TEACHING STRATEGIES TO SUPPORT THE EDUCATION OF GIFTED LEARNERS

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Giftedness is a concept that is defined largely by comparison—gifted learners differ from their peers because they learn material more quickly and with less repetition, they more easily grasp content at deeper and more complex levels than their classmates, and they may be able to engage with more advanced material in a more complex and abstract way earlier and more consistently than their peers. Gifted education experts have used these characteristics as a way of defining the student population of interest, and as justification for making recommendations about the types of services appropriate to these learners in various educational settings, with a central focus on ensuring challenge to promote learning and growth.

Because gifted students learn differently from their peers—in terms of pace, complexity, capacity for abstract understandings, and other factors—the classroom activities in which they engage should likewise be different to promote an effective learning environment. These activities include a strong emphasis on challenging instructional experiences, as opposed to experiences more likely to induce boredom because of slow pace or excessive repetition of already-mastered content (Fredricks, Alfeld, & Eccles, 2010). Gifted students tend to be able to engage with a different level of challenge during instruction as compared with their more average peers, and this capability underscores recommendations to engage students in instruction that is more challenging in its content, pace, and complexity (Rogers, 2007). Beyond the capacity for more advanced learning, several researchers have also demonstrated student preference for more challenging learning experiences (e.g., Kanevsky & Keighley, 2003; Martin, Hands, Lancaster, Trytten, & Murphy, 2008; Rogers, 2007). From students' perspectives, challenge (or lack thereof) in the classroom may be defined by pace, depth, and opportunities to engage with higher-level thinking and to pursue greater depth around their own interests (J. J. Gallagher, Harradine, & Coleman, 1997; Kanevsky & Keighley, 2003), all provided within a context that has appropriate support structures (Martin et al., 2008).

This chapter discusses key aspects of instructional practices and teaching strategies that allow teachers to respond to the needs of gifted students and to promote effective learning for this population. It begins with a discussion of some of the foundations and support structures that underscore instruction appropriate for gifted learners, as well as some of the essential components of that instruction. Several instructional approaches and strategies prevalent in the gifted education literature also are outlined.

The teaching strategies mentioned in this chapter should not be reserved only for gifted students, and this chapter is not intended to suggest such a perspective. Rather, the strategies outlined here are beneficial for learners who show strong academic potential and also for other learners, though in some cases aspects of the instruction may be differentiated for groups of students. Such differentiation may occur through the grouping method used, the pace of instruction, and/or the specific stimuli and prompts used, even within the context

of a common set of instructional strategies. Therefore, the literature cited includes sources specific to gifted education, as well as sources from the broader educational literature.

IMPORTANCE OF THE TOPIC

High-quality instruction for students at any level should be grounded in a strong connection to the curriculum and intended learning outcomes, as well as to assessment evidence that demonstrates student readiness to engage with the learning activity and to benefit from it in terms of growth in learning. In addition, the successful implementation of particular teaching strategies requires attention to certain contextual variables and support structures. This chapter is not the context for extensive discussion of these foundational elements or support structures, but a brief overview of them and how they connect to teaching strategies is warranted.

Instruction as Connected to Curriculum and Assessment

VanTassel-Baska (2003) advised that teaching strategies should always be "subordinate to educational purpose" (p. 170). In other words, the questions of "why are we doing this?" and "what are students supposed to take away from this?" should underscore the selection of a strategy or approach. The curriculum framework in place—which itself should be directly linked to the mission and goals of an overall educational program for the gifted (Pfeiffer, 2013)—should be the starting place for the development and selection of instructional strategies, because these must be linked to the specific intended learning outcomes of any course, unit, lesson, or activity. Indeed, curriculum documents become intertwined with instruction at the unit and lesson level through the articulation of the steps, questions, and activities to be implemented in support of the intended outcomes. Furthermore, instructional strategies must be linked not only to the intended learning outcomes (and by extension the overall program goals) but to the nature of the content under study and the relevant practices of the disciplines (Burns, Purcell, & Hertberg, 2006; VanTassel-Baska, 2003, 2014).

