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Preamble/History

New Horizons School is a public Charter School. It is open to all children from kindergarten to grade nine who meet the requirements of its unique program targeting the special needs of gifted students.

Each student submits an application containing an assessment of intelligence (standardized I.Q. test), parent nomination form and checklist, and evidence of achievement (cumulative school records containing standardized test results, provincial exam scores, and other evidence of high achievement). Other measures of the child's abilities and potential may be included or requested especially for determining the student's areas of relative weakness. An admission's committee examines each student's application to determine if the child is gifted and would benefit from the special program offered by the school.

New Horizons Charter School Board, Administration, Educators, Staff, and Parents are committed to providing the most appropriate educational program and learning opportunities to address the special needs of all gifted students, including those at-risk. In an attempt to maintain optimal programs for addressing the special educational needs of gifted students, a periodic review of the literature is conducted to identify salient and evidence-based educational practices.

Purpose of Report

This 2009 report provides an updated reference list containing salient information regarding the best practices available supported with scholarly evidence. This summary of the literature is intended to facilitate the efforts of the stakeholders at New Horizons Charter School towards addressing the special educational needs of their gifted students, guide their teaching practices, and better prepare their gifted students for life-long learning, self-sufficiency, success in their work, and citizenship. The following key areas were reviewed:

- The practices being used to identify gifted elementary and adolescent students.
- The effectiveness of different educational settings (i.e., congregated, cluster, inclusive, traditional) in serving gifted students.
- The gifted education programs that best address the social and the emotional needs of gifted students.
- The current practices being utilized in curriculum differentiation, especially in Mathematics, e.g., advancement, extensions, enrichment, or challenges.
- The insights with regard to serving gifted students who experience other special needs or at-risk conditions that may impact their learning (e.g., behavioural challenges, learning disabilities, or sensory impairments).

Three considerations are worth noting. First, the questions are addressed in the context of recognized current practices at New Horizons School, acknowledged issues and practices in the field of gifted education (Plucker & Callahan, 2008), future or aspirational directions of education (Sternberg, 2004b), and upcoming directives for special education by Alberta

Education for implementation in 2010. Second, the questions posed are considered to be integral with one another and likely to yield continuity and economy in their implementations. Third, whenever possible, Canadian based literature is identified. However, much of the literature on giftedness still does not include Canadian (or Alberta) student populations or educational programs. Any application to Canadian contexts requires due consideration. That being said, the literature primarily based in the U.S.A. has historically been acknowledged for many appropriate applications to Canadian educational settings and addressing the learning needs of Canadian gifted students.

Question 1.

What practices are being used to identify gifted elementary and adolescent students?

The approaches and measures employed to support the identification of a student's giftedness remain primarily focused on the identification of giftedness based on standardized individual and group tests of intellectual (WISC) or cognitive (CCAT) ability. Such measures of IQ correlate highly with academic achievement. The portfolios of gifted students often include their academic achievement results or grades indicating their mastery of grade level content). A student's identification as gifted can also be found in additional information found in nominations from Parents, Teachers, Peers, and the Student (Self).

In 2004(a), several points of broad agreement regarding giftedness were identified (Sternberg):

- Giftedness involves more than just high IQ.
- Giftedness has non-cognitive (e.g., motivationally driven) components as well as cognitive ones.
- Environment is crucial in terms of whether potentials for gifted performance will be realized.
- Giftedness is not a single thing: There are multiple forms of giftedness. Hence, one-size-fits-all assessments or programs are likely to be too narrow.
- Measures for identifying or evaluating gifted individuals need to be proposed to operationalize theories, and then need to be evaluated rather than merely being assumed to be valid. (pp. xxiv-xxv)

Current educational practices for identifying elementary and adolescent students as 'gifted' involves two related components. Firstly, identifying giftedness based on a definition of giftedness and secondly, employing suitable measurement instruments that support (evidence) the pre-selected definition.

A wide range of definitions (Borland, 2008; Gagné, 1997a, 1997b) and manifestations (Sternberg, 2004a) of giftedness exist in the literature and among educational settings (Stephens & Karnes, 2000). These various definitions, models, and theories of giftedness are used to identify the characteristics evidenced in gifted students, such as task commitment, creativity, and leadership.

