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Research on the Schoolwide Enrichment Model: Four decades of insights, innovation, and evolution

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Abstract

The process of talent development with children and young adults who have participated in programs based on the Enrichment Triad and the Schoolwide Enrichment Model (SEM) has been the focus of research by Renzulli and Reis, as well as other scholars and colleagues, for over four decades. Periodic summaries of this extensive research have been completed and have informed the evolution of the SEM approach. In this research synthesis, we describe almost four decades of research on this model, focusing primarily on the most important syntheses and research that has been published in peer reviewed journals. This synthesis of research suggests that the SEM is broadly and widely used across the globe and leads to positive outcomes for academically talented and high potential students, in addition to being a source of schoolwide enrichment that provides challenging, strength-based opportunities for all students.

Keywords

Gifted education, research summary, Schoolwide Enrichment Model, talent development, enrichment pedagogy

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Introduction

The process of talent development with children and young people who participate in programs based on the Schoolwide Enrichment Model (Renzulli and Reis, 1985, 1997, 2014) and Enrichment Triad Model (Renzulli, 1977) has been the focus of research by Renzulli and Reis for over four decades. Summaries of this extensive research base ARE challenging, they do exist (Gubbins, 1995; Reis and Renzulli, 2003; Renzulli, 1988b; Renzulli and Reis, 1994, 2010). These summaries have contributed to the continuing development of this enrichment approach, which is based on key principles that have evolved over time. The most important of these principles is the belief that the creative and productive experiences of children and young adults who participate in planned and purposeful SEM enrichment opportunities have an important influence in their later lives. For example, research suggests that students who complete in-depth, self-selected project experiences develop strong interests and will continue to seek additional creative and productive experiences (Delcourt, 1993; Hébert, 1993; Westberg, 2010). Renzulli and Reis (2014, 2017) have consistently found that students who experience the joys, challenges, and intensities of creative productivity in elementary, secondary school, and college are more likely to pursue creative work and challenges in their adult lives, regardless of the field, major, domain, or career they choose.

Various types of research have been used to study the SEM and are described in this article. Descriptive studies, including historical and evolutionary overviews of the SEM as well as case studies, illustrate the way that the SEM is implemented in a classroom or a school (Beecher and Sweeny, 2008). For example, an assistant superintendent of schools and a SEM researcher analyzed the ways that the SEM was implemented in a new urban school (Reis and Morales-Taylor, 2010). Another group of scholars interviewed teachers and observed SEM-R classrooms to analyze how well teachers implemented the SEM-R (Reis et al., 2018). Another researcher observed teachers who are implementing a new SEM-R reading program to investigate how they used differentiated reading strategies (Fogarty, 2007).

Correlational studies, which investigate the relationships between two or more variables, have also been used to study the SEM. For example, researchers studied students who were underachieving and reversed or diminished their underachievement behaviors after completing an interest-based Type III study (Baum et al., 1994). In another study, researchers used SEM pedagogy to teach math to students with both talents and disabilities (Reis et al., 2003).

In some SEM research, experimental designs have been used to investigate the possibility of a causal relationship between two or more variables. For example, the SEM-R reading program was implemented in some classes, while in other randomly selected classes teachers continued to use the same standard reading program they had been previously using, with positive findings favoring the SEM-R (Reis et al., 2011). In this summary, we focus on the most important syntheses completed, as well as research that has been published in peer reviewed journals in the United States and around the world.

Background and introduction to the SEM

The SEM integrates the Three Ring Conception of Giftedness (Renzulli, 1978), the Enrichment Triad Model (Renzulli, 1977) and the Revolving Door Identification Model (Renzulli et al., 1981). It has been implemented in thousands of school districts worldwide as a gifted program, enrichment program, and school-based theme approach to learning. In addition to the United States, the SEM is used in schools in China, Mexico, Chile, the Caribbean, Dominican Republic, Grand Cayman, Puerto Rico, Argentina, Brazil, Netherlands, Canada, the Virgin Islands, Spain, Germany, Portugal, Turkey, Bahrain, Iraq, United Arab Emirates, Jordan, Hungary, Holland, Lebanon, Singapore, New Zealand, Indonesia, Switzerland, Croatia, South Korea, England, Japan, Peru, India, Dubai, Phillipines, and Austria (Hernandez-Torrano and Saranli, 2015; Reis and Renzulli, 2003; Renzulli, 2003; Sytsma, 2003).

This article summarizes 40 years of research on the SEM and offers insights about its effectiveness at serving gifted and high-ability students in a variety of educational settings and with diverse populations of varying socioeconomic backgrounds (Reis and Renzulli, 2003; Renzulli and Reis, 1994). Van Tassel-Baska and Brown (2007) called the SEM one of the mega-models in the field of gifted education and talent development. In the sections below, the evolution of the model is explained, as is pertinent research underlying each of its components.

The Schoolwide Enrichment Model (SEM)

The SEM (Figure 1) integrates the previously developed Three Ring Conception of Giftedness (Renzulli, 1978), Revolving Door Identification Model (Renzulli et al., 1981), and Enrichment Triad Model (Renzulli, 1977). Renzulli and Reis, the developers of the SEM, focused their work on the importance of highly challenging work for academically talented students, additional opportunities for enrichment for all students, and a more flexible approach to identifying high-potential students from all backgrounds. Research on the SEM has been conducted in schools with widely differing socioeconomic levels and program organizational patterns and has generally shown positive results (Gubbins, 1995; Reis and Renzulli, 2003; Renzulli and Reis, 1994).

In most schools or programs that use this model, the identification system developed as part of the SEM is also used, resulting in the creation of a talent pool of 15–20% of above-average ability/high-potential students. The talent pool is formed using a variety of identification measures and tools, including multiple criteria such as locally normed achievement tests, teacher nominations, assessment of student potential for creativity and task commitment, as well as alternative pathways of entrance (self-nomination, parent nomination, etc.). The SEM is broadly used as a gifted education program, an enrichment program for entire schools, theme for magnet or charter schools, and as a programming model for innovative and engaging schools for high potential students, sometimes called Renzulli Academies. In these academies, above average and high potential students are grouped together, and the entire school population is considered the talent pool.

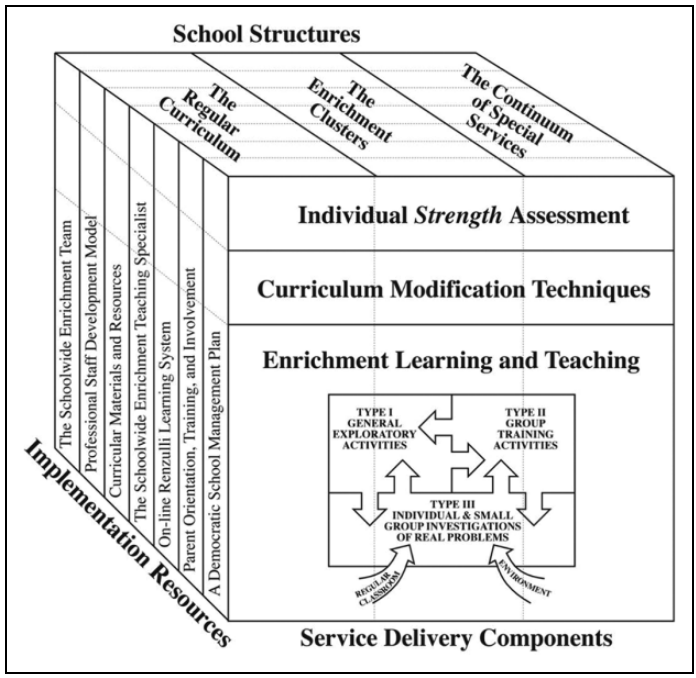

Figure 1. The Schoolwide Enrichment Triad Model.

