



Literature Review – The Million Dollar Question!

What are identified research-based instructional best practices (pedagogical and curricular methods, differentiation techniques, ability grouping practices, personalized learning solutions) to ensure advanced learners are challenged, engaged in learning, and achieving strong academic growth?

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Introduction

In their book, *Best Practices, in Gifted Education: An Evidence-based Guide*, Robinson, Shore, and Enersen (2007), described 29 practices supported by systematic inquiry and research, organized by home, classroom, and school, that “work” with talented youth. In the text, the authors acknowledged that there is variety in the terms used in the research that supports these practices- terms such as gifted, talented, high ability, and promising learners – all of which the authors used interchangeably because in practice, the terminology does not define the learner. Every learner is unique and no group of students is ever homogenous. In this literature review, like Robinson et al., we cannot make distinctions between highly capable or advanced learners. Gifted students are defined, sorted, and labeled locally, confounding research that purports to distinguish gifted from non-gifted students, or bright from gifted students, or in the state of Washington, highly capable from advanced learners. According to Peters (2016), no matter what theoretical foundation or conceptual framework one uses to define giftedness, “the end goal of K-12 gifted education is to provide students in need with some service or intervention that they would not otherwise receive” (Peters, 2016, p. 127).

It is imperative that we conduct this literature review within the context of the Advanced Learning Program in Seattle Public Schools. Although Seattle makes a distinction between highly capable and advanced learners, the literature that we have researched does not make that distinction. The Seattle Public Schools has a complex system for serving its academically advanced students. Students in grades K-8 are labeled highly capable if they are in the 98th-99th percentile on one CogAT Form 7 on 2 of 7, and in the 95th percentile or above in both reading and mathematics on district administered achievement tests. Students in grades from 9 -12 are identified highly capable on the basis of portfolio assessments, national normed test results (e.g.,

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PSAT, SAT, ACT) and district administered math and readings achievement tests (95th percentile or above). Students who are labeled advanced learners meet these criteria: 87th percentile on one CogAT Form 7 on 2 of 7 (grades 3-7) or CogAT Screening Form (K-2), and 87th percentile or above on district administered achievement tests in mathematics and readings. Students are not identified for the Advanced Learner Program after 8th grade. In addition, parent and teacher rating scales are considered in the evaluation of student eligibility for both Highly Capable and Advanced Learner/Spectrum programs. Advanced Learner/Spectrum provides enriched and/or accelerated curriculum in reading or mathematics, and flexible grouping opportunities for students who are district identified at the elementary and middle school levels.

Identification based on composite CogAT and achievement test scores cannot accurately determine two groups of students that are each homogenous and different from one another. Therefore, the scope of this literature review cannot convey how instructional practices should be implemented for advanced learners any differently than for highly capable students. According to VanTassel-Baska and Wood (2010),

As gifted education becomes more concerned about appropriate programs and services that can bolster achievement in schools for both gifted and other populations and less concerned about precise identification of who is gifted, the emphasis turns then to what works—what programs and services are likely to produce the greatest learning for students? (p. 345).

The Washington Administrative Code WAC 392-170-036 defines students who need enriched or accelerated programming as those students with the following characteristics:

- Capacity to learn with unusual depth of understanding, to retain what has been learned, and to transfer learning to new situations.

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- Capacity and willingness to deal with increasing levels of abstraction and complexity earlier than their chronological peers.
- Creative ability to make unusual connections among ideas and concepts.
- Ability to learn quickly in their area(s) of intellectual strength.
- Capacity for intense concentration and/or focus.

Notice that these characteristics infer that students need increasing levels of abstraction and complexity, opportunities to make unusual connections among ideas and concepts, opportunities to go faster or at their own pace, and opportunities for students to engage in projects with intensity.

Methodology

To answer this question: “What are identified research-based instructional best practices (pedagogical and curricular methods, differentiation techniques, ability grouping practices, personalized learning solutions) to ensure advanced learners are challenged, engaged in learning, and achieving strong academic growth?”, we conducted a series of searches in the educational and social sciences databases. A total of six databases were searched for publications, with key articles obtained primarily from the Education Resources Information Center (ERIC), Education Source, EBSCOhost, and PsycInfo. We limited our search to the last 15 years of publications in peer-reviewed journals, books, and book chapters. It was determined that the approaches and practices had to be contemporary to be judged relevant and effective. Several topics (ability grouping, acceleration, differentiation, instructional and curricular approaches for teaching the gifted, personalized learning solutions) were of particular interest for this review, as they have been widely studied and discussed in the field of gifted education and were directly related to the research question. Our initial search included the term “gifted” or “high-ability” along with one

of the following keywords: ability grouping, acceleration, differentiation, inquiry-based learning, problem-based learning, curriculum, and instructional practices. Studies were eligible for consideration in this review if: (a) the focus of the study was gifted students; and (b) there was at least one keyword concerning research-based instructional practices. Based on this literature – and critiques of them, we further reviewed special forms of service delivery models, social and emotional considerations, and self-concept. Because these searches yielded hundreds of articles, we retained the publications that were most relevant to this literature review. Given more time, we would include all articles that were considered eligible according to our inclusion criteria (see Appendix).