A variety of measures (e.g., WISC) are used to evidence the extent (e.g., top 1% or 10% of the population) of the student's above-average abilities in specified areas of function (e.g., IQ for cognition and achievement for mathematics and music). Irrespective of the psychometric (i.e., validity) questions that prevail in the literature, traditional practices remain prevalent until more suitable measures have been adequately studied with gifted student populations (Pyryt, 1996).

Age- and grade-related distinctions appear in the appropriateness of specific instruments targeting particular age groups, the variety of measures employed, and the purpose for which the measure is intended for use. Examples of recent references provide information attesting to the importance of early identification of gifted students and potential approaches for their identification (Pfeiffer& Petscher, 2008; Sankar-DeLeeuw, 2000).

Also important are alternative measures of giftedness and talent. These pertain to those that identify the broader range of above-average abilities in students (e.g., music, athletic, creativity, leadership). Additionally, the assessment instruments could be used to effectively guide and evaluate educational programming directions for the gifted student. The latter is considered to provide stronger evidence between the properties of the test and the data produced by the measures.

The proposed direction for the identification of gifted students is to focus on more comprehensive aspects of identification that flow through to educational programming. Canadian scholar, François Gagné (2007) deemed the academic talent approach noteworthy. American scholars, Reis and Sullivan (2009) addressed the conceptualizations of giftedness that include the characteristics of gifted learners. Stanley's Diagnostic Testing and Prescriptive Instruction (DTPI) and the Talent Search Model (Swiatek, 2000) continue to provide scholarly evidence.

Employing a more comprehensive approach to identifying students' giftedness will serve to make more effective and efficient use of resources (time and funds). Furthermore, it will provide relevant information that can be used to guide and evaluate the gifted student's educational programming to ultimately meet his or her learning needs successfully (Chart, Grigorenko, & Sternberg, 2008).

Recommendations:

New Horizons Charter School could work towards the development of a more comprehensive standard entrance profile. This multifaceted approach would provide information and data for use in developing and guiding educational program planning and evaluating their effectiveness. In addition to formal test results, measures that distinguish student's characteristics of giftedness should also be included. Such measures might provide the information found on the inventories completed by parents (Robinson, Shore, & Enersen, 2007) and other individuals who have worked with a given child (Kindergarten) or student (Grades 1 to 9). Other indicators of giftedness concerning creativity, social, emotional, and leadership might also be employed (VanTassel-Baska, 2008).

Implications:

Comprehensive and evidence-based approaches for the identification of giftedness in students are deemed to provide more relevant data and information that are:

- conducive to supporting the identification of gifted students,
- useful in planning the students' educational programs that will lead to better meeting the needs and characteristics of the gifted students,
- applicable to establishing and evaluating students' educational objectives, and
- efficient and economic use of professional resources.

Selecting, implementing, and applying more appropriate and comprehensive identification approaches will require support, consultation, or training from a professional gifted education specialist. Should New Horizons School and some of its students be interested in participating with scholars to pursue research in this area, some of the time and costs associated with the implications of this recommendation could be covered through the support of various government grants.

Question 2.

What does the literature say regarding the effectiveness of different educational settings (i.e., congregated, cluster, inclusive, traditional) in serving gifted students?

Traditional (inclusive and congregated) settings that include options such as pullout programs, independent studies, and cluster settings continue to be regarded as effective with support found in the literature and in practice. The focus remains on placing the gifted student or group of students in settings that can support their learning best (Gross, 2006). Given the varied and diverse learning needs of gifted students, the best setting is one in which the programming for these individuals is effective in meeting their needs but also where they feel supported socially and emotionally. If these elements come together in a group social setting, then the success of the student is highly likely.

It is important to keep in mind that it isn't so much the setting per se as the identification of the characteristics and learning need(s) of the gifted children that might best be met in particular settings. It is the students' information that is used to determine how any one or more of these settings could solely or in combination be effective in addressing their learning. Essentially, addressing gifted students' learning needs can occur in a variety of educational settings.