Moreover, as part of instructional planning, educators must consider the question of students' level of readiness for a learning activity. Systematic application of preassessment can provide the evidence teachers need to determine (a) whether students have the prerequisite skills to engage with the planned instruction, and (b) whether students have already reached the intended outcomes (Gronlund, 1998). The answers to these questions should clearly affect instructional decision making; if students do not have the prerequisite skills, then some remediation or reteaching is necessary, whereas if students have already reached the intended outcomes, then a new instructional plan must be established to take students forward to the next set of learning outcomes. In addition, ongoing assessment is critical in monitoring the degree to which students are progressing toward intended outcomes, so that the instructional pace, approach, or content may be adjusted in response (Waugh & Gronlund, 2013).

Therefore, instructional planning and decision making should always be based solidly in the foundation of the curriculum and the assessment evidence. For gifted learners, ideally the curriculum is differentiated, with an articulated scope and sequence that reflects the needs of this population of learners; and assessment procedures include consistent use of formative assessment and above-level assessments to prevent ceiling effects that limit the inferences to be made about instructional needs (VanTassel-Baska, 2003, 2014). Furthermore, as teachers examine curriculum and assessment data to inform instructional planning, they must recognize that the assessment might well demonstrate early student progress toward learning outcomes, or even mastery of those outcomes before instruction has begun (Reis et al., 1993).

Contextual Variables and Support Structures for Implementing Teaching Strategies

Beyond the fundamental connection of instruction to curriculum and assessment, other factors also influence selection and implementation of teaching strategies. With gifted learners, some of the most salient of these factors are the grouping model used,

individual differences among learners, the available resources, and the preparation of teachers.

Grouping. Grouping is a critical question in any discussion of the education of gifted learners, and it is discussed in greater detail elsewhere in this handbook (see Chapters 23 and 32). There is considerable evidence to support grouping gifted students together for instruction, at least some of the time, to support their achievement and other valued outcomes (Rogers, 2007). There are also extensive recommendations in the literature for an approach to instructional planning that emphasizes flexible grouping (Heacox, 2002; Tomlinson, 2001), using assessment evidence and the purposes of lessons and activities to inform the grouping approach. Recommendations around flexible grouping tend to appear primarily in discussions of differentiation in the regular classroom, as opposed to within special classes or programs for gifted learners, but flexible grouping is relevant in any setting in which instructional activities will occur. In the selection of instructional strategies, teachers must consider the varied possibilities for how learners will be grouped and the implications of the grouping approach for how the instruction will move forward.

Individual differences and special populations. Gifted students, as with any other group of students, are not really a homogeneous population, in terms of their personal characteristics or the ways and levels to which they demonstrate their potential. Although we can make general recommendations about strategies and approaches that tend to be successful and effective with gifted learners overall, these recommendations must be considered within a context of recognizing the individual differences within the population and the special needs that some students may be bringing to the learning environment. In some cases, there are patterns of these special needs within populations of gifted learners (Castellano & Frazier, 2010), such as students who come from a particular cultural or linguistic background, twice-exceptional learners (i.e., gifted students who also have disabilities) who may share another exceptionality, or learners often described as "highly" or "profoundly" gifted. Instructional planning must incorporate attention to the larger group

of gifted learners, the special populations within that group, and the individual students with whom the instruction will occur.

Resources. The availability of resources is also a key consideration in instructional planning, including not only material resources but also time and human resource support. Some of the teaching strategies that might be highly effective in pursuit of learning outcomes may be limited by the available time, or there may not be sufficient personnel available to support the implementation of a strategy. Some of the approaches frequently recommended for gifted learners include connections with individuals and contexts beyond the classroom and the school day, and these clearly introduce the need for additional resource attention. Riley (2009) emphasized that in seeking and selecting resources, as with seeking and selecting instructional strategies, teachers must emphasize the linkage of resources to intended learning outcomes, practicalities, and the specific needs of the learners in the classroom.

Teacher preparation and professional development. Teacher preparation and professional development are critical support structures for the effective implementation of teaching strategies that will support the learning of gifted students. Most teacher preparation programs and in-service professional development schedules give limited attention to gifted education and the needs of gifted learners (Callahan, Moon, & Oh, 2014; National Association for Gifted Children & Council of State Directors of Programs for the Gifted, 2013). As a result, teachers may have limited background in recognizing and responding to this population (Brown et al., 2005; Siegle & Powell, 2004; Westberg & Daoust, 2003). As noted previously, the specific teaching strategies highlighted in this chapter are not limited to gifted learners, but teachers may need additional professional development support to implement them effectively with this population. Some evidence demonstrates that teachers with more background in working with gifted students and correspondingly more confidence also elicit greater engagement and achievement from learners (Dimitriadis, 2012). Ongoing professional supports are important for helping teachers implement

strategies targeting the needs of advanced learners. Such ongoing supports may include guidance for using curriculum-based formative assessment to inform grouping and instructional pace (Missett, Brunner, Callahan, Moon, & Azano, 2014); sustained attention over several years to promote strategies to support critical thinking (VanTassel-Baska et al., 2008); and coaching models to support implementation of specific differentiation practices (Hunsaker, Nielsen, & Bartlett, 2010).