How Best Do We Meet the Needs of Academically Advanced Learners?

In this section, we describe various administrative structures, curricular and instructional practices, and we pay particular attention to findings and practical ideas that might be helpful in decisions regarding meeting the academic, social, and emotional needs of advanced learners. Historically, identified highly capable learners have been served in many different ways, including within the classroom, outside the classroom in special part-time or full-time classes, or with unique arrangements inside or outside the school. In the literature, many of these options are referred to as service delivery models.

According to the Washington Administrative Codes (WACs) 392-170-078 and 392-170-080, the State of Washington provides four different administrative structures for creating specialized services for identified highly capable students:

- General Education Classroom – Based Services/Programs,
- Acceleration Services/Programs,
- Unique Highly Capable Program (HCP) Services, and

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- Non-Traditional Services/Programs.

In Washington, students may be served within the general education classroom, or in special services that are designed just for them. They may also be served through any form of acceleration, or programs that they label as “non-traditional” which include mentorships, partnership with schools, agencies, or universities outside of their home school district. Within each of these administrative structures, there are many possibilities for program and instructional designs. A synthesis on research of the needs of identified highly capable students by Rogers (2007) noted these important instructional considerations that infer specific programming features;

- The need for daily challenge,
- Opportunities for students to work independently in their area of passion and talent,
- Acceleration to match their level of content mastery, and
- The opportunity to socialize with peers who also are advanced learners.

These instructional considerations may also take place within or outside of the student’s classroom.

Service Delivery Models

The most frequently referenced service delivery models in the literature are integrated classroom support, cluster grouping, pull-out programs, special classes for advanced learners, and special schools. *Integrated classroom support*, also known as within-class services, refers to differentiated instruction and services by a regular classroom teacher, with or without the guidance and assistance of a highly capable specialist. *Cluster grouping* is a within-class grouping model by which advanced students receive services grouped with other advanced students who have similar interests, needs, and abilities. *Pull-out programs* refer to part-time

services implemented in a separate classroom by a specialist trained in gifted education. The term *special classes* refers to a variety of service options for advanced learners, including pull-out groups, or outside of school enrichment programs such as Saturday and summer programs. *Special schools* are educational and instructional programs designed specifically to meet the learning needs of advanced students. Of these models, only integrated classroom support has a specific goal of improving access to quality resources for students not identified as gifted. The other models, however, have been used as a form of grouping within and outside the general classroom. Although there is a substantial amount of research focusing on academic benefits of ability grouping, practitioners should approach these studies cautiously. The research on ability grouping is flawed.

Ability Grouping

Ability grouping has been used for different meanings in the gifted education context. Some researchers equated it to tracking (e.g., Herrmann, Schmidt, Kessels, & Preckel, 2016); whereas, some others referred to ability grouping as “flexible ability grouping” (Neihart, 2007; Tieso, 2003). Neihart (2007) defined ability grouping as “any arrangement that attempts to place students with similar levels of ability in instructional groups” (p.333). There are various forms of ability grouping, each of which is associated with different outcomes for advanced learners. Steenbergen-Hu, Makel, and Olszewski-Kubilius (2016), on the basis of their comprehensive review of literature, categorized ability grouping into four main types: between-class ability grouping, within-class ability grouping, cross-grade subject grouping, and special grouping for the gifted. In between-class ability grouping, students of the same grade are assigned into high, average, or low classes based on their prior achievement or ability levels. Again, one should be cautious of studies that identifies high, average, and low – as not all students are separated into

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those groups with similar data. Some may use cognitive test scores, others may use achievement test scores, and there is generally no information specifically related to the regional context of the grouping. (Every district has its own grouping ability cut-off scores). In within-class ability grouping, teachers assign students within a class into several small groups based on their achievements, interests, skills, or various other factors. Cluster grouping is a type of within-class ability grouping, because it places “several high achieving, high ability, or gifted students in a general classroom with other students and a teacher who has received training or has a desire to differentiate curriculum and instruction for these ‘target’ students” (Gentry & MacDougall, 2009, p.3). In cross-grade subject grouping, students of different grade levels are grouped together to learn a particular subject. Finally, special grouping for the gifted refers to educational and instructional programs designed specifically for advanced students.

A great deal of research has examined the academic benefits of ability grouping. A recent second-order meta-analysis that synthesized approximately 100 years of research on the effects of ability grouping on students’ academic achievement has documented positive outcomes from within-class grouping, cross-grade subject grouping, and special grouping for the gifted, but no positive effect of between-class grouping (Steenbergen-Hu et al., 2016). Note that these findings did not vary for high-, medium-, and low-ability students.