Ideally, gifted students choose from a menu of options or 'carte du jour' selection (Riley, 2009a). The various settings appear to be flexible and can co-exist such that a gifted student can work on an independent study within a regular classroom setting. Acceleration opportunities can also take place via distance education programs. Although a variety of settings may be selected for learning to occur, many of these settings can take place within the traditional classroom (Pyryt & Bosetti 2006; Riley 2009a). The following are a few examples noted in the literature: acceleration classes (traditional advanced grade level), distance educational classes, and cross-grade or -age grouping of students based on areas or topics of interest. Cluster grouping, where a small group of gifted students are placed in the same classroom, has been effective with a teacher who is experienced in differentiating curriculum and is also dedicated to working with these students. This cluster setting has been subject to parental pressure but is considered to be quite effective and less costly to implement (Riley, 2009). Mentorships may also provide students with appropriate and unique learning environments (Colangelo, Assouline, & Gross, 2004). With training and support, parents and even peers can effectively serve as mentors (Seigle, McCoach, & Wilson, 2009).

Recommendations:

When and where possible, gifted students should have an opportunity to learn in the most appropriate setting. Once the learning needs of the gifted students have been identified, the Administrators and Teachers can arrange the students in one or more of the appropriate settings. At this point, Administrators and Teachers can further consider the operational viability in implementing any one or more of the targeted settings.

New Horizons School maintains grade level groupings, as opposed to family or strict ability or interest level settings. A reasonable guideline might be to provide representative settings from the following three recognized practices. Inclusive classroom settings can provide appropriate learning opportunities for gifted students within the various subject areas. (e.g., the presentation of new material and instruction for fundamental process skills such as strategies or methods for

conducting research, managing information, learning new technology). Small group settings (cluster and pullout) are effective for providing gifted students with opportunities to apply additional content and share information with like-minded peers for accelerated curriculum or enrichment projects. These groupings can occur within or outside of the regular classroom. Independent Study settings are effective for providing learning and development opportunities to self-paced students through distance programs and collaborative learning with a mentor.

Implications:

Successful learning environments depend upon a number of considerations such as: appropriate differentiation of curriculum, administrative support, modifications to the learning structures in the school (online learning classrooms and off-site learning), access to resources, and teachers trained in classroom management (Riley, 2009a). Providing appropriate programs and settings for gifted students requires Teachers' involvement in: designing or compacting curriculum, providing instruction and monitoring students in various settings, reviewing students' characteristics and their learning needs, identifying students' learning objectives, recognizing, understanding, and implementing one or more of the learning settings.

The Educational Staff may find it beneficial to becoming familiar with the various models for gifted education that include independent study components in their programs (e.g., Autonomous Learner Model, Enrichment Triad, and Self-Initiated Learning Model). The guidelines and steps for independent study are well worth following (Johnsen & Goree, 2009). So are the roles, guidelines, and training for learning through mentorships (Seigle, McCoach, & Wilson, 2009).

Professional development, training, and support in any one or more of these areas would be worthwhile, although some costs are associated with each. There may also be costs associated with implementing the above-mentioned activities (e.g., access to advanced materials and registration fees for advanced courses).

Question 3.

How can gifted education programs best address the social and emotional needs of gifted students?

Serving the emotional and the social needs of gifted students are articulated in the vision statement and goals for New Horizons School. Indeed addressing these areas of development has received much interest and discussion but little scholarly evidence is found to measure and implement these areas of learning and development in students' educational programs (Ferguson, 2009; Neihart, Reis, Robinson, & Moon, 2002). A few program models do include social and emotional development components for gifted, e.g., Betts' Autonomous Learner Model includes social (interpersonal skills) and emotional (self-awareness) development components (Betts & Neihart, 1985; Betts, 1986).

The current focus is on the identification, understanding, and development of the social and the emotional needs of gifted students (Ferguson, 2009; Neihart, Reis, Robinson, & Moon, 2002). The most appropriate approach is to define the affective characteristics in terms that can be used to identify them for development in appropriate programming. For example, leadership and cooperative learning relate to social skill development. Heightened awareness and sensitivity are considered emotional characteristics (Mendaglio, 1995).

There are a number of social and emotional components that could be incorporated into the students' curriculum: e.g., communication skills, discussions of emotion to develop students' awareness and understanding of these in the context of their subject areas, mentorships, service activities, self-care management, exploration of giftedness (role play and study of eminent individuals), physical and mental care (e.g., stress management strategies and physical fitness), and independent self-exploration activities (guided journal writing and self-evaluations). It is critical that the affective and social areas have defined measurable objectives (qualitative and quantitative) and evaluated outcomes. These will help to provide effective and accountable programs that meet the particular social and emotional needs of the gifted students.