Students in SEM programs receive several kinds of services, depicted on the face of the SEM cube in Figure 1. The Renzulli Profiler (https://renzullilearning.com) generates a unique profile by analyzing interests, preferred preferences for learning, and expression styles. These tools are also available on as PDFs (https://gifted.uconn.edu/schoolwide-enrichment-model/sem3rd/) and can be used in pen-and-paper format to determine the interest, modes of learning and expression styles of each student. This information is used to help teachers differentiate bases on strengths and interests rather than deficits. These tools, in addition to other data and work samples, are used to create a Total Talent Portfolio (TTP) for each student. The TTP can help teachers to both identify and create students' interests, as well as to encourage students to develop and pursue these interests in various ways. Preferred learning modes assessed include projects, independent studies, teaching games, simulations, peer teaching, programmed instruction, lecture, drill and recitation, and discussion. Expression style preferences include written, oral presentations, artistic products, visual displays, dramatizations, computer programs and games, and construction or service projects.

Comprehensive research syntheses on the SEM have investigated the use of this enrichment approach with students from different social and economic backgrounds, types of schools, and regions of the country and world, showing several important benefits across these varied studies (Reis, 2016; Reis and Renzulli, 2003; Renzulli and Reis, 1994, 2010). From the earliest publications on the SEM, the focus has been on the use of strengths and interests to increase student achievement, engagement, and

enthusiasm in school (Reis and Renzulli, 2010; Renzulli, 1977; Renzulli and Reis, 1985). Varied research summaries have demonstrated that the use of SEM enriched and accelerated content can increase achievement, enthusiasm, and engagement for learning (Beecher and Sweeny, 2008; Delcourt, 1993; Hébert, 1993; Renzulli, 1992b), reverse underachievement (Baum et al., 1994; Renzulli et al., 1999), positively influence students' attitudes toward learning (Olenchak and Renzulli, 1989), enhance students' social and emotional development (Reis and Renzulli, 2004) and enhance the educational experiences of students with a combination of talents and disabilities (Baum, 1988; Baum et al., 2014; Reis et al., 2013). In one comprehensive study, Olenchak (1990) studied the effectiveness of a year-long implementation of the SEM in 11 schools, with 1,698 elementary grade students, 236 teachers, 120 parents, and 10 principals, finding positive changes in student and teacher attitudes, numerous student creative products, and favorable changes in attitudes toward gifted students in classroom teachers and the general student population. In this study, Olenchak also found large increases in student-centered enrichment activities and work on self-selected interests, greater cooperation between classroom teachers and gifted education specialists, and more favorable attitudes toward special programming on the part of parents.

SEM has been used to facilitate teachers' use of compacting and strength-based student choice Type III projects to enhance acceleration (Colangelo et al., 2004). It has also been discussed as a method for integration into initiatives such as Response to Intervention (Reis et al., 2013; RTI). Components of the SEM have been implemented to infuse creative productivity into other important models for gifted and talented youth, including International Baccalaureate (Carber and Reis, 2004). Participation in the SEM has also resulted in increased creativity and creative productivity in children and young adults (Delcourt, 1993; Hébert, 1993; Westberg, 2010). SEM extensions in reading (SEM-R) have led to the implementation of differentiated reading instruction embedded in the reading curriculum as well as higher reading engagement (Reis and Boeve, 2009; Reis and Housand, 2009; Reis et al., 2007, 2008, 2011), comprehension and fluency (Reis and Housand, 2009; Reis et al., 2007, 2008, 2011), and self-regulation (Reis and Housand, 2009).

Some research on the use of the SEM pertains to increased levels of student creative productivity or engagement in school (Baum et al., 2014; Beecher and Sweeny, 2008; Brandon et al., in review; Brigandi et al., 2018, Reis and Morales-Taylor, 2010). Other research focuses on one or more of the three major components, such as the use of enrichment clusters (Reis et al., 1998a; Renzulli et al., 2013), the development of instruments, such as learning or expression styles (Kettle et al., 1998; Renzulli and Sullivan, 2009), the use of the Total Talent Portfolio (Renzulli, 1997), or the use of curriculum compacting (Reis and Purcell, 1993; Reis and Renzulli, 1992; Reis et al., 1998b). Research has also been conducted and published on the successful use of the SEM in urban schools (Briggs et al., 2008; Reis and Morales-Taylor, 2010; Reis and Renzulli, 2010) or rural schools (Reis and Renzulli, in press). In urban schools, the use of enrichment pedagogy can promote engagement and creativity as well as enable students to apply thinking skills in an integrated, inductive, and problem-oriented manner. In rural schools, much more attention is given to identifying diverse enrichment opportunities and finding mentors, sometimes on line, for differing levels of student enrichment.

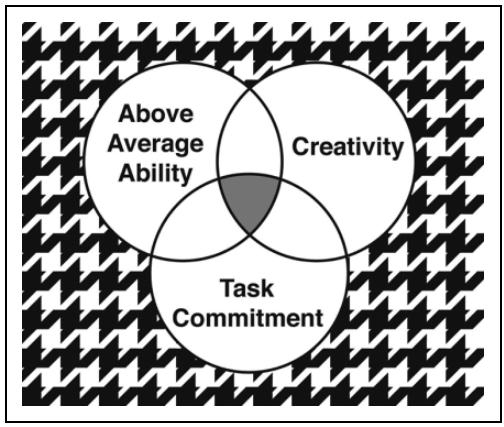

Figure 2. The Three-Ring Conception of Giftedness.

Individual components of the SEM are often both implemented and investigated without the entire program being used, resulting in research focused only on one component, such as enrichment clusters (Morgan, 2007; Reis et al., 1998a; Renzulli, 2000, 2001b; Renzulli et al., 2004) or curriculum compacting (Reis and Purcell, 1993; Reis and Renzulli, 1992; Reis et al., 1998b; Renzulli et al., 1982).

In the sections that follow, we summarize pertinent, important classic and current research on the SEM, including the extensions of the SEM for school engagement, enrichment, and improvement for all students (Renzulli, 1994, 1998). We begin with the Three Ring Conception of Giftedness that underlies the development of the SEM.

The Three Ring Conception of Giftedness

The Three-Ring Conception of Giftedness (Renzulli, 1978, 1986, 1999, 2005; see Figure 2), is the theoretical conception of giftedness that is the basis for the SEM. The Three-Ring Conception recognizes both academic or high achieving giftedness, and creative-productive giftedness which is the way in which giftedness is recognized in the non-school world. (Renzulli, 2012; Renzulli and Reis, 1994, 1997). Both types of giftedness are important independently of each other and in terms of the ways they interact, and both should be developed in special enrichment programs.

This conception of giftedness identifies three interacting clusters of abilities: (a) Above Average but not necessarily superior ability, (b) Task Commitment, and (c) Creativity. These clusters, defined below, focus on creative productive giftedness; and it is the interaction between and among the clusters that results in what we prefer to call "gifted behaviors," When young people display these kinds of behaviors, it does not mean that they will automatically be labeled as gifted. Rather, Renzulli and Reis (1985, 2005, 2014) have described their actions as thinking, feeling, and doing like a practicing professional, even if at a more junior level that a scientist at a research university, a writer at a leading magazine, or a film maker in Hollywood.