At the same time, several of the studies noted also demonstrated the challenges teachers face in implementing strategies that are recommended for gifted learners and in making specific instructional adjustments for the advanced learners in their classrooms (Hunsaker et al., 2010; Latz, Speirs Neumeister, Adams, & Pierce, 2008; Scot, Callahan, & Urquhart, 2008). A further consideration is ensuring a learning context in which this kind of teaching can occur. Often, teachers feel pressured in the current accountability environment to ensure progress of students performing below grade level, and they may feel that the constraints of accountability prevent them from being able to implement the types of strategies recommended for high-ability learners (Scot et al., 2008). Furthermore, other specific constraints, including management issues and limited understanding of student characteristics, may limit teachers' comfort with implementing the kinds of strategies often recommended in the gifted education literature (Hertzog, 2007).

When teachers are engaging not only with advanced learners but with high-level content with those learners, it is important that they be supported with sufficient professional development and opportunities to link content knowledge, knowledge for teaching, and knowledge of students systematically. Teacher subject matter knowledge and pedagogical content knowledge are significant considerations for their work with any learners (Park & Oliver, 2009; VanTassel-Baska, 2003), but perhaps specifically for advanced learners because of the needed level of questions and pace of learning. Teachers with a higher level of content knowledge and depth of understanding, as well as greater comfort with relevant teaching practices and anticipation of misconceptions, are likely to be more willing to engage

with the content at a high level to support more advanced learners (Remillard, 2005; Spillane, 2000).

RELEVANT THEORY AND PRINCIPLES: ESSENTIAL CONCEPTS FOR TEACHING STRATEGIES

As explained in the introduction to this chapter, the teaching strategies that experts tend to recommend for gifted learners should not be reserved exclusively for this population. Rather, what makes the strategies appropriate for supporting gifted learners is how they are combined with several concepts that are essential to promoting engagement, learning, and growth for these students. These are the concepts most critical to differentiating curriculum and instruction for gifted learners (Kaplan, 2009; Rogers, 2007; VanTassel-Baska & Stambaugh, 2006).

Accelerated Pace and Content

Acceleration is a central consideration in gifted education, with close linkages to most definitions and conceptions of giftedness in childhood and adolescence. Gifted learners tend to learn things earlier, faster, and with less repetition than their peers of the same age. Therefore, their curriculum should be more advanced, and the instructional practices used, especially for more basic content and skills, should reflect attention to a faster pace with less repetition (Rogers, 2007). *Acceleration* is a term that encompasses a wide variety of approaches to intervention for gifted learners, including moving students to different grade levels, introducing advanced content earlier, and moving students more quickly through content (Assouline, Colangelo, & VanTassel-Baska, 2015). The focus of this chapter is how practices of acceleration may support instructional decision making, including the following key ideas:

■ Introducing more advanced content earlier— Although this concept is central to the approaches of grade and subject acceleration (strategies that involve moving the student as opposed to moving the content), it is also reflected instructionally in decisions to use more advanced stimuli within a lesson or activity (e.g., more advanced problem set or reading selection; Chamberlin, 2010; Little, 2011).

- Moving more rapidly through content—One of the long-standing concerns about education of gifted learners in general classroom settings is that they become easily bored (Fredricks et al., 2010). This boredom tends to stem from the repetition of content and slower pace that may be in place to support the needs grade-level typical students. Instructional approaches that allow more rapid progression through content are, therefore, advisable for this population (Rogers, 2007). Fifted learners need less repetition and less practice to master many of the skills in the school curriculum, and therefore instructional planning should support accelerating the pace and eliminating extensive practice with the same skills.

- Elimination of instructional content—Paired closely with moving more rapidly through material is the idea of eliminating material from instructional time. Within an educational context that tends to include a lot of repetition over multiple grade levels, gifted learners often experience the same content multiple times despite demonstrated evidence of mastery (Reis et al., 1993). When formative assessments demonstrate that learners have already grasped content and skills, instruction can move on and skip over this content. Such emphasis on compacting the curriculum supports the implementation of other kinds of instruction in the classroom for gifted learners (Lee & Olszewski-Kubilius, 2006; Reis et al., 1993; Rogers, 2007).