The perspectives and characteristics of creativity and leadership in gifted individuals may be considered within the students' social and emotional development. Various resources, environmental considerations, strategies, and activities that may help promote and foster creativity in gifted students are available (Cramond & Connell, 2009; Pyryt, 1993). The *Incubation Model* by Torrance and Safter (1990) is noteworthy as it extends students' thinking and learning beyond the classroom. Similar resources are available for leadership development, e.g., the definitions of leadership (identification) and the curricular components (instructional elements) used to incorporate leadership development and opportunities into programs for the gifted (Bean & Karnes, 2009).

Recommendations:

The initial process of identifying the social and emotional needs of gifted students may benefit from the guidance of a trained professional (Johnson, 2001). Educators would receive training in understanding the unique characteristics and needs of gifted students that yield the most effective learning outcomes for the students (Ferguson, 2009). A checklist such as Dabrowski's *Overexcitability Questionnaire* (Mendaglio, 2002) might be used to obtain an awareness of affective characteristics in gifted students.

A subsequent step would involve providing Teachers with support to incorporate some of the more salient social and emotional components into the existing curriculum and programs, e.g., cooperative learning and the exploration of the characteristics of giftedness.

Implications:

Educational staff and Parents should be provided with the information and resources available to date on the social and emotional needs of gifted students. It may be beneficial for Teachers to have a gifted education specialist to assist them in their implementation and evaluation of these components in the various curriculum areas.

Both time and cost are inherent in professional development, consultation, and obtaining resource materials.

Question 4.

What current practices are being utilized in curriculum differentiation, especially in Mathematics, e.g., advancement, extensions, enrichment or challenges?

Current practices employed in curriculum differentiation for mathematics continue to include, advancement, compacting, extensions, enrichment, and challenges. Strong support is evidenced in the literature in the field of gifted education for Stanley's Diagnostic Testing and Prescriptive Instruction (DTPI) approach to provide acceleration opportunities for students gifted in mathematics (Assouline & Lupkowski-Shoplik, 2005). Evidence also supports curriculum-based assessment for students as it applies to incorporating similar measurement and evaluation considerations that facilitate continuity in the students' learning and programming (Hosp, 2008). Approaches involving acceleration or advancement opportunities to more appropriate instructional levels for students' gifted in mathematics are deemed to best meet their learning needs in this subject area (Gavin, Casa, Adelson, Carroll, & Sheffield, 2009). A combination of acceleration and ability grouping over enrichment is also supported in the literature (Kulik & Kulik 1992).

There are a variety of educational approaches and settings worth noting from the literature. These range from defining and measuring the multifaceted construct of mathematical giftedness to instructional groupings to international programs, and competitions (Gavin& Adelson, 2008; Sriraman & Steinthorsdottir, 2008). The literature contains other noteworthy considerations relating to curriculum differentiation in mathematics.

- Off-level testing may need to be used with gifted students. Identifying and evaluating mathematical exceptionality are important components to have in place for addressing the diverse learning needs of mathematically gifted students (Assouline & Lupkowski-Shoplik, 2005). Recent findings suggest that there are differences in the ways that girls and boys excel in mathematics.
- A recent *National Mathematics Advisory Panel Report* contains relevant information on various aspects of mathematics education, such as instructional methods, assessment, learning processes, and math content that would pertain to addressing the needs of gifted students in this subject area (American Educational Research Association, 2008).
- Lateral learning experiences may be effective for some mathematically gifted students (e.g., independent study and integrated subject applications). Accelerated students may be in a position to include another subject of study (foreign language learning and career development opportunities).
- Mathematics is one area of student exceptionality that connects in a similar manner to exceptionality in the areas of language and science. Therefore, the educational practices (acceleration and lateral learning) used for math should be conducive for adaptation in science and language subject areas.

Recommendations:

It is initially important to assess gifted students as early as possible to identify their mathematical abilities and mastery of various content levels. This information is needed to determine if and what enrichment and acceleration opportunities (e.g., compacted curriculum, advanced grade level placement, distance learning, and independent studies) might best be implemented. The

Diagnostic Testing > Prescriptive Instruction Model (DTPI) demonstrates the most effective approach for meeting the learning needs of gifted students, primarily through acceleration (Assouline & Lupkowski-Shoplik, 2005).