The most cited article on this conception of giftedness is Renzulli's introduction please correct spelling of the definition (Renzulli, 1978), followed by a description of the outcomes of the use of more flexible identification measures to create a talent pool in numerous school districts (Reis and Renzulli, 1982). When a broader pool of students was identified, students in the more flexible talent pool completed creative products that were just as highly evaluated as those in the top 1–3%. The results demonstrated the efficacy of a broader talent pool for participation in gifted programs focusing on creativity and creative productivity.

Perhaps the most salient aspect of the Three-Ring theory is the *interaction* between and among these clusters of traits that is brought to bear upon a particular problem situation and/or performance area that creates the conditions for the creative productive process to begin and flourish. Additionally, Renzulli found that these clusters of traits emerge in certain people, at certain times, and under certain circumstances (Renzulli, 1986, 1988, 1989, 1990, 2005). The houndstooth background represents the various personality and environment factors that give rise to the three clusters of traits (Renzulli, 2002a; Renzulli and D'Souza, 2012; Renzulli et al., 2006).

Above Average Ability encompasses ability as measured by cognitive and standardized achievement tests and strengths and talents in areas such as the arts, leadership, and other fields not easily assessed by formal testing. This cluster is named "above average ability," as opposed to exceptional ability, as it derives from research suggesting that, beyond a certain level of cognitive ability, real-world achievement is less dependent upon ever increasing performance on skills assessments than upon other personal and dispositional factors (e.g., Task Commitment and Creativity; Renzulli, 1978, 1986, 2005).

Task Commitment represents a non-intellective cluster of traits found consistently in creative productive individuals (e.g., perseverance, determination, will power, positive energy). It may best be summarized as a focused or refined form of motivation—energy brought to bear on a particular problem or specific performance area.

Creativity is a cluster of traits that encompasses curiosity, originality, innovation, imagination, ingenuity, and a willingness to challenge convention and tradition. There have been many gifted scientists throughout history, but the scientists whose work we revere, whose names have remained recognizable in scholarly communities and among the general public, are those scientists who used their creativity to envision, analyze, and ultimately help resolve scientific questions in new, original ways.

Various research summaries (Renzulli, 1978, 1986, 1988, 1989, 2005; Renzulli and Reis, 2017) have been published on this developmental conception of giftedness (see Table 1 below), beginning with the first article in 1978. A frequently raised question discussed in these syntheses relates to whether Creativity and Task Commitment must be present in order for a person to be considered "gifted." In the study of human abilities, traditionally measured achievement tends to remain constant over time (indeed, this is the reason for the high reliability of cognitive ability and achievement tests). Task Commitment and Creativity, on the other hand, are not always present or absent; rather, they emerge and are developed within certain contexts and circumstances that are the result of experiences (e.g., effective teaching) that promote these traits. Creativity and Task Commitment, unlike traditionally measured academic achievement traits included in the Above Average Ability circle, are developmental and therefore subject to change

Table 1. Research about the Three Ring Conception.

Author	Date	Publication	Core results or findings
Renzulli (1978)	1978	*Phi Delta Kappan*	Comprehensive research summary leading to the development of the Three Ring Conception.
Reis and Renzulli (1982)	1982	*Phi Delta Kappan*	Students who score in the top 15% completed products that are as highly rated as those who score in the top 1–3%.
Renzulli (1986)	1986	*Cambridge University Press*	Follow-up research summary of new research on Three Ring Conception.
Renzulli (1988)	1988	*Roeper Review*	Summary of a decade of experiences related to the Three Ring Conception.
Renzulli (1989)	1989	*Thresholds in Education*	Application of Three Ring Conception translating theory to practice.
Renzulli (1990)	1990	*Early Child Development and Care*	Applies the Three Ring Conception to a broader method of identifying talent in young people using multiple criteria.
Renzulli (1992a)	1992a	*Talent for the Future (edited book) Maastricht, The Netherlands*	An overview of the research base for Renzulli's Three-Ring Conception of giftedness based on international discussions at a symposium.
Renzulli (1999)	1999	*Journal for the Education of the Gifted*	Twenty-five year retrospective of the Three Ring Conception, new research findings summarized.
Renzulli (2002a)	2002a	*Phi Delta Kappan*	Theoretical argument for expanding the definition of giftedness and Operation Houndstooth
Renzulli (2002b)	2002b	*Exceptionality*	Operational definition for schools in developing identification and programming
Renzulli (2002c)	2002c	*British Journal of Gifted and Talented*	Summary of the how the Three Ring Conception is being used internationally.
Renzulli (2005)	2005	*Cambridge University Press*	Summary of new research related to the Three Ring Conception of Giftedness and components.
Reis and Renzulli (2010)	2010	Journal of Education	Update on the SEM in urban schools and how it integrates advanced opportunities for talent development in different types and levels of enrichment, such as enrichment clusters, the SEM-R, Renzulli Learning, and the Enrichment Triad Model.
Renzulli (2016)	2016	International Journal for Talent Development and Creativity	Introduces a new discussion about the role of blended knowledge in the Three Ring Conception.
Renzulli and Reis (2017)	2017	*American Psychological Association*	Update on the last two decades of research on the Three Ring Conception and its application to the SEM.

depending on the experiences that are provided for both young people and adults (Renzulli and Reis, 2017). These clusters emerge after various opportunities, resources, and encouragement by teachers or others who spark a creative idea or engender the motivation that enables a student to follow through on an idea (Renzulli, 1992b). The research summaries that discuss the roles of Task Commitment and Creativity and other aspects of the Three Ring Conception in classic and more current research articles (Renzulli, 1986, 1988, 1989, 1990, 2005, 2012; Renzulli and Reis, 2017) demonstrate that this definition is research-based and it emphasizes the critical roles of teachers, mentors, and coaches in the overall process of talent identification and development.

About the time that the positive psychology movement began emerging (Seligman and Csikszentmihalyi, 2000), Renzulli was investigating the environmental and personal traits that gave rise to the abilities, creativity, and task commitment clusters (Renzulli, 2002a). He became fascinated by the question of what traits cause some people to use their intellectual, motivational, and creative assets in ways that lead to outstanding creative productivity and what causes some individuals to value human concerns and the common good above financial gain or ego enhancement. A comprehensive review of the literature and new research resulted in the identification of major components in the houndstooth pattern underlying the three rings. (Renzulli, 2002a; Renzulli et al., 2006; Sytsma, 2003). They included optimism, courage, romance with a topic or discipline, sensitivity to human concerns, physical and mental energy, and a sense of vision or destiny (Renzulli, 2002a).

The SEM identification model

The Three-Ring Conception of Giftedness is based on an interaction between and among the three clusters of traits described above that creates the conditions for developing and applying gifted behaviors. In this approach, giftedness is not viewed as an absolute or fixed state of being (i.e., "... you have it or you don't have it"). Rather, it is viewed as a developmental set of behaviors that can be applied to creative endeavors and problem-solving situations. In other words, the most important goal in the SEM is to develop creativity and task commitment traits in individuals who demonstrate above average abilities or potential. This concept is a cornerstone of the corresponding Renzulli Identification System for Gifted Program Services (RIS/GPS; Renzulli and Reis, 2012).