Depth, Complexity, and Abstraction

Although acceleration through content and a faster pace in general are advisable for gifted learners, another set of essential concepts may promote slowing down instruction to support engagement with more complex material. Most recommendations in curriculum and instruction for gifted learners emphasize the importance of engaging students with greater levels of depth and complexity in their learning, and with moving earlier and more consistently to abstract levels of understanding (Kaplan, 2009; VanTassel-Baska & Stambaugh, 2006). These considerations may necessitate allocating more instructional time (Hattie, 2009), as compared with the previous points about accelerating content.

These emphases work in a complementary fashion; because students can move more rapidly through basic content, they can benefit from spending more time engaging with more advanced content in depth (McGinnis & Kahn, 2015; Park & Oliver, 2009; VanTassel-Baska, 2003). Because they need less practice with basic skills, they can have opportunities to work with challenging problems and questions that require the complex application of multiple skills and/or more abstract ideas.

Also reflected in these emphases on depth, complexity, and abstraction is the combination of skills and content with which gifted learners should be engaging. Today's educational initiatives place a strong value on critical and creative thinking skills, problem solving, authentic audiences, and communication and collaboration. For gifted learners, however, these types of emphases must be combined with appropriately advanced content to promote learning and growth. Moreover, the content with which gifted learners work should be focused on engaging learners with "big ideas," emphasizing concepts, principles, and generalizations (Rogers, 2007). Many of the current educational reform efforts for all learners emphasize the importance of engaging students in authentic learning experiences that reflect the practices of the disciplines, and recommendations for gifted learners are no different. Indeed, given all the factors already noted about these learners' capacities for a faster pace and greater depth and complexity, they should have more and earlier opportunities to engage in disciplinary practices, and wherever possible, these experiences should include interactions with experts in the disciplines.

Metacognition and Independence

Gifted learners should also be engaged in practices that encourage them to develop independence and skills for appropriate self-evaluation as learners. Instructional practices that support the development of independent initiative, risk-taking, and inquiry into areas of interest help develop in students the skills and dispositions they will be able to use in later educational and career experiences (Case, 2005; Rogers, 2007). This is not to say that gifted learners should be pushed into independent work that removes them from instructional support;

rather, learning experiences that promote independence should be carefully planned and facilitated by teachers as with any other teaching strategy.

Cautions Related to Teaching Strategies

The goal of this chapter is to provide an overview of recommended and evidence-based strategies and instructional activities for gifted learners, with exploration of some concepts that underlie the selection of such strategies and activities. At the same time, it is important to raise cautions around some of the approaches that are often used with this population, particularly within the general education classroom setting, and that may not be appropriate or supportive of learning and growth for this group of learners. Next, I address some of these approaches, linking them to key considerations to demonstrate the issues and concerns they raise.

One of the most common challenges that gifted learners present their teachers is the issue that they often finish their work quickly. This results logically from the point that they learn things earlier, faster, and with less repetition. However, the outcome is that teachers are then presented with learners who are finished with work and may have nothing to do (and therefore may become disruptive) while other learners need to continue with the task. Sometimes, the teacher response to this situation may be to present more work—which becomes problematic if it is more of the same work. Once learners have demonstrated mastery of a skill or task, to present them with more practice of the same thing does not promote their learning.

Another approach teachers often take to fill the time of a "rapid finisher" is to suggest that the learner help someone else in the class with the work. Teachers will often justify this approach with the notion that one learns material more thoroughly when one teaches it, though attention to the assessment evidence on the learning of the advanced learner in this context is limited (Missett et al., 2014). However, there is little to no evidence to support that this approach advances the learning of the gifted student, and students often complain about

the practice (Dimitriadis, 2012). Moreover, although some evidence supports social and academic benefits of peer tutoring models, that evidence is grounded in approaches that involve training and supporting the tutors as well as the students being tutored (Leung, 2015), and specific studies examining achievement outcomes for gifted students in peer tutoring contexts are sparse.

While this caution about using gifted learners extensively as peer tutors is important, it is not meant to suggest that having students interact with one another as they are learning together is inappropriate. Flexible grouping is an important underpinning to differentiated instruction, and teachers should consider the best ways of grouping students based on assessment evidence and the intended learning outcomes of any instructional activity.