Math acceleration can take many forms (NAGC, 2000). Administrators and Teachers can discuss the suitability of implementing such options to address the needs of their students. A number of resources are available for providing Educators with specific approaches and practices. Kettler & Curliss (2003) apply a tiered objectives model to differentiating math acceleration in a mixed-ability classroom.

Provide students with learning opportunities that develop the breadth and depth of their content knowledge in math/subject areas. An example for math is to have the student apply mathematical principles to design something new (geometry (e.g., fractals) to create and modify nature items). An example for science is to have student investigate a mechanism used in the space shuttle, or develop a new solar collection monitor to record home energy use.

Integrating mathematic concepts with other subject areas provides extended learning opportunities, perspectives, and applications benefiting gifted students. (e.g., use 3D structural imaging to obtain new perspectives of numeric data) (Pyryt, 2008).

Incorporating a variety of skill development components into the regular math curriculum or smaller groups may serve to provide gifted students with related skills to benefit their learning (e.g., cooperative learning, metacognition, divergent-convergent thinking, critical thinking, and creative problem-solving (Gavin, Casa, Adelson, Carroll, & Sheffield, 2009; Sriraman & Steinthorsdottir, 2008).

Implications:

Educators may require training and support to understand the various options for differentiating the mathematics curriculum to meet the needs of the mathematically gifted students and to determine the extent of the students' mathematical abilities and mastery levels, particularly with off-level test interpretation and the manifestation of mathematical mastery for boys and girls.

A variety of acceleration practices are noteworthy, such as those found in the NAGC standards (2000), the DTPI approach, tiered objectives, and Kanevsky's (1999) *Toolkit*. Integration practices involving other subject area applications and skill development such as creative and critical thinking merit consideration.

Access to appropriate mathematics assessment measures and advanced mathematics classes may involve additional costs (e.g., materials, registration, and professional consultation).

Question 5.

What insights does the literature provide regarding serving gifted students who experience other special needs or at-risk conditions that may impact their learning (e.g., behavioural challenges, learning disabilities, or sensory impairments)?

Understanding and addressing the needs of gifted students who present with other special needs or at-risk conditions remains an important area for study and development in the field of gifted education. The literature provides insights in recognizing the unique and challenging characteristics of gifted students (Neihart, Reis, Robinson, & Moon, 2002; Reis & Sullivan, 2009).

A few promising approaches are evidenced in the literature and appear to address the needs of the gifted students. Initially, understanding the varied characteristics of giftedness (e.g., overexcitabilities and heightened sensitivity) can be challenging. This is particularly so for individuals who are not familiar with these behaviours as they can appear similar to other special needs (e.g., Attention Deficit Disorder, learning disabilities, and behavioural, social, or emotional disorders). Careful consideration and professional assessment are warranted to determine whether a student meets the criteria for a (medical) diagnostic disorder. He or she would then be considered "twice-exceptional", such as gifted learning disabled (King, 2005; Reis & Sullivan, 2009; Vespi & Yewchuk, 1992).

The special needs of those gifted students with dual exceptionalities can be used to provide the learning objectives and settings to best meet their needs. The literature directs educators towards addressing the whole child (King, 2005). These students benefit from educational programs containing self-awareness components such as self-concept, social and emotional awareness (Betts, 1986; Mendaglio, 1995), and affective curriculum components, especially self-exploration activities such as guided journals and instructional sessions targeting awareness and understanding of giftedness. Including a mentor for these gifted students would be ideal as they are considered to be particularly important for at-risk students (Gray & Gray, 1986; Pleiss & Feldhusen, 1995). Parents should be considered when selecting mentors for their children.

Recommendations:

Administrators, Teachers, and Parents would benefit from training designed to increase their understanding of such challenging behaviours typical for their gifted children. It is important to empower them with strategies and support so they can better address these challenges within the student's learning environments and curriculum.

A list of professional resources (personnel and materials) could be compiled for Educators and Parents to access when further support and consultation are desired.

Implications:

Specialists in gifted education would best provide professional development, support, and consultation. Administrators and Educators will identify the special needs in gifted students and design a program to meet the student's unique learning needs. They will also need to coordinate, monitor, and evaluate the student's progress possibly in coordination with the Parents and Mentors.