Based on the literature, it is difficult to decide whether, when, and how to use these grouping strategies with advanced learners. Firstly, ability grouping studies in the gifted literature used the samples of students identified as highly capable/gifted which typically represents the top 3-7 percent of a student body based on some ability or achievement test scores. The findings from these studies may not generalize to other populations. Secondly, each study had its unique context and differed from others in so many ways such as the duration of ability

grouping, the subject area (e.g., math, reading, science, social studies), the quality of pedagogy and curriculum, comparison condition, measures used as an outcome variable, and criteria for identification of students as gifted/highly capable. Thirdly, seeking to help us understand the real benefits of any educational practice, we tend to use the results of the research reviews such as best-evidence syntheses and meta-analyses. Although such studies usually specify their inclusion and exclusion criteria and literature search strategies, they often consider all included studies as equally valid. When we carefully look at these studies, we see that most of them suffer from serious methodological pitfalls. For example, all first-order meta-analyses on the impact of ability grouping on students' achievement since 1980s had serious methodological problems. Of 13 ability grouping meta-analyses that were included in Steenbergen-Hu et al.'s study, seven were rated as having low methodological quality with major weaknesses, six had moderate methodological quality, and no meta-analysis had high quality. Although Steenbergen-Hu et al. used the most feasible approach in their analysis, these profound limitations suggest that educators should be cautious if they are to make informed decisions based on these research reviews. Additionally, ability grouping is a single instructional strategy for highly capable students who typically participate in a range of service delivery options simultaneously. Plucker et al. (2004) properly questioned the sagacity of drawing conclusions from the findings on the outcomes of this single strategy. **It is the quality of instruction and instructional resources that impacts students' academic growth the most** (Neihart & Yeo, 2018).

Although the academic benefits of ability grouping for advanced learners are well-documented in the literature (despite abovementioned limitations), it still remains as one of the most controversial educational practice due to a number of raised objections about its detrimental psychosocial outcomes and lowered self-concept (Belfi, Goos, De Fraine, & Van Damme, 2012;

Seaton, Marsh, & Craven, 2009). Research has shown that academic self-concept (i.e., one's perceptions of his/her own abilities and competences) decreases when students engage in social comparisons with a highly capable reference group (i.e., a negative contrast effect; Marsh & Hau, 2003; Herrmann et al., 2016). This so-called Big-Fish-Little-Pond Effect (BFLPE; Marsh, 1987) explains why advanced students who are placed in class for their ability socially compare themselves with peers and perceive their own ability to be lower. Such comparison may increase anxiety in advanced students (Matthews, Lin, Zeidner, & Roberts, 2018). Some studies indicated that a highly able reference group can also make students feel positive about their abilities when students associate themselves with positive qualities of this group and have increased motivation due to perceived similarities – a so-called assimilation effect (Mussweiler, 2003). Seaton et al. (2008) argued that the BFLPE constitutes the net effect of these two opposite processes: negative contrast effects and positive assimilation effects. In addition, the psychosocial outcomes of ability grouping vary across various subgroups of highly capable students. Its effects on twice exceptional, minority, and disadvantaged children have not been examined systematically (Neihart & Yeo, 2018). Neihart (2007) summarized research on benefits of grouping and cited small positive outcomes for some advanced minority students. Neihart also argued that ability grouping should not be the intervention of choice for highly capable or advanced students on the autism spectrum or with attention-deficit/hyperactivity disorder. Thus, educators and counselors will need to consider the characteristics of different subgroups of advanced students and the availability of alternative means of arrangements when making decisions about placement and instructional strategies for these learners.

Advanced students often gain access to “like-minded peers” through ability grouping, acceleration, and advanced course enrollment such as international baccalaureate, thus enhancing

their academic and socioemotional development (Foust, Hertberg-Davis, & Callahan, 2009; Park, Caine, & Wimmer, 2014). Barber and Wasson (2015) found that students enrolled in advanced coursework had a larger network of friends and more engaged friends than equally able students who were not taking advanced coursework. In addition, being in an advanced learning environment with like-minded peers provides students with opportunities for exploring and developing their academic strengths and interests (Bate, Clark, & Riley, 2012). These results, however, must be interpreted cautiously.

Like-mindedness is often a misunderstood phrase that infers that by being labeled gifted, or highly capable, students are all thus, like-minded. Parents often advocate for their children to be with like-minded peers. On the contrary, like-minded in the literature, has been defined in terms of shared perspectives and viewpoints (Levine & Cox, 2005), group identity and connectedness (Modani et al., 2014), and common goals and motivations (Bicknell, 2014). There is nowhere in the literature where like-mindedness means achievement, or cognitive ability. Classroom climates can be created with students of all readiness levels working on projects that give students opportunities to share viewpoints and perspectives, work on common goals, and feel a group identity. It is a misnomer to think that gifted students have to be with other gifted students to feel connected. Simply a shared interest may give students an affiliation. Finding like-minded peers should not be and is not only found in classes where students who are labeled gifted are joined together.

Academic Acceleration

Academic acceleration is both a curriculum model and an intervention model (Assouline, Colangelo, VanTassel-Baska, & Lupkowski-Shoplik, 2015). There are at least 20 types of acceleration that fall into two general categories of instructional management: (a) *subject-based*

acceleration, which exposes students to advanced content and skills before their expected grade level, and (b) *grade-based acceleration*, which comprises options for students to skip the grades in the K-12 school system (Rogers, 2015). The most important connection between acceleration and highly capable or advanced learners is the teacher or highly capable specialist who is most likely to be aware of the accelerative opportunities within the context of advanced learning opportunities (Assouline & Lupkowski-Shoplik, 2018).