PRACTICE AND POLICY ISSUES: SELECTED TEACHING STRATEGIES

Defining a practice as a "teaching strategy" is a somewhat precarious endeavor, because of the wide range of explanations and classifications of strategies in a teacher's work. For example, Marzano (2007) proposed a list of 41 categories of strategies to characterize the work of teaching, including 18 focused specifically on the content of instruction. These built on prior work of nine "high-probability"[1] categories of instructional strategies (Marzano, Pickering, & Pollock, 2001), including some that describe ways of engaging students with content (e.g., identifying similarities and differences, generating and testing hypotheses) and others that focus more on the learning context and communications (e.g., homework and practice, setting objectives and providing feedback). Furthermore, instructional strategies are integrally tied within the context of the curriculum and assessment approaches, so in many respects there are overlaps between what may be described as a teaching strategy and its grounding in the curriculum.

Some of the specific types of teaching strategies that are frequently recommended for gifted learners

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[1]Marzano et al.'s (2001) categories have become more popularly known as high-yield strategies, but are referred to here with their original descriptor, reflecting Marzano (2009).

include those emphasizing critical and creative thinking, engaging with concepts and ideas, addressing authentic problems, working with advanced resources, and interacting around higher-level questions (e.g., Burns, Purcell, & Hertberg, 2006; Kaplan, 2009; VanTassel-Baska, 2003). These key emphases are not mutually exclusive. Rather, specific strategies might address aspects of some or all of these emphases, integrated with the essential considerations noted previously and other key aspects of good instruction, including an emphasis on building culturally responsive classrooms (Ford, Howard, Harris, & Tyson, 2000) and on supporting students' affective growth (VanTassel-Baska, Cross, & Olenchak, 2009). The National Association for Gifted Children (2010) included several key recommendations around instructional strategies in the *Pre-K to Grade 12 Gifted Programming Standards,* notably an emphasis on using strategies that challenge gifted learners and on developing learners as "independent investigators" (pp. 4–5) through a focus on critical and creative thinking skills, problem solving, and inquiry. These emphases share a dual focus on challenging gifted learners as they grow from their current levels of readiness while also promoting preparation for more advanced experiences later in their education and career. This section outlines a few types of strategies that tend to recur in the recommendations for instruction with gifted learners.

Higher-Level Questioning

Questioning is perhaps the most central component of teaching practice. Other than some straight lectures, nearly every teaching strategy involves engaging students with questions from the teacher, a resource, one another, or their own mind. In discussions of practices appropriate for gifted learners, higher-level questioning is almost a default response; perhaps the most common way of thinking about instruction in response to gifted learners is to ask them questions that are more complex, that engage higher levels of thinking, and that push them to respond beyond the level of recalling basic information. The education literature generally demonstrates support for questioning as a central and important part of instruction (Cotton, 1989; Hattie,

2009), and for the use of higher-level questions as a way of fostering deeper learning and engagement (e.g., Soter et al., 2008; Taylor, Pearson, Peterson, & Rodriguez, 2003). For example, several researchers have examined questioning sequences for the effects of higher-level follow-up questions to press student thinking within discussions, demonstrating that students engage in more cognitively active or rigorous roles, and provide more elaborated justifications for their thinking when teachers ask higher-level follow-up questions that go beyond simple recall (Chin, 2006; Gillies, 2011; Soter et al., 2008; Wolf, Crosson, & Resnick, 2005).

Nevertheless, the research continues to demonstrate that, in general, teachers tend to use more lower-level questioning (Coleman, 2006; Taylor et al., 2003; Tienken, Goldberg, & DiRocco, 2009), and limited differentiation occurs in this area for gifted learners (Westberg, Archambault, Dobyns, & Salvin, 1993). A further challenge is the issue of definition in the recommendations made to teachers around higher-level and lower-level questioning, because the terms are often ill defined, and "higher-level" and "lower-level" are not always directly synonymous with characteristics of challenge and quality. These terms are perhaps most often paired with the classifications of objectives in Bloom's Taxonomy (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956), with an assumption that higher levels on the taxonomy mean questions that are harder, and thus more appropriate for gifted learners. On the contrary, the classifications of cognitive processes are not always directly linked to how hard a question might be, and ideally all students should be engaging with thinking at all levels of the taxonomy (Marzano, 2001). Parks (2009) raised cautions about the misuse of Bloom's taxonomy as the basis for classifying questions and activities as higher level or lower level, emphasizing that it is the combination of the type of question, the content, and the way students must engage their thinking that will drive the rigor and challenge of a question versus some easy classification of level. Therefore, questioning as a strategy for supporting gifted learners requires careful planning, the integration of appropriately challenging content, and an implementation context that supports active student engagement with the questions.