This RIS/GPS identification system (Renzulli and Reis, 2012) recognizes students with undiscovered potential and provides opportunities to develop their talents through an integrated continuum of special services (i.e., the SEM). This approach facilitates the identification of students who need and would benefit from services that recognize both academic and creative-productive giftedness. A key feature of this identification system is the formation of a Talent Pool that includes students who have been identified by both test and non-test criteria. The system includes students who earn high scores on traditional measures (including high-aptitude underachievers), and it also includes students who demonstrate their potentials in other ways. In districts where this system has been implemented, students, parents, teachers, and administrators have expressed high degrees of satisfaction with this approach. We can expand general enrichment opportunities to more students, such as those who score below the top 3–5 percentile levels as

Table 2. Research about the SEM/Revolving Door Identification Model.

Author	Date	Publication	Core results or findings
Delisle et al. (1981)	1981	*Exceptional Children*	Successful field testing of RDIM in a school district in CT resulting in support from teachers, students, and parents.
Renzulli and Delcourt (1986)	1986	*Gifted Child Quarterly*	Examination of alternative criteria to identify gifted students.
Renzulli et al. (2009)	2009	*Journal of Advanced Academics*	Introduction and reliability information on four new Renzulli scales SRBCSS subscales: mathematics, reading, science, and technology.
Renzulli and Reis (2012)	2012	*Creative Learning Press*	A summary of two decades of research and practice of the new Renzulli identification System.
Greiten (2016)	2016	*Journal of Education and Human Development*	Description of the use of the Renzulli Identification Model in Germany.

well as those students who gain entrance by non-test criteria, including teacher and parent nominations and ratings (Renzulli et al., 2002, 2009), performance based assessment, and the use of Assessment *for* Learning instruments (rather than assessment of previous learning) completed by the students themselves. Table 2 highlights important studies on the Revolving Door Identification Model.

The Enrichment Triad

The curricular and instructional basis underlying all learning activities in the SEM is the Enrichment Triad Model (see Figure 3; Renzulli, 1977), which was initially implemented in school districts as a gifted and talented program, but is now integrated in the SEM. The Triad was designed to encourage students' creative productivity by exposing them to various topics, areas of interest, and fields of study and by training them to *apply* advanced content, process-training skills, and methodology training to self-selected areas of interest. As depicted in Figure 3, two types of General Enrichment plus a SEM component called Enrichment Clusters are made available to all students. These opportunities further train students to *apply* advanced content, process-training thinking skills, and investigative methodology training to self-selected areas of interest.

Type I Enrichment includes general exploratory experiences such as guest speakers, field trips, demonstrations, interest centers, and the use of audiovisual materials and technology (such as webinars) designed to expose students to new and exciting topics, ideas, and fields of knowledge not ordinarily covered in the regular curriculum. Type II Enrichment includes instructional methods and materials purposefully designed to promote the development of thinking, feeling, research, communication, and methodological processes. Type II training, usually carried out both in classrooms and in enrichment programs, includes the development of creative thinking and problem solving, critical thinking, and affective processes; executive function skills, a variety of specific

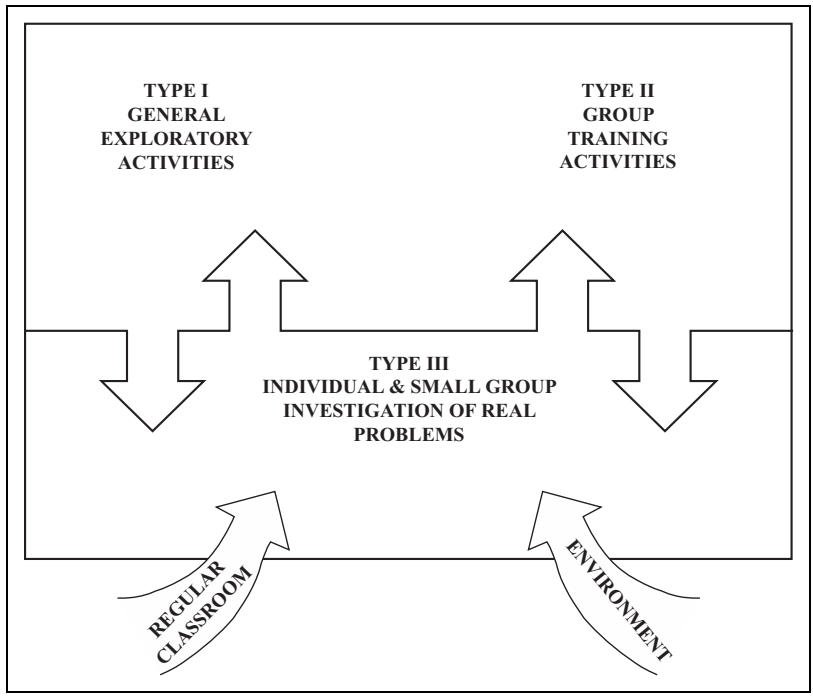

Figure 3. The Enrichment Triad Model.

learning-how-to-learn skills; skills in the appropriate use of advanced-level reference materials; and written, oral, and visual communication skills.

Type III Enrichment is the most advanced level of enrichment in the Triad Model. Although Types I and II Enrichment and curriculum compacting should be provided on a regular basis to talent pool students, the ability to engage in Type III Enrichment depends on an individual's interests, motivation, and desire to pursue advanced level study. Type III Enrichment includes investigative activities and artistic productions in which the learner assumes the role of a first-hand inquirer thinking, feeling, and acting like a practicing professional, with involvement pursued at a level that is as advanced or professional as possible, given the student's level of development and age. The most important feature of the model is the "flow" or connection among the experiences. Each type of enrichment is viewed as a component part of a holistic process that blends present or newly developed interests (Type I) and advanced level thinking and research skills (Type II) with application situations based on the modus operandi of the first-hand inquirer (Type III).

In the Enrichment Triad Model, the *interaction* between and among the three types of enrichment is as important as any one type of enrichment or the collective sum of all three types. Research on the use of the Enrichment Triad Model and its integration into the Schoolwide Enrichment Model at the secondary level has been discussed in a separate review (Reis and Renzulli, 1989), as have discussions within content areas and its

Table 3. Research about the Enrichment Triad.

Author	Date	Publication	Core results or findings
Reis and Hébert (1985)	1985	*Roeper Review*	Summary of how the Triad Model can be applied to Social Studies and History classes and used for students' historical research.
Starko (1988)	1988	*Gifted Child Quarterly*	Participation in Enrichment Triad and number of projects completed predicted creative productivity outside of school.
Reis and Renzulli (1989)	1989	*Journal for the Education of the Gifted*	Explanation of how the Secondary Enrichment Triad Model evolved after several years of experience with numerous field test sites in which the Enrichment Triad Model expanded to middle and high school.
Reis and Renzulli (1991)	1991	*Gifted Child Quarterly*	Summarizes the reliability and validity information regarding the development and use of the *Student Product Assessment Form* that can be used to assess student Type III products.
Schack et al. (1991)	1991	*Journal of Research in Education*	Three studies involving a total of 918 elementary and middle school students of above average ability confirm the importance of self-efficacy in students' decisions to initiate creative productivity and increase self-efficacy and creative productivity.
Delcourt (1993)	1993	*Gifted Child Quarterly*	Students who participated in Type III enrichment maintained related interests and career aspirations in college.
Baum et al. (1995)	1995	*Gifted Child Quarterly*	Involvement in Type III enrichment resulted in achievement improvement in 17 gifted underachieving students.
Baum et al. (1994)	1994	*Educational Leadership*	Case studies of gifted underachievers who reversed their underachievement after completing type III enrichment.
Cho and Kim (2003)	2003	*Gifted Education International*	Gifted students in South Korea responded positively to enrichment based gifted programs.
Fakolade and Adeniyi (2010)	2010	*International Journal of Special Education*	Use of Enrichment Triad resulted in higher achievement scores in Nigeria.
Aljughaiman and Ayoub (2012)	2012	*Journal for the Education of the Gifted*	Saudi Arabian students who received enrichment had higher scores on analytical and creative abilities than those who did not.