The 2015 publication of *A Nation Empowered: Evidence Trumps the Excuses Holding Back America's Brightest Students*, published by the Belin-Blank Center, provides strong evidence for the effectiveness of acceleration in multiple educational settings. Research has shown that academic acceleration that comprises the appropriate educational dose for an individual student is educationally appropriate and necessary (Colangelo & Davis, 2003; Lubinski, 2004). Wai's Study of Mathematically Precocious Youth (SMPY; 2015) reported that advanced students benefit from accelerative learning opportunities and usually have few regrets, if any, about their acceleration. A literature review investigating the impact of acceleration on social and emotional factors indicated positive benefits on students' affective lives (Cross, Andersen, & Mammadov, 2015). However, the impacts of acceleration on the affective realm are not as robust as the impacts on the cognitive realm. Although the research on the outcomes of acceleration is overwhelmingly positive, decisions about individual students must be based on more than research, which engenders caution (Rogers, 2015).

According to Assouline and Lupkowski-Shoplik (2018), educators will need to consider grade-level testing and above-level testing for the identification of students for challenging curriculum and/or subject acceleration. In addition, pre-assessing individual students on a specific topic or units helps teachers to identify which students have already mastered the

required material. Appropriate assessment practices are critical for informing instructional decisions about the differentiation process.

Pedagogy of Gifted Education

The pedagogy of gifted education focuses on teaching strategies and practices that optimize challenge for all students, including the most advanced learners. Common elements of instruction that optimize challenge include inquiry-based approaches to learning, enhancing student autonomy in the classroom, and designing opportunities for students to develop their creative and critical thinking. Although these strategies are also effective teaching practices for all students, they serve as a basis for teachers to maximize opportunities for students to pursue their own interests, and respond to learning activities at their own readiness levels.

The notion that there is a distinct way of developing curriculum that only benefits identified gifted children has proven to be false. Research indicates that curriculum developed for identified gifted students has also benefited those who have not been identified as gifted. Through the Javits program at the Center for Gifted Education at the College of William and Mary, VanTassel-Baska and colleagues used the Integrated Curriculum Model (ICM) to develop curricula in the core subject areas of language arts, social studies, science, and mathematics. ICM is comprised of three interrelated dimensions:

1. Emphasizing advanced content knowledge that frames disciplines of study.
2. Providing higher-order thinking and processing.
3. Organizing learning experiences around major issues, themes, and ideas that define understanding of a discipline and provide connections across disciplines.

Experimental and quasi-experimental research studies have been conducted to discern the learning gains of gifted students, promising students from low-income and minority

backgrounds, and typical students. The findings from language arts effectiveness studies suggested that learning outcomes were aligned with the intent of the National Council of Teachers of English and the International Reading Association standards that advocate for substantive content, high-level thinking processes, and mastery of meaningful language art skills (VanTassel-Baska, Zuo, Avery, & Little, 2002). In their three-year longitudinal study of using language arts curriculum in Title 1 schools and inclusive schools with all learners, VanTassel-Baska and Bracken (2008) found that all groups within the experiment (i.e., gifted, promising students from low-income and minority backgrounds, and typical students) showed significant and educationally important gains, suggesting that the curriculum is effective with a broad range of learners.

Research on the efficacy of the William and Mary science curriculum yielded significant improvement in students' integrated scientific process skills. For example, Feng, VanTassel-Baska, Queck, Bai, and O'Neill (2005) examined the effects of the science curriculum by using the problem-based learning units across cohort groups in the same school district through a six-year longitudinal study. Gifted students in a pull-out program who had been exposed to three problem-based learning units at grades 3, 4, and 5 had significant gains each time they were taught a problem-based unit. A quasi-experimental research for social studies curriculum with 1200 gifted and typical students in regular classroom settings showed significant gains in conceptual reasoning, critical thinking, and content learning (Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007). In summary, the research evidence for the effectiveness of the William and Mary curriculum developed on the ICM showed benefits for those students who were identified as gifted, as well as those who were not identified as gifted.

Inquiry-Based Learning

Pedagogy of gifted education includes inquiry-based learning and problem solving. A great deal of research supports inquiry learning pedagogies for all students (Hertzog, 2017). First, questioning strategies provide content-relevant pedagogy to enhance deep learning. Second, deliberate use of inquiry based approaches helps students scaffold their learning to promote automaticity. Third, different modes of inquiry elevate thinking and problem solving, which enables students to transfer their learning to new situations with confidence in their ability (VanTassel-Baska, 2012). Research has shown that higher level questioning strategies are effective with all students, but specifically crucial for promoting learning in advanced learners (VanTassel-Baska & Brown, 2007).

Problem-based learning is one way of incorporating inquiry into the curriculum. “Problem-based learning approaches are a close cousin of project-based learning. Lessons typically involve a specific type of activity focused on using reasoning and resources to solve a problem,” (Barron & Darling-Hammond, 2008, p. 5). The primary goal of problem-based learning is to enhance learning by requiring learners to solve problems.