Student Discussion

Moving questioning beyond the traditional pattern in which the teacher asks a question, a student responds, the teacher asks another question, and so forth requires attention to how students interact with one another around key questions. Several strategies to promote student discussion around questions and problems have emerged in practice and in the literature, and several of these have received considerable attention within gifted education.

In math, *talk moves* are specific types of interactions and phrases that students are taught to use in engaging in mathematical discourse (Chapin, O'Connor, & Anderson, 2003). Teachers model and reinforce these talk moves, including such acts as repeating another student's comment, agreeing or disagreeing with something that has been stated, and adding on to prior comments. These talk moves formed a key component of several curricular projects focused on promoting advanced and differentiated learning in elementary mathematics, with evidence demonstrating the effectiveness of these approaches in supporting student achievement (Gavin, Casa, Adelson, Carroll, & Sheffield, 2009; Gavin, Casa, Firmender, & Carroll, 2013). Similarly, the framework for *accountable talk* guides teachers in encouraging students to interpret and use one another's statements, press for clarification and explanation, recognize and challenge misconceptions, and ask for evidence for claims and justification of proposals (Fisher & Frey, 2007; Michaels, O'Connor, & Resnick, 2008).

The Socratic seminar is a popular approach to encouraging student discussion, with a focus on engaging students with "big ideas" and essential questions linked to texts or other stimuli (Cuny, 2014; Paul & Elder, 2007). Within a Socratic seminar, the teacher provides some guiding questions and facilitates aspects of the discussion, but most of the responsibility for discussion is placed on students, who follow a set of predetermined norms and procedures to promote a productive conversation. Students encourage one another to explain, support, or elaborate on their points, and their discussion reflects some of the same conversational moves of talk moves and accountable talk. Within

this context, students are developing and sharing personal interpretations and developing understanding of multiple perspectives (Beghetto & Kaufman, 2009). Socratic seminars have been implemented with students across a wide range of abilities and needs, grade levels, and subject areas (Chorzempa & Lapidus, 2009; Koellner-Clark, Stallings, & Hoover, 2002; Le & DeFilippo, 2008), and they remain a staple strategy for working with gifted learners.

In each of these approaches focused on student discussion, the strategy involves having the teacher step back from much of the interaction. Each approach requires initial teaching and modeling, as well as ongoing monitoring and facilitation from the teacher, but the primary responsibility for the discussion interaction falls on the students. This promotes independence, metacognition, and also listening and collaboration for students. These kinds of discussion can be particularly supportive for gifted learners because of the encouragement to develop and discuss complex questions and to consider multiple points of view on ideas and issues.

Concept-Oriented Instruction

Curriculum and instruction organized around key concepts help to promote the kind of depth and complexity in learning that are appropriate for advanced learners. Concept-oriented instruction carries benefits for students across levels of ability and readiness; in comparisons of more traditional, topic-focused versus concept-based instruction, students in the concept groups have tended to perform at least as well as their peers on measures of content learning, as well as to outperform them on measures of conceptual understanding or critical thinking (Chappell & Killpatrick, 2003; Kim, VanTassel-Baska, Bracken, Feng, & Stambaugh, 2014; McCoy & Ketterlin-Geller, 2004). Erickson (2007) highlighted the many skills involved with conceptual thinking, including aspects of seeing patterns and relationships, evaluating understandings based on supportive evidence, and transferring conceptual understanding, sometimes in the effort to solve a problem or create a new product. Rogers (2007) emphasized the importance of whole-to-part concept teaching for gifted learners as part of a larger scope of differentiated instructional delivery,

with emphasis on providing opportunities for gifted learners to work with concepts, principles, issues, and generalizations.

Instructional approaches related to concept learning include focus on concept development or formation, concept mapping, and questioning to emphasize conceptual thinking. Taba (1962) and Seiger-Ehrenberg (2001) emphasized engaging students in a process of concept formation by building from known examples and nonexamples of the concept toward classification and organization of said information in ways that inform deeper understandings about the concept itself. These deeper understandings then guide student interpretation of the specific content within a given subject area (S. A. Gallagher, 2012; Little, 2017).