(continued)

Table 3. (continued)

Author	Date	Publication	Core results or findings
Brigandi et al. (2016)	2016	*Journal for the Education of the Gifted*	Participation in Type III enrichment was related to goal valuation and students' continued interest and perceptions of enjoyment after completion.
Booij et al. (2017)	2017	*Institute of Labor Economics, Netherlands*	When gifted SEM programs were implemented, all Dutch students who received SEM enrichment based services had improved achievement.
Brigandi et al. (2018)	2018	*Gifted Child Quarterly*	Participation in Type III enrichment activities was related to increased students' positive perceptions of their learning environment.
Brigandi et al. (2019)	2019	*Journal of Advanced Academics*	Participation in professional development in Enrichment Triad resulted in increased knowledge of gifted education, attitude toward change, and repertoire of instructional strategies.
Sumardi and Naim (2018)	2018	*IOP Conference Series: Earth and Environmental Science*	Use of the Enrichment Triad improved outcomes in history content and learning.
Brandon et al. (in review)	Under review	*Roeper Review*	Support provided for creative productivity resulted in increased autonomy and the opportunity for college students to complete independent and small group advanced work.

use a positive intervention to reduce underachievement (Baum et al., 1994, 1995) and enhance students interests and learning engagement (Baum et al., 2014; Beecher and Sweeny, 2008). Using the Enrichment Triad Model as an intervention with twice exceptional students has also shown positive outcomes (Baum et al., 2014). Longitudinal research on the use of the Triad Model has shown that students who completed Type III projects, both in and out of school, maintained interests and career aspirations in college and in graduate school (Delcourt, 1993; Renzulli and De Wet, 2010; Westberg, 2010). Research on the use of the Triad Model in college has also been conducted, with positive findings related to student creative productivity and engagement (Brandon et al., in review).

Researchers have also conducted longitudinal investigations on impact of Type III projects for decades. Starko (1988) found that students who became involved with self-selected independent studies in SEM programs initiated their own creative products both inside and outside school more often than students who qualified for the program but attended school in a district without a program. Students in the enrichment group completed over twice as many creative projects as the comparison group. Starko also found that the number of creative products completed in school

Table 4. Research about enrichment clusters.

Author	Date	Publication	Core results or findings
Reis et al. (1998a)	1998a	*Journal for the Education of the Gifted*	Classroom teachers facilitated enrichment clusters for all students, integrating challenging content into 95% of the clusters through teaching specific authentic methodologies, advanced-thinking and problem-solving strategies. Approximately 60% of teachers transferred some advanced strategies used in clusters into their classroom practices.
Renzulli (2000, 2001)	2000, 2001	*Middle School Journal*	A two-part explanation about how Enrichment Clusters, also called Academies of Inquiry and Talent Development, are implemented in middle schools to promote academic rigor through instructional differentiation.
Renzulli (2001)	2001	*Gifted Education International*	Describes how the use of SEM enrichment clusters can be used to screen general populations for unidentified or under identified students who may benefit from the types of services ordinarily provided by special programs, concluding that the use of clusters can aid performance based identification.
Renzulli et al. (2004)	2004	*Educational Leadership*	An update about the use of Enrichment Clusters in urban and suburban districts and how these positively affected students engagement and enjoyment of learning.
Morgan (2007)	2007	*British Journal of Special Education*	Parents, students, and teachers found enrichment clusters beneficial for gifted students.

(Type IIIs) was a highly significant predictor of self-efficacy. Other research on Type III suggests that students who engage in Type III Enrichment have a positive relationship between their early interests and subsequent interests (Westberg, 2010), postsecondary school plans (Hébert, 1993), career choices (Delcourt, 1993), goal valuation (Brigandi et al., 2016), environmental perceptions (Brigandi et al., 2018), levels of self-efficacy (Schack et al., 1991), and self-regulation (Brigandi et al., 2018; Hébert, 1993). Baum and colleagues (1994, 1995) reported that Type III enrichment was an effective approach to reverse underachievement. Brigandi et al. (2016) also found a positive connection between participation in enrichment and goal valuation. Students who engaged in Type III Enrichment perceived their projects to be interesting and beneficial and believed they would contribute to their continued interest and perceptions of enjoyment in the future. Most recently, Brigandi et al. (2018) found that students who engaged in Type III enrichment benefited from environmental supports, including exposure to challenging coursework and trusted relationships with project mentors, like-minded peers, and the gifted education teacher, which in turn positively affected their ability to self-regulate their work and self-actualize their goals.

Related research about the Triad Model also resulted in the development of valid and reliable instruments, including the Student Product Assessment Form, which is used to evaluate Type III products (Reis and Renzulli, 1991). In summary, using the Enrichment Triad Model has resulted in positive outcomes with gifted and non-identified students, finding that the enriched and accelerated content in this approach helps to reverse underachievement and increase achievement. Brigandi et al. (2019) recently examined professional development in Renzulli's Enrichment Triad Model and one gifted education teacher's knowledge and practice, with particular attention paid to differentiated instruction. Findings indicated that professional development increased the participating teacher's knowledge of gifted education, attitude toward change, and repertoire of instructional strategies. Information on additional studies regarding the Enrichment Triad can be found in Table 3.

Enrichment clusters

Enrichment clusters have become one of the most widely known and implemented components of the SEM (Renzulli et al., 2004). Clusters are weekly enrichment opportunities that focus on students' interests and pair students with a teacher facilitator who helps each student develop a product or service in an area of personal interest. The goals of enrichment clusters are higher enjoyment of enriched learning, enabling all students to apply both advanced content and process, and the use authentic methods, content, and materials to complete products and services, as recommended in the Enrichment Triad Model. Reis et al. (1998a) investigated the impact of providing enrichment clusters to the entire population of two urban elementary schools and found positive effects on differentiated teaching practices. After classroom teachers facilitated clusters, they introduced more challenging content, as well as more authentic methodologies, advanced thinking, and problem-solving strategies in their regular classroom teaching. Research and case studies have also supported the use of enrichment clusters with middle school students (Renzulli, 2000, 2001a).

Other research found that enrichment clusters can benefit performance-based identification of high potential students by broadening teachers' perceptions of students' talents and potentials when they are seen in other contexts (Renzulli, 2001b). Baum and colleagues (2014) found that using enrichment clusters in a school for twice exceptional (2E) students enabled students to become part of a social group; overcome some social, emotional, and cognitive challenges; develop ongoing mentor and professional relationships with people in talent areas; and develop expertise in areas of talent. Additional research on this topic can be found in Table 4.

Curriculum compacting

Curriculum compacting, another core component of the SEM, (Reis and Renzulli, 1992; Reis et al., 2016; Renzulli at al., 1982) is also offered and provided to all eligible students (usually the talent pool, but occasionally other students, based on preassessments) in the SEM. Compacting is a widely utilized approach to differentiation of instruction that combines both enrichment and acceleration strategies (Colangelo et al., 2004) and

Table 5. Research about curriculum compacting.