Authentic mathematical problem-solving tasks have the highest level of challenge for all students (Lesh & Zawojewski, 2007). Authentic problem solving not only provides challenge for advanced learners, it also helps students to understand the real world uses of different subjects. Research has shown that practicing as professionals is an important means of motivating students in a given subject area (Mammadov & Topcu, 2014). Teaching both general processes that are used in conducting research and solving problems specific to different disciplines are a desirable aspect of curriculum for advanced learners (Tomlinson et al., 2002).

Enhancing Student Autonomy

Autonomy is one of the three basic psychological needs that individuals possess (the other two needs are competence and relatedness; Deci & Ryan, 2000). Students have a need for autonomy in learning settings because it is an important precursor of academic motivation. The quality of a student's motivation explains part of why he/she prefers optimal challenges and generates creative products. When a student is intrinsically motivated to carry out some task, creative outcomes are most likely to occur. To be intrinsically motivated, and therefore thrive in educational settings, students should have choices in their learning.

There are several guidelines that are critical in appealing to students' intrinsic interests. Given that intrinsic motivation arises from the needs of autonomy, students will benefit when teachers support their autonomy (Reeve, Ryan, Deci, & Jang, 2008). Teachers should be trained to use autonomy-supportive instructional behaviors in their classes. Reeve et al. (2008) listed several empirically validated supportive behaviors for teachers:

- spending time listening to students' voice during instruction,
- asking what the students need,
- allowing time for students to work independently and in their own way,
- providing rationales to explain why a particular course of action, way of thinking, or way of feeling might be useful,
- using statements to communicate positive feedback about the students' improvement or mastery,
- being responsive to student-generated questions, comments, recommendations, and suggestions, and
- using empathic statements to acknowledge the students' perspectives or experiences.

Differentiation

The goal of any educational program, including a highly capable program is to provide the optimal environment for learning and growing. Because advanced learners are diverse with a range of needs, interests, backgrounds, and readiness levels, no single “highly capable/advanced learner curriculum” can be identified as best for all students and for all situations. Beyond providing challenges that incorporate greater depth and complexity, adjusted pace, and greater autonomy, schools should consider curricular and instructional modifications geared toward individual student needs.

The National Association for Gifted Children (NAGC, n.d.) defined differentiation as “modifying curriculum and instruction according to content, pacing, and/or product to meet unique student needs in the classroom” (para. 21). According to Tomlinson (1999), it is doing whatever it takes to ensure that each child grows as much as he/she possibly can each day, each week, and throughout the year. Teaching an entire class as a homogenous group misses the opportunity for many students to make continuous growth (Inman & Roberts, 2018). Research has shown that even teachers who voice the importance of differentiation do not differentiate their instruction to meet individual student needs. For example, Westberg and Daoust (2003) conducted a follow-up study on classroom practices and found that, 10 years after the first study (Archambault et al., 1993), teachers who realized the importance of differentiation were still using one lesson plan to teach. One of the primary factors affecting the lack of differentiation in classrooms is the lack of teacher training. According to the recent survey study conducted by The New Teaching Center (2015) across 20 states, more than the half of teacher population indicated that they need training on differentiation in order to teach their children more effectively. Furthermore, when teachers do have training, they tend to focus on differentiating for

exceptional students on the other end of the spectrum, not advanced students (Inman & Roberts, 2018).

There are a variety of strategies and methods that can be used to differentiate the curriculum and instruction for advanced learners. Differentiation strategies include *content acceleration, curriculum compacting, flexible pacing, and more advanced or complex abstractions and materials*. Content acceleration should be a part of teachers' planning principles. Curriculum compacting for advanced learners is a straightforward procedure in which teachers determine what students already know and what they still need to learn, and replace the content with more advanced and challenging materials according to students' interests and needs (Manning, Stanford, & Reeves, 2010). Research has reported several benefits of curriculum compacting in meeting the needs of advanced students such as elimination of classroom material that students already mastered, implementation of appropriate instructional strategies for students to demonstrate mastery, and increased achievement in reading, math computation, and social studies (Riley, 2005). The optimal match between the challenge level of the task and the level of student's skills is critical in appealing to advanced learners' intrinsic interests. Just as students differ in their readiness to learn, they differ in their interests and general motivation. Teachers should consider these differences when differentiating curriculum and instruction (Tomlinson et al., 2003). Students should be allowed and encouraged to select their own topics for projects and share their ideas with parents and teachers about what could make them more engaged in learning (Wolfe, 2001). For example, when students chose the reading materials of their interest, they demonstrated substantive engagement and experienced increased reading performance (Carbonaro & Gamoran, 2002).

Other Personalized Learning Solutions for Advanced Learners

According to the U.S. Department of Education (2016), personalized learning refers to “instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) may all vary based on learner needs. In addition, learning activities are made available that are meaningful and relevant to learners, driven by their interests and often self-initiated” (p. 7). Differentiated curriculum and instruction, as discussed above, is one of the widely supported ways to tailor and optimize learning objectives, approaches, content, and tools for each learner. The other two practices that have widely been studied in the literature are mentoring programs and adaptive learning, both of which share attributes with personalized learning and create equitable opportunities for students.