The value of instructional time devoted to concept learning includes the ways in which it emphasizes addressing misconceptions. Thorough exploration of concepts helps to prevent the development of critical misconceptions within disciplines, particularly when teachers anticipate and plan for how to address these issues (Borko, 2004; S. A. Gallagher, 2012). Coll, France, and Taylor (2005) highlighted the use of models and analogies in science education, emphasizing that for students to develop conceptual understandings accurately and comprehensively, they need to be able to reflect on and discuss these understandings as they are in the process of developing them. Similarly, Barton and Levstik (2004) emphasized the importance of encouraging students to express their understandings of key ideas in history, highlighting several types of misconceptions likely to develop unnoticed by teachers unless students were given opportunities to share their understanding in their own words.

Critical and Creative Thinking Skills

Just as the emphasis on higher-level questioning tends to be almost a default description of what should happen instructionally with gifted learners, so too are emphases on critical and creative thinking skills. Critical and creative thinking skills are also strong emphases in educational reform recommendations for all learners, as central components of 21st century skills, college and career readiness, and other major goals of education today (National

Governors Association & Council of Chief State School Officers, 2010; Partnership for 21st Century Skills, 2011). Once again, the emphasis on critical and creative thinking is not intended exclusively for gifted learners; rather, these areas of focus are necessary for gifted learners and must be engaged at a level of challenge and depth appropriate to their needs.

Countless textbooks and teacher resources offer definitions and suggestions of critical and creative thinking skill categories and applications for classroom use. One question that has long influenced discussions of thinking skills instruction is the degree of explicit versus embedded attention that should be given to these skills, as well as the level of transfer likely to occur from different types of instruction in thinking. Several researchers, over a span of more than 25 years, have highlighted that thinking skills do not necessarily transfer automatically for learners from an isolated thinking skills program to other contexts (Abrami et al. 2008; Perkins & Salomon, 1988). Abrami and colleagues (2008) demonstrated the importance of approaches that combined content-embedded critical thinking with explicit instruction in critical thinking; studies with such combined emphases showed greater effect sizes than approaches that used only embedded critical thinking methods. Swartz and Parks (1994; see also Swartz, 2001) articulated this approach as an infusion of critical and creative thinking skills into content instruction, with explicit skill instruction and application in multiple content areas and contexts.

Recommendations for how to teach and infuse critical and creative thinking include attention to defining the concepts and the specific skills they include. Broadly speaking, critical thinking is reasonable and reflective, and it focuses on deciding what to believe or do in response to a question or problem at issue (Ennis, 1985), whereas creative thinking is "the ability to generate novel and interesting ideas" (Sternberg & Grigorenko, 2007, p. 59). Some of the specific types of skills that are often highlighted for instruction related to one or both include classifying, comparing and contrasting, generating possibilities, creating metaphors, reasoning by analogy, determining cause and effect, making inferences, and making decisions (Burns, Leppien,

et al., 2006; Swartz & Parks, 1994). Critical and creative thinking skills are also integrally tied in with problem solving skills, another common emphasis in recommendations for gifted learners, as well as for learners in general in the current educational context.

Paul (1992) explained that critical thinking is an awareness of the thought processes that we undergo, and that "critical thinkers . . . attempt to heighten their awareness of the conditions under which their self-created conceptualizations—and inferences from them—are rationally justified" (p. 25). Critical thinking includes a strong metacognitive component, with emphasis on developing students' capacity for evaluating thinking and applying the processes in new contexts to build strong conceptualizations and inferences. Case (2005) argued that critical thinking is characterized less by particular mental operations and more by the qualities of thinking applied in context, emphasizing that students may engage in an analysis task without bringing careful judgment to it, or on the other hand might need to bring careful critical thinking to their efforts to comprehend and remember key content. He suggested that teachers should engage students in learning experiences that will help them develop a repertoire of resources including background knowledge, criteria for judgment, critical thinking vocabulary, thinking strategies (e.g., heuristics, models, algorithms relevant to a challenge), and habits of mind. Beghetto and Kaufman (2009) emphasized the value of bringing creative thinking and academic learning together in authentic ways that promote individual interpretation and exploration of multiple perspectives within a focus on academically rigorous content and questions. With regard to teaching strategies, the recommendations from these scholars link to consistent application of specific teaching and learning models and thinking vocabulary in multiple contexts and content areas, with rich resources that promote engagement and individual response at a deep level (VanTassel-Baska & Little, 2011).