Author	Date	Publication	Core results or findings
Renzulli et al. (1982)	1982	*Elementary School Journal*	Introduces curriculum compacting, a useful strategy for curriculum differentiation that was widely adapted and used in elementary classrooms to challenge and teach gifted and talented students.
Reis and Renzulli (1992)	1992	*Educational Leadership*	A descriptive general education article on curriculum compacting, showing it as a research-based differentiation technique enabling high-ability students to eliminate work they already know and substitute more challenging content.
Reis and Purcell (1993)	1993	*Journal for the Education of the Gifted*	Describes a national study that examined the effects of curriculum compacting and achievement test scores of a national sample of 336 high ability students from 20 schools, showing that achievement test scores of students whose curriculum was compacted did not differ significantly from students whose curriculum was not compacted.
Reis and Westberg (1994)	1994	*Gifted Child Quarterly*	Three levels of staff development in curriculum compacting were provided to teachers in 20 school districts, who were randomly assigned by district to one of three treatment groups teachers. Teachers were able to eliminate between 42% and 54% of content for high ability/gifted students.
Troxclair (2000)	2000	*Roeper Review*	Explanation of how to successfully implement curriculum compacting in social studies, using conceptual thematic units, questioning strategies, interest development centers, independent study programs, and mentorships in compacted time.
Reis et al. (1998b)	1998b	*Gifted Child Quarterly*	Use of compacting resulted in the same achievement test scores for students who did all of the content as opposed to those for whom a majority of content that was already mastered was eliminated.
Stamps (2004)	2004	*Roeper Review*	Describes how compacting can be effectively implemented with first grade high ability students in a rural school district. Curriculum compacting was effective in eliminating previously mastered content and higher student achievement.
Livers et al. (2018)	2018	*School-University Partnerships*	Details a successful collaborative effort to implement curriculum compacting activities with elementary students in conjunction with developing teacher candidates' abilities to teach mathematics.

enables classroom teachers to differentiate, modify, and accelerate the regular curriculum by eliminating portions of previously mastered content. Research on compacting (see Table 5) has consistently demonstrated that academically talented students can have 24–70% of their regular curriculum eliminated or streamlined to avoid repetition of

previously mastered work, guaranteeing mastery while simultaneously substituting more appropriately challenging activities (Reis and Purcell, 1993; Reis et al., 1998b) without any loss of achievement or drops in achievement test scores. Reis et al. (1998b) found that when teachers used curriculum compacting to eliminate between 24 to 70% of the regular curriculum for gifted and high potential students, they scored just as well or better in the out-of-level post achievement tests, using the Iowa Tests of Basic Skills, ITBS. For example, the high ability students whose curriculum was eliminated in science and math scored significantly higher on science and math achievement tests than did the control group whose curriculum was not compacted.

Reis and Westberg (1994) investigated the use of compacting in 20 school districts across the country in which teachers were randomly assigned by district to one of three treatment groups that received different levels of staff development. After receiving training in curriculum compacting, teachers were able to eliminate between 42% and 54% of the content for the identified high ability students. Reis and Purcell (1993) found that elementary teachers were able to eliminate between 24–70% of the curriculum across content areas for high ability students but that classroom teachers needed considerable assistance to design challenging and rigorous replacement activities for the content that was eliminated. In summary, curriculum compacting is an efficient, widely used strategy for differentiating curriculum and instruction for academically talented and high potential students.

SEM extensions

The Schoolwide Enrichment Model in Reading (SEM-R)

A newer extension of the SEM is the Schoolwide Enrichment Model in Reading (SEM-R), which has demonstrated success with differentiation, advanced levels of challenge, and engagement for all readers (Reis et al., 2007, 2008, 2011). This enriched reading approach, developed by Reis and a team of reading and gifted education specialists, focuses on acceleration and enrichment for the development of talents in readers through engagement in challenging, options for self-selected reading, accompanied by instruction in high-level thinking and reading strategy skills. A second core focus of the SEM-R is differentiation of reading content and strategies, coupled with more challenging reading experiences and advanced opportunities for metacognition and self-regulated reading. In other words, the SEM-R program challenges and prepares students who are talented in reading or have strong interests in reading to read more challenging books in school and at home.

The SEM-R has been proven to be effective at helping teachers differentiate reading instruction and to reduce time spent in whole group instruction. SEM-R resulted in increased achievement in reading and encouraging talented readers to read more challenging material for longer periods of time (Reis et al., 2007, 2008, 2011). Specific research about the Schoolwide Enrichment Model in Reading (SEM-R) has been uniformly positive in demonstrating that teachers can eliminate up to 5 hours of regular grouped reading instruction and replace it with short conferences and enriched reading based on interests (Reis and Fogarty, 2006; Reis et al., 2006, 2008, 2011). When the

Table 6. Research on the SEM-R.

Author	Date	Publication	Core results or findings
Reis and Fogarty (2006)	2006	*Educational Leadership*	Description of the SEM-R in a general education journal. Participation in SEM-R led to higher scores in reading fluency, reading comprehension, and attitude toward reading.
Reis et al. (2007)	2007	*The Elementary School Journal*	A randomized design investigated the use of the SEM-R or a control group with remedial reading during an afternoon literacy block. Results on oral reading fluency tests and attitudes toward reading scales indicated that students in the SEM-R group scored significantly higher than control students in oral reading fluency and attitude toward reading.
Reis et al. (2008)	2008	*Journal of Educational Research*	A randomized design investigated the effects of an enriched reading program, Schoolwide Enrichment Reading Model (SEM-R) in comparison with basal reading programs to investigate the addition of planned enrichment strategies and independent reading on students' reading achievement. Statistically significant differences favoring the SEM-R treatment group were found in reading fluency.
Fogarty and Reis (2008)	2008	*Gifted Education Communicator*	Explains how SEM-R components can challenge and engage primary grade talented readers.
Housand and Reis (2009)	2009	*Journal of Advanced Academics*	The combination of domain-specific strategy instruction in SEM-R reading classrooms combined with direct teaching of self-regulated strategies to support knowledge acquisition resulting in students achieving and maintain focus during reading instruction.
Reis and Boeve (2009)	2009	*Journal for the Education of the Gifted*	Culturally and linguistically gifted students in an urban low income school showed increased reading fluency and increased ability to manage frustration when challenged to read text above their current reading level after participation in SEM-R program after school.
Fogarty (2007)	2007	*Roeper Review*	Differences between SEM-R and control teachers' reading instruction were examined in 80 observations of 16 third through seventh grade teachers. Ten of the 16 teachers used the experimental reading model, and with 2 days of training all but one of the teachers in the study was able to implement the SEM-R successfully with high treatment fidelity. Teachers using the SEM-R provided more differentiated reading strategy instruction than teachers in more traditional classrooms.

(continued)

Table 6. (continued)

Author	Date	Publication	Core results or findings
Reis et al. (2011)	2011	*American Educational Research Journal*	Participation in SEM-R led to higher scores in reading fluency, reading comprehension, and attitude toward reading. This experimental study demonstrated that an enrichment reading approach, with differentiated instruction and much less whole group instruction, was as effective as or more effective than a traditional whole group basal approach.
Firmender et al. (2013)	2013	*Gifted Child Quarterly*	This research examined the range of reading fluency and comprehension scores of 1,149 students in five diverse elementary schools, implementing the SEM-R, revealing a range in reading comprehension and reading fluency across all schools. Comprehension levels ranged 9.2 grade levels in Grade 3, 11.3 in Grade 4, and 11.6 in Grade 5.
Gilson and Little (2016)	2016	*Journal of Advanced Academics*	Exploration of teachers listening orientations when implementing the SEM-R highlighted need for differentiation in these settings.
Reis et al. (2018)	2018	*International Journal for Talent Development and Creativity*	Case studies of successful SEM-R classrooms describe how this approach is implemented, finding that over 90% of the teachers implemented with high fidelity. The SEM-R benefited all students, including those who achieved at high and low levels of reading comprehension.