Adaptive learning provides personalized learning, assessment, and feedback for students through the use of technology (Moeller & Reitzes, 2011). Research has suggested that students, regardless of age, are motivated to learn new technologically-based tasks (Bruder, Blessing, & Wandke, 2014). Adaptive learning is driven by a student’s interaction, behavior, aptitude and performance. The content is adjusted based on these factors and the resources are attuned according to differences in needs and experiences of learners. Students who already master the content and skills have opportunities to work on more advanced topics and tackle more difficult problems. Research has shown that, through adaptive learning, advanced students explore disciplines using authentic methodologies (Siegle, 2017), and implement the creative processes of professionals to create products that rival those made by professionals (Siegle, Amspaugh, & Mitchell, 2017).

Although mentorship programs are increasingly recognized as a means of providing guidance for students with varied academic, behavioral, and social needs, Callahan and Dickson (2014) reported,

The very limited empirical literature on the roles that mentorships have played in the lives of gifted individuals and the effects of mentor relationships relies on post- hoc analyses of biographical data, case study analyses, and/or retrospective questionnaire data. Experimental studies of the effects of programs or specific types of mentorships or gifted students do not exist (p. 420).

An older study that examined high school students' experiences in a mentoring program confirmed significant differences between classroom experiences and mentorships, with students noting that mentorships

- (a) provided increased learning opportunities;
- (b) provided the setting for students to develop an increased willingness to take risks;
- (c) helped them develop talents and learn about advanced subject matter; and
- (d) gave them more opportunity to work independently, utilize technical skills, utilize research skills, investigate job routines and responsibilities, find out about career entrance requirements, examine lifestyles and characteristics of professionals, see how professionals interact, and make contacts and network" (Beck, 1989 cited in Callahan and Dickson (2014).

Mentorships can be an effective educational intervention for educating and encouraging highly capable and advanced students (Clasen & Clasen, 2003; Mammadov & Topcu, 2014). Mentoring provides advanced students with opportunities to focus intensely on their area of interest and ability and explore it in a "ceilingless" environment (Purcell, Renzulli, McCoach, &

Spottiswoode, 2002). Mentors can help advanced students who face obstacles in realizing their potential (Clasen & Clasen, 2003). Mentors who have an expertise in a particular field can inspire, challenge, and encourage advanced students in their academic and psychosocial growth. Callahan & Dickson (2014) stated that the functions of the mentor in late adolescent/adult gifted individuals were three-fold: that of a role-model, personal support, and professional socialization. There is also research to suggest that mentoring for special populations of students, including females, and those historically underrepresented groups have had positive effects, especially in the realm of academic achievement and career development.

These dimensions of benefits suggest that computer-mediated solutions and mentorship programs should be considered as personalized learning approaches that can influence advanced students' skills, knowledge, interests, ways of thinking, and perspectives at different stages of their academic, social, and personal lives.

Social and Emotional Considerations for Advanced Learners

Social and emotional needs of advanced learners are important factors in transforming their potentials into success (Olszewski-Kubilius, Subotnik, & Worrell, 2015). Some researchers argue that highly capable or advanced students may have unique characteristics that render them particularly vulnerable to an array of social and emotional problems (Peterson, 2009), whereas others support the idea that these students are no more likely to be vulnerable to social and emotional difficulties than other students (Shechtman & Silektor, 2012). A recent comprehensive review of research on social and emotional development of highly capable children suggested that serious social and emotional issues appear no more or less often among highly capable students than among their peers (Neihart, Pfeiffer, & Cross, 2015). Social and emotional difficulties that might arise among advanced students are likely to be due to a mismatch between

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a student and his/her environment (Rinn, 2018). Therefore, educators and advanced learner specialists will need to focus on strategic instructional design, counseling, appropriate educational placement, and effective pedagogical strategies as the major means to meet social and emotional needs of advanced learners.

Teachers who acquire as much information about their students as they can are likely to be successful in addressing these distinct levels of experiences and needs. Using, for example, interest inventories to learn about each student is also an important message to them saying, “I care about you and your interests” (Hébert, 2018). Nugent (2005) recommended that teachers develop their own questionnaires asking about what students enjoy the most outside classroom, who are the most important people in their lives, and how they feel about particular school subjects. Such information will also help teachers in the planning and designing supportive learning environment that is inclusive of every student.

Teachers should consider integrating an affective component in the curriculum for advanced learners. According to VanTassel-Baska (2009), the areas of affective program for advanced learners ideally would contain self-assessment, philosophy of life, bibliotherapy, a talent development plan, and an emotional intelligence curriculum emphasis. Peterson (2016) suggested that affective curriculum helps children to reflect about themselves and others, develop positive relationships, learn expressive language, explore careers, make effective decision, and progress with developmental tasks. Teachers can infuse affective curriculum into their classrooms by, for example, asking students to write reflections to literature, self-assessments of values and beliefs, affective insights through books, or responses to social and emotional issues described in films or discussions (Hébert, 2018). A longitudinal study of the implementation of affective curriculum in a school for advanced learners showed that weekly

development-oriented, teacher-led small-group discussions provided support for institutionalization of the program and its continuation (Peterson & Lorimer, 2011).