Problem-Based Learning

Problem-based learning (PBL) is an approach to curriculum and instruction that engages students with a real-world, ill-structured problem that they must work with and address within a particular time frame and with designated deliverables. PBL is particularly appropriate for gifted learners because of its complexity and space for engaging in the practices of the disciplines at high levels (S. A. Gallagher, 2009). Reflecting some of the critical and creative thinking skills noted previously, students engaged in a PBL context must recognize and define their problem on an ongoing basis (because the problem changes, as real-world problems are wont to do). They must bring their background knowledge and newly developing content knowledge to bear on the problem, and they must explore varied perspectives, test ideas and hypotheses, and make decisions around the problem and its context.

PBL was originally developed in higher education contexts, but it has been applied to content learning in K–12. Researchers have demonstrated gains for students in content learning, as well as in relevant process skills from engaging in PBL in social studies and science (S. A. Gallagher, 2009; S. A. Gallagher & Stepien, 1996; VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998). Some of the key benefits of PBL, in addition to the achievement gains, include the initiative and independence students must develop as the teacher facilitates but guides the students to lead the approach to the problem.

Independent Study

The pursuit of independent research around topics and questions of interest has a long history in gifted education. Independent study reflects recognition of several key characteristics of the population, including high levels of content understanding and intensive focus on topics of interest. Independent study approaches also offer opportunities to promote development of independent initiative and metacognition, greater depth within a content area, and engagement with authentic audiences. Specific models and recommendations for effective independent study focus on several key elements: problems or questions that are authentic to the disciplines and require development of disciplinary skills; real-world focus beyond the classroom setting; teacher facilitation; and focus on student interest (Johnsen & Goree, 2009; Renzulli, 1977; Renzulli & Reis,

1997; Rogers, 2007). For example, the enrichment triad model (Renzulli, 1977) incorporates independent investigations as the third of three types of enrichment, following on exposure to varied topics and problems of interest and the development of skills that will support independent investigations.

Johnsen and Goree (2009) outlined some of the instructional components that underscore successful independent study efforts, including identification and instruction in needed skills, flexibility to respond to shifts in students' interests within the overall project, and guidance around varied types of research. They also emphasized the need to allocate time for independent study activities, which may in many cases be "bought" through curriculum compacting (Reis & Purcell, 1993; Renzulli & Reis, 1997). Another aspect of independent study is ensuring that students have access to the expertise they need; sometimes this expertise can come from the classroom teacher or other teachers within a building, but other times students may need to go beyond the school context for support. Mentorships are another approach to supporting independent or small group pursuit of high-level research projects. Often, particularly as gifted students reach higher grade levels, the level of their questions and interests may go beyond what is offered at their own school level, and opportunities to engage with mentors who are experts in their disciplines may support independent study efforts and promote ongoing academic relationships around shared interests.

FUTURE CONSIDERATIONS AND DIRECTIONS

The literature is full of recommendations for strategies and approaches to use in working with gifted learners. However, the research supporting some of these recommendations is sparse, and may or may not specify direct evidence of effectiveness with gifted learners. As noted, many of the strategies outlined here are useful and likely effective approaches with a wide range of learners; further research to support the strategies overall and to articulate the most important features of them with the gifted population would benefit the field. In addition, several scholars have called for greater attention in the research to linking instructional strategies more clearly to student outcomes (Hunsaker et al., 2010) and to emphasizing documentation of fidelity of implementation in studies of curriculum implementation and instructional practice (Callahan, Moon, Oh, Azano, & Hailey, 2015). Additional research to explore linkages among professional development approaches, classroom implementation, and student outcomes would also inform the field regarding the best approaches for helping teachers to implement strategies effectively.

Additional research on teacher preparation for and use of instructional strategies, as well as the influence of these strategies on student learning, can strengthen the literature base and provide greater supports for teachers and those who work with them. Such additional research can also shed light on the nuances of teaching strategies to promote greater understanding of their complexity in application. As Marzano (2009) emphasized, it is a mistake to expect that particular strategies will always work or to limit oneself as a teacher to a narrow range of instructional strategies. Teaching strategies best support the educational experiences of gifted students when they are carefully selected with an eye to their integration with the program goals, the curriculum, the assessment evidence, and the essential qualities that are most responsive to the needs and capabilities of the learners in the classroom.

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