SEM-R is implemented using randomized experimental designs, significant differences have been found, favoring the SEM-R group in reading fluency and attitudes toward reading. (Reis et al., 2007). Several other studies are described in Table 6 below, including research on afterschool reading programs. Reis and Boeve (2009) used qualitative, comparative case study methods to investigate an afterschool enriched reading program using the SEM-R for academically gifted urban students who had also been identified as talented readers. Although these students initially encountered frustration and struggled when asked to read content that was either at or slightly above their current independent reading level, most were eventually successful, and their reading fluency scores improved.

Renzulli Learning

Some students who participated in SEM programs also had access to the Renzulli Learning System (www.renzullilearning.com), an online component that helps teachers implement the SEM (Renzulli and Reis, 2011). Renzulli Learning offers an automated, digital diagnostic assessment that creates a profile of each student's academic strengths, interests, learning styles, and preferred modes of expression. Next, a differentiation

Table 7. Research on Renzulli Learning.

Author	Date	Publication	Core results or findings
Reis and Field (2007)	2007	*New England Reading Association Journal*	Discussion of Renzulli Learning and how it can be combined with SEM-R to increase engagement in reading.
Renzulli and Reis (2007)	2007	*International Journal of Emerging Technologies in Learning*	Overview of the Renzulli Learning System for those interested in technology in education.
Field (2009)	2009	*International Journal of Emerging Technologies in Learning*	Participation in Renzulli Learning was correlated with higher growth in reading comprehension, oral reading fluency, and social studies achievement.
Renzulli and Reis (2011)	2011	*Gifted Education International*	Explanation of Renzulli Learning and how it can be used with the SEM across the globe.
Al-Khataybeh and Al-Tarawneh (2017)	2017	*Al-Manarah*	Participation in Renzulli Learning led to increases in students' English writing achievement at a school in Jordan.

search engine examines over 50,000 enrichment activities, materials, resources, and opportunities and selects those that are appropriate for each student's profile based on age, level of challenge, and interests. A project management tool guides students and teachers to use specifically selected resources for assigned curricular activities, independent or small group investigative projects, and a wide variety of challenging enrichment experiences. Students have opportunities to pursue advanced level Type II training and Type III projects in their strength areas and areas of personal interest, using a project organization and management plan called The Wizard Project Maker.

Field (2009) used quantitative procedures in an empirical study to investigate the effects of Renzulli Learning on oral reading fluency, reading comprehension, science achievement, and social studies achievement in two schools. After 16 weeks, students who participated in Renzulli Learning demonstrated significantly higher growth in reading comprehension, oral reading fluency, and social studies achievement than students who did not participate in the on-line program. Information on additional research on Renzulli Learning can be found in Table 7.

Implementing SEM for diverse populations

The use of SEM has proven effective with diverse populations, including students who are twice-exceptional (Baum, 1988; Baum et al., 2014; Reis et al., 2003), who underachieve in school (Baum et al., 1995), and who are from culturally and linguistically diverse groups (Beecher and Sweeny, 2008; Reis and Morales-Taylor, 2010). The talent pool identification model and interest-based enrichment provide additional opportunities for students who are not yet identified but have creative-productive potential. This increased exposure, along with opportunities for interest-based activities, increases engagement and opportunity (Beecher and Sweeney, 2008).

Twice-exceptional students

Students who are twice-exceptional (2E) are often not identified as either gifted or learning disabled, as their disabilities usually mask their talents while their talents simultaneously mask their disabilities. Several researchers have examined the use of SEM strength-based instruction and student interest in working with students who have both talents and disabilities (Baum, 1988; Baum et al., 2014; Reis et al., 2003). Research related to providing appropriate enrichment approaches has suggested that these strategies helped 2E students to succeed and achieve at higher levels than using remedial strategies (Baum, 1988; Baum et al., 1995, 2014; Emerick, 1992; Reis et al., 2003). In Table 8, research on the use of SEM with twice-exceptional students is summarized.

Underachieving students

The SEM can also be effective with gifted students who tend to underachieve, which can include a significant number of students in the talent pool (Reis and McCoach, 2000). McCoach and Siegle (2003) found that one difference between gifted achievers and underachievers is the value they place on the goals they set for themselves, and pursuing interest-based enrichment aligns with this finding. Brigandi et al. (2016) also found a positive connection between participation in enrichment and students' goal valuation. In one of the most compelling studies published on reversing underachievement, Baum et al. (1995) found that the completion of Type III self-selected products based on student interests helped to reverse underachievement in 17 gifted students (ages 8–13). Gains were made by 82% of the participating students who were no longer underachieving in their schools at the end of the intervention.

Culturally diverse populations

Many factors contribute to the under-representation and under-identification of culturally and linguistically diverse students in gifted and talented programs, including identification practices that benefit upper middle-class students (Briggs et al., 2008). The SEM, with a talent pool identification model, expands exposure to a larger and more diverse group of students and has been used for that purpose and implemented in high poverty, urban and rural schools for decades. For example, Allen at al. (2016) found that use of enrichment clusters at an urban, largely Latinx elementary school improved the school's sense of community, validated students' home cultures, increased attendance, and developed students' sense of agency. In some urban areas, SEM schools have been created to serve culturally diverse gifted students (Beecher and Sweeny, 2008; Reis and Morales Taylor, 2010) and have been successful at increasing the engagement, creative productivity, and academic achievement of diverse and low-income students. These schools, sometimes called Renzulli Academies, incorporate all components of SEM and are designed for students who have a passion for learning and are capable of advanced and creative performance in school. A few dozen of these schools, both standard public themed schools as well as charter schools, currently exist in the United States.

Table 8. Research on use of SEM with diverse populations.

Author	Date	Publication	Core results or findings
Baum (1988)	1988	*Gifted Child Quarterly*	Participation in type III projects improved self-regulation, self-esteem, and the development of specific instructional strategies to enhance the potential of high potential, learning disabled students.
Olenchak (1990)	1990	*Journal for the Education of the Gifted*	Participation in SEM was associated with improved attitudes toward learning and increased self-confidence among elementary aged high ability students with learning disabilities.
Emerick (1992)	1992	*Gifted Child Quarterly*	Gifted underachievers responded positively to interventions that focus on their strengths and interests both in school and after they had completed school.
Baum et al. (1995)	1995	*Gifted Child Quarterly*	Participation in Type III projects led to reversal of underachievement.
Beecher and Sweeny (2008)	2008	*Journal of Advanced Academics*	Use of SEM as a schoolwide approach reduced achievement gaps and increased achievement learning and engagement in learning for CLD students in an urban, highly diverse student population.
Reis and Morales-Taylor (2010)	2010	*Gifted Child Today*	The use of the SEM created a Renzulli Academy for high potential diverse students, resulting in higher achievement and increased engagement in learning in an urban, low socio-economic school.
Reis et al. (2003)	2003	*Exceptional Children*	The use of an SEM talent development approach led to enhanced understanding of math in students with Williams Syndrome.
Baum et al. (2014)	2014	*Gifted Child Quarterly*	Participation in strength based SEM program opportunities resulted in 2E students becoming part of social groups, overcoming some social, emotional, and cognitive challenges, and developing mentor relationships and expertise in their talent area.
Hernández-Torrano and Saranli (2015)	2015	*Gifted Education International*	The SEM is a successful flexible model that enables schools in different regions of the world to provide individuals with opportunities to identify their potentials and to help them reach their highest levels of competence.
Zhbanova et al. (2015)	2015	*Early Childhood Education*	Use of Enrichment Triad with students from underrepresented minorities showed increased academic achievement, leadership, and creative skills.
Allen et al. (2016)	2016	*Gifted Child Today*	Use of enrichment clusters expanded opportunities for CLD students at one urban school.