Implications

Serving the needs of students who are labeled either highly capable or advanced learners requires a holistic approach. Research shows that their academic needs require advanced and skilled teaching strategies to make sure that they are challenged appropriately. They also need attention to their social and emotional growth. Attention to their outside interests, future career possibilities, and planning for their academic future is an important part of their identity, and more attention in schools to preparing for the future is desired by parents as well as future employers. In designing a service delivery model to best serve advanced learners, keep in mind four areas that support their growth: Academic, social/emotional, college or career planning, and parent and community engagement and support (see Diagram 1).

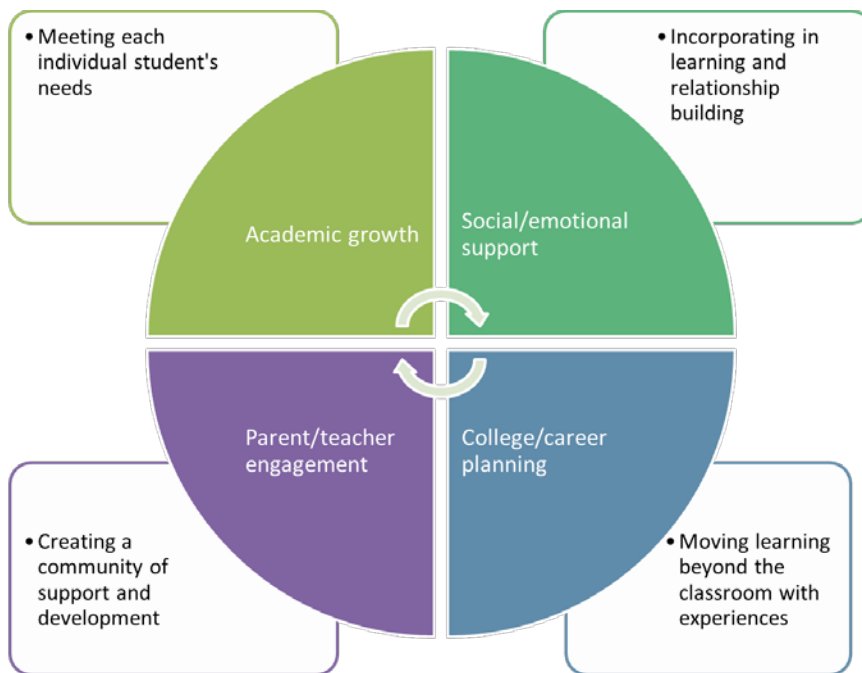


Diagram 1: *Hi-Cap program model* (Grubbs & Hertzog, 2017)

Advanced Learning Literature Review

A number of conclusions and recommendations can be drawn from this literature review:

- No single approach can be used to address all students' needs.
- A variety of programming, from inquiry-based learning and differentiation to personalized learning practices, must be available to address the unique needs of advanced students.
- Educators should use appropriate accelerative opportunities.
- Ongoing assessment practices are critical to informing instructional decision-making.
- Appropriate levels of challenge must be an important component of curricular and instructional solutions for advanced students.
- Advanced learners, like all students, need to feel competent, connected to others, and have a sense of autonomy in their learning (Deci & Ryan, 2000).

Not all teachers are appropriately trained to meet the needs of advanced learners.

Teachers' positive perceptions and attitudes toward differentiation and other principles are not enough to implement effective instructional and curricular practices without training. Students in advanced learning programs must be guided by the professional expertise of highly trained teachers to reach their highest capabilities (Manning et al., 2010). The limited research on the effectiveness of teachers with training in gifted education suggests that teacher professional development and coursework have a positive influence on teachers' knowledge and skills in matching their instructional practices to the needs of their advanced learners (Hertberg-Davis, 2009; Robinson, 2008). According to Evans (2018), effective teachers of highly capable or advanced students must have both strong subject area expertise and an understanding of and appreciation for the special needs of these students. Therefore, a final recommendation based on

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this literature review is to ensure professional development for educators who work with advanced learners, as well as programs that help parents become partners in supporting the growth of their children.