Summary

The purpose of this report has been to review the literature on gifted education. It is intended to provide the stakeholders at New Horizons Charter School with information and recommendations that can be used to guide them in the development of their educational practices for teaching and learning. Five questions were presented regarding the educational practices for gifted students: their identification, their educational settings, the programs available to meet their social and emotional needs, the programming options available for mathematics education, and programs to address their special needs.

Although many of the current practices are supported in the literature, the research evidence continues to be limited. This is particularly true for studies involving Canadian (Alberta) populations of gifted students. Therefore, it is prudent to draw from a variety of scholarly resources and recognize that the characteristics, learning needs, and programming options for gifted students are diverse and multifaceted. The challenges remain in identifying the learning needs of the gifted students and finding the most suitable programming options that will meet their individual or group needs.

The findings of this report indicate that first and foremost it is important to identify and assess the characteristics and abilities (e.g., mastery of content levels in various subject areas) of the gifted students. This information will be useful in developing their learning objectives. These will be pivotal in selecting from among the various potential programming options designed to meet these needs in one or more environmental setting. Students' needs and the school's resources are key considerations in developing updated relevant goals for the educational practices employed.

The focus can be on any one of the areas in question, although all five areas share similar approaches and some overlap (e.g., independent study relates to an effective grouping practice for learning as well as a programming option for math acceleration and enrichment opportunities). The direction is not simply to provide isolated answers to address each question but to integrate the questions, their implications and recommendations that best support the school personnel in meeting the needs of their gifted students more effectively, proactively, and knowledgeably. This can be achieved by incorporating relevant components into the school's existing programs and curriculum.

It might be worth noting the impact of the evolving issues and practices in gifted education (Plucker & Callahan, 2008), future educational considerations (Sternberg, 2004b), and the upcoming directives (e.g., funding, identification, and accountability processes) for special education presently in development by Alberta Education (*Setting the Direction*) for implementation in 2010. An important consideration in educating the gifted is that we are educating them for great possibilities and potential in unknown futures. Sternberg (2004b) recognized four sequential levels of education, rote memorization, critical thinkers, intelligent thinkers, and wise thinkers. There is no question that the focus for current educational practices with gifted students needs to include providing them with a strong foundation of knowledge and skills to engage in life-long learning. The challenge becomes including elements throughout the learning opportunities for gifted students that prepare them for the new worlds they will impact and live. This perspective directs educators to provide a curriculum that includes components of skill development (e.g., self-understanding and (basic and advanced) process skills that facilitate learning such as critical thinking).

In attempting to facilitate the best learning practices and environments for meeting the educational needs of gifted students, the following points are also noteworthy.

- Opportunities are needed for training and educating professionals, parents, and community members in their understanding of the unique learning needs and characteristics of gifted students. Professional development and support are desirable for training, providing assistance in implementing and coordinating practices, obtaining access to resources, and securing consultation.
- Information, resources, and support are needed to implement the various programming options (e.g., independent study and mentoring).
 - The NAGC Standards (2000) can be an effective planning resource for school personnel to determine how and where the school's educational programs are functioning as desired or not (Pyryt). Each (of the seven) gifted education programming criterion areas provides a description, guiding principles, and standards (minimum and exemplary) that Educators are encouraged to incorporate into any quality program for gifted learners.
 - The *Toolkit for curriculum differentiation* developed by Canadian scholar, Lannie Kanevsky (1999) might be useful for addressing the needs of gifted students in and across various subject areas.
- Community resources may be obtained for cost savings, (e.g., mentors from business and academia who volunteer and provide community service, students engaging in professional learning through practicum experiences and research (education and psychology), and parents involvement.
- There is a strong need for research in the field of gifted education, especially studies that include Canadian students and programs. Professional support might be added through coordination with scholars, supported by research grants and engaging in research at New Horizon's Charter School.
- Canadian administrators and teachers might find the information and cost effective insights useful from Riley (2009) and Stephens and Karnes (2009) regarding the location and securing of potential resources from the United States.

New Horizons Charter School already provides evidence-based educational programs that meet many of the unique and diverse learning needs of their gifted students. The content in this report can be used to facilitate the efforts of the various stakeholders at New Horizons Charter School to maintain and excel at achieving their mission, "To enable gifted students to strive for excellence in and environment that is low-anxiety, positive, and supportive of the individual."

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