Table 9. Longitudinal research on the SEM.

Author	Date	Publication	Core results or findings
Delcourt (1993)	1993	*Gifted Child Quarterly*	A summary of findings on 18 highly creative/ productive secondary school students who completed creative Type III work, pursued and completed investigations based on their interests, that were maintained over time.
Hébert (1993)	1993	*Roeper Review*	Elementary Type III experiences affected high school seniors' post-secondary plans and served as training for later productivity. Students also reported fewer creative productive experiences in junior high and high school.
Westberg (1999)	1999	*NAGC: Creativity and Curriculum Division Newsletter*	Students maintained their interests over time and continued to be involved in creative productive work in a longitudinal study.
Westberg (2010)	2010	*Gifted Education International*	In another longitudinal study, after 25 years, a correlation was found between SEM students' early and subsequent interests. The results from the study provide support for SEM talent development.
De Souza Fleith and Soriana de Alencar (2010)	2010	*Gifted Education International*	Describes SEM education of the gifted in Brazil in 27 Brazilian states by the Ministry of Education. Implementation and research data about SE is provided.
Hébert (2010)	2010	*Gifted Education International*	SEM shapes the social and emotional development of students by their involvement in enriched teaching and learning. Eight important influences upon the affective development of gifted and talented students are identified.
Beecher (2010)	2010	*Gifted Education International*	Using the Schoolwide Enrichment Model reduced the achievement gap in a school with a high at-risk student population. This longitudinal research suggested that enrichment and instructional differentiation and strength-based teaching replaced a previous remedial paradigm.
Mueller-Oppliger (2010)	2010	*Gifted Education International*	Summary of longitudinal efforts at teacher education as well as educational efforts to implement the SEM in different cantons in Switzerland, with case studies of three schools and how they implemented a talent development approach.
Mueller-Oppliger (2014)	2014	*CEPS Journal*	Overview of gifted education in Switzerland, including information about positive implementation of the SEM and the Three Ring Conception of Giftedness.

(continued)

Table 9. (continued)

Author	Date	Publication	Core results or findings
Robinson (2010)	2010	*Gifted Education International*	A longitudinal overview of an SEM middle school program focusing on after school enrichment clusters; mentorships; assembly programs; speakers; starting a center; and authentic science research.
Booij et al. (2016)	2016	*University of Amsterdam*	Participating students had higher achievement, increased involvement in STEM fields, and higher academic self-efficacy. They also pursued higher level career tracks and earned higher salaries.
Booij et al. (2017)	2017	*Institute for the Study of Labor (IZA), Research Series*	All participating students have higher achievement when Renzulli (SEM) gifted and enrichment programs are implemented. Students can replace classroom hours for project work and this benefits the achievement of a much broader group of students.

Longitudinal research on the SEM

In a 25-year follow-up study of students who attended a school based on the SEM model (Booij et al., 2016), three Dutch economists reported that participating students obtained higher grades, followed a more science intensive curriculum (most notably for girls), and reported stronger beliefs about their academic abilities than students who did not attend a SEM based school (see Table 9 below). They also found that the positive SEM program effects persisted in the universities they attended, where students chose more challenging fields of study, resulting, on higher salaries upon entrance into the employment market. These same researchers found that these results are consistent with a human capital interpretation of the effect of an education program that promotes both academic excellence and creative productivity. In a follow up study, Booij and his colleagues (2017) also published an analysis of the effects of enrichment on all participating students, finding higher achievement for all students when SEM enrichment programs are implemented.

Gifted and general education programs based on the SEM have provided specific benefits to academically talented and high potential students, enabling students to increase aspirations for college and careers and to select interest-based and challenging post-secondary and career plans (Delcourt, 1993; Hébert, 1993), and develop creativity and motivation that was applied to later work (Delcourt, 1993; Hébert, 1993). Hébert (1993) and Delcourt (1993) found that gifted programs using the SEM approach (Renzulli, 1977; Renzulli and Reis, 1985, 1997, 2014) helped focus students' academic development and productivity in their areas of interest, had a positive effect on students' subsequent interests, and positively affected post-secondary career plans. Renzulli and Reis (2014) also summarized research suggesting that early advanced project work in gifted programs served as important training for later productivity. Hébert (1993)

observed that non-intellectual characteristics, such as creativity, interests, and task commitment remain consistent in gifted and talented students over time. His subsequent research in 2010 identified important affective lessons that students gained during their Type III Enrichment experiences in SEM programs, especially a belief in self, empathy for others, making contacts with intellectual and affective soulmates. Westberg (1999, 2010) investigated longitudinal effects on students who participated in the same type of program and found that students maintained interests and were still involved with both their interests and creative productive work after they finished college and graduate school. In summary, both qualitative and quantitative longitudinal studies of SEM gifted programs demonstrate positive outcomes in cognitive, affective, and social development of participating students. SEM participants have increased their college and work aspirations and maintained interests and creative productive work that began in gifted programs after they finished college and graduate school.

Summary: Research on the SEM

The SEM includes many research-based recommendations for developing gifted behaviors and talents in young people. In addition, the SEM identification system is and has always been more flexible than most traditional identification systems. Renzulli and Reis have consistently advocated providing some general enrichment (Type 1 and II Enrichment) and enrichment clusters for all students. Focused, planned efforts on talent development have emerged from the researchers' consistent attempts to change the culture of schools by creating a planned, systematic set of opportunities, resources, and encouragement for talent development. Many SEM schools have stated student goals related to talent development and offer a special haven for creative and talented students who want to learn in an active and engaging way, pursuing their interests and completing products that are personally meaningful. SEM teachers offer learning experiences that focus on talent development and also embrace the positive intention of enrichment opportunities. In other words, using the SEM has the power to instill in teachers the same kind of enjoyment, engagement, and enthusiasm for learning they hope for their students to experience.

Reis and Renzulli hope that more schools and districts will continue to implement talent development programs based on the SEM in the years to come, whether as part of gifted or enrichment programs, magnet or theme schools, or as a part of a general education program. During the last decade, several Renzulli Academies have been developed, which emphasize the use of SEM pedagogy, and these schools have been successful at increasing academic achievement as well as providing many opportunities for enriched learning and creative productivity (Reis and Morales Taylor, 2010). In addition, new resources have been published or are in press focusing on implementing the SEM philosophy in Science (Heilbronner and Renzulli, 2015), Technology (Housand et al., 2017) and Mathematics (Gavin and Renzulli, 2018).

The research reviewed in this article and conducted over the last four decades has been an important part of the evolution and change process in the SEM. Much has been learned from numerous research studies that have been conducted, as well as from the teachers and enrichment specialists that have implemented this approach to talent

development. Renzulli and Reis believe that students' enjoyable, creative productive experiences can and will increase the likelihood that they will seek future creative opportunities in their subsequent careers and personal lives. And when they do, the world will benefit from their creative and personally meaningful contributions. Indeed, that is the intended legacy of these decades of work in the SEM.

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