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Appendix: Literature Review Methodology

Primary Search Terms*	Results	Relevant Literature
Ability Grouping	140	<p>Herrmann, J. R., Schmidt, I., Kessels, U., & Preckel, F. (2016). Big fish in big ponds: Contrast and assimilation effects on math and verbal self-concepts of students in within-school gifted tracks. <i>British Journal of Educational Psychology</i>, <i>86</i>, 222-240.</p> <p>Neihart, M. (2007). The socioaffective impact of acceleration and ability grouping: Recommendations for best practice. <i>Gifted Child Quarterly</i>, <i>51</i>, 330-341.</p> <p>Plucker, J. A., Robinson, N. M., Greenspon, T. S., Feldhusen, J. F., McCoach, D. B., & Subotnik, R. F. (2004). It's not how the pond makes you feel, but rather how high you can jump. <i>American Psychologist</i>, <i>59</i>, 268-269.</p> <p>Steenbergen-Hu, S., Makel, M. C., & Olszewski-Kubilius, P. (2016). What One Hundred Years of Research Says About the Effects of Ability Grouping and Acceleration on K–12 Students' Academic Achievement: Findings of Two Second-Order Meta-Analyses. <i>Review of Educational Research</i>, <i>86</i>, 849-899.</p>
Acceleration	359	<p>Assouline, S., & Lupkowski-Shoplik, A. (2018). Acceleration: Practical applications and policy implications. In J. L. Roberts, T. F. Inman, and J. H. Robins (Eds.), <i>Introduction to gifted education</i> (pp. 237-253). Waco, TX: Prufrock Press.</p> <p>Assouline, S., Colangelo, N. J. Van Tassel-Baska, & Lupkowski-Shoplik, A. (Eds.). (2015). <i>A nation empowered: Evidence trumps the excuses holding back America's brightest students</i>. Iowa City, IA: Belin-Blank Center.</p> <p>Neihart, M. (2007). The socioaffective impact of acceleration and ability grouping: Recommendations for best practice. <i>Gifted Child Quarterly</i>, <i>51</i>, 330-341.</p>
Adaptive Learning	13	<p>Moeller, B. & Reitzes, T. (2011). <i>Integrating Technology with Student Centered Learning</i>. Quincy, MA: Education Development Center.</p> <p>Siegle, D., Amspaugh, C. M., & Mitchell, M. S. (2017). Learning from and learning with technology. In J. VanTassel-Baska & C. A. Little (Eds.), <i>Content-based curriculum for high-ability learners</i> (3rd ed., pp. 437-460). Waco, TX: Prufrock Press.</p>

Primary Search Terms*	Results	Relevant Literature
Affective Curriculum	37	<p>Peterson, J. S. (2016). Affective curriculum: Proactively addressing the challenges of growing up. In K. R. Stephens and F. A. Karnes (Eds.), <i>Introduction to curriculum design in gifted education</i> (pp. 307-330). Waco, TX: Prufrock Press.</p> <p>VanTassel-Baska, J. (2009). Affective curriculum and instruction for gifted learners. In J. VanTassel-Baska, T. L. Cross, & F. R. Olenchak (Eds.), <i>Social-emotional curriculum with gifted and talented students</i> (pp. 113-132). Waco, TX: Prufrock Press.</p>
Curriculum	1514	<p>Little, C., Feng, A., VanTassel-Baska, J., Rogers, K., & Avery, L. (2007). A study of curriculum effectiveness in social studies. <i>Gifted Child Quarterly</i>, 51(3), 272-284.</p> <p>VanTassel-Baska, J., & Wood, S. (2010). The integrated curriculum model (ICM). <i>Learning and Individual Differences</i>, 20, 345-357.</p> <p>VanTassel-Baska, J., & Brown, E. (2007). Towards best practice: An analysis of the efficacy of curriculum models in gifted education. <i>Gifted Child Quarterly</i>, 51, 342-358.</p>
Differentiation	373	<p>Hertberg-Davis, H. (2009). Myth 7: Differentiation in the regular classroom is equivalent to gifted programs and is sufficient. <i>Gifted Child Quarterly</i>, 53, 251-253.</p> <p>Inman, T. F. & Roberts, J. L. (2018). Differentiation. In J. L. Roberts, T. F. Inman, & J. H. Robins (Eds.), <i>Introduction to gifted education</i> (pp. 253-277). Waco, TX: Prufrock Press.</p> <p>Manning, S., Stanford, B. P., & Reeves, S. (2010). Valuing the advanced learners: Differentiating up. <i>The Clearing House</i>, 83, 145-149.</p> <p>Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T., Brimijoin, K., ... Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. <i>Journal for the Education of the Gifted</i>, 27, 119-145.</p>
Inquiry-based Learning	14	<p>Barron, B., & Darling-Hammond, L. (2008). <i>Teaching for meaningful learning: A review of research on inquiry-</i></p>

Primary Search Terms*	Results	Relevant Literature
Mentoring	263	<p data-bbox="691 296 1365 363"><i>based and cooperative learning</i>. San Francisco, CA: Jossey-Bass.</p> <p data-bbox="610 405 1438 579">Callahan, C. M. & Dickson R. K. (2014). Mentors and mentorships. In J. A. Plucker and C. M. Callahan, (Eds)., <i>Critical issues and practices in gifted education: what the research says</i>. (2nd ed., pp. 413-426.). Waco, TX: Pufrock Press.</p> <p data-bbox="610 590 1446 726">Clasen, D. R., & Clasen, R. E. (2003). Mentoring the gifted and talented. In N. Colangelo & G. A. Davis (Eds.), <i>Handbook of gifted education</i> (3rd ed., pp. 254-267). Boston, MA: Allyn & Bacon.</p>

*The term “gifted” or “high ability” was used in every search along with one specific keyword.

