level	4.093	0.855	2.315	1.067	8.74	.0047**
E. Care, attention to detail, etc.	4.259	0.813	3.463	1.043	9.75	.0029**
F. Time, effort, energy	4.481	0.766	3.759	1.069	8.15	.0062**
G. Original contribution	4.481	0.814	3.833	0.820	8.49	.0053**
Subtotal	**30.185**	**4.641**	**24.796**	**6.099**	**13.35**	**.0006****
TOTAL	**62.981**	**8.047**	**52.981**	**12.619**	**12.05**	**.0010****

*p < .05
**p < .01

Table 1

record keeping (Planning), identifying a problem (Decision Making), and learning about the topic—sidentifying human and material resources (Productive Thinking).

Although the intent of this study was not to investigate the effects of the treatment lessons on students' decisions to initiate a Type III project, it is notable that twice as many students in the treatment group (n=99) began Type III investigations as compared to students in the control group (n=48). This finding was consistent with Burns' (1987) research, which reported that participation in Type II orientation lessons was significant in determining which students would begin Type III investigations. In addition, Gubbins' (1982) research showed that 90.2% of the students who did not begin a Type III project indicated that they had received minimal or no training in how to focus, plan, and manage the projects. Data from the treatment-group questionnaire indicated that students included activities of interest finding, focusing the interest area, and planning the project, as being among the most helpful processes for them in the Type III investigation.

Implications of the Study

This study indicates that we educators can provide more integrated and meaningful learning experiences for our students in designing opportunities for students to synthesize knowledge with learning how-to-learn skills as Taylor (1986), Renzulli and Reis (1985), Schlichter (1986), and Burns (1987) have suggested. This research confirms the effectiveness of integrating the TU with processes involved in creating *bona fide* products for real audiences. More specifically, through application of the TU, students can learn to identify and focus topics for investigation; develop inquiry skills to identify problem areas and questions for research; develop skills to organize and manage the implementation of investigative studies; learn to develop and refine products so that they represent quality beyond age and grade levels; and develop skills to present and evaluate their work much like real-world, adult professionals.

Integration of the TU processes with steps in conducting Type III investigations or independent study projects also can minimize the noncompletion rate by assisting students in identifying topics that are important and have meaning for them. Further, through TU processes, students can learn to identify appropriate human and material resources and to develop time management plans to help keep their investigations focused and on track. In completing the process, students can learn task commitment as they develop strategies for perseverance and hard work.

Finally, through the process of applying the TU processes to real-world investigations, students can sharpen their skills in Productive Thinking, Decision Making, Planning, Forecasting, and Communication. As Schlichter (1986) suggested, offering students experiences similar to those that adults encounter in real-world problem solving is more significant in encouraging students to use the TU processes for real-life situations and problems than teaching TU as discrete skills in hypothetical, unrelated exercises. Thus, as educators, it becomes our responsibility to provide such opportunities for our youngsters so that they are better equipped to meet the challenges of the future as adults